SORTIE1 Final Radiometric Data Report
Document Number: WET-DN-00509
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1.1 Reference Documents

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[1] Profiler II Operational Manual, SAT-DN-00223, 2003-09-19.

[2] Operation Manual for the HyperOCR, SAT-DN-00249, 2004-06-30.

[3] ProSoft User Manual 7.7, SAT-DN-00228, Rev C.

[4] SatCon Data Conversion Program User Guide, SAT-DN-00029, Ver 1.4.

[5] SatView Data Logging/Display Program User Guide, SAT-DN-00028, Ver 2.8.

[6] Zibordi, G., and B. Bulgarelli (2007), Effects of cosine error in irradiance measurements from Field ocean color radiometers, submitted to Applied Optics.

[7] Zibordi, G., D. D'Alimonte, and J-F. Bulgarelli (2004), An evaluation of depth resolution requirements for optical profiling in coastal waters, JOAT, July 2004, 1059-1070.

[8] Thuillier, G., M. Herse, P. Simon, D. Labs, H. Mandel, D. Gillotay, and T. Foujols (2003), The solar spectral irradiance from 200 to 2400nm as measured by the SOLSPEC spectrometer from the ATLAS 1-2-3 and EURECA missions, Solar Physics, 214, 1-22.

[10] Hooker, S., S. McLean, J. Sherman, M. Small, G. Lazin, G. Zibordi, J. Brown (1999), The seventh SeaWiFS intercalibration round robin experiment (SIRREX-7), NASA Technical Memorandum 2002-206892, Vol 17, SeaWiFS Postlaunch Technical Report Series, 74pp.

[11] Brown, S., B.C. Johnson (2003), Stray light correction algorithm for spectrographs, Metrologia, 40, S81-83.

[12] Brown, S., G. Eppeldauer, J. Rice, J. Zhang, and K. Lykke (2004), Spectral Irradiance and Responsivity Calibrations using Uniform Sources (SIRCUS) facility at NIST, Proc. SPIE 5542, 363.

[13] In Water Radiometric Profiling Data Collection Standard Operating Procedure for SORTIE, WET-DN-00419, 2007-02-23.

[14] SORTIE Operational Plan, WET-DN-00420, Rev F, 2007-02-27.

[15] HyperOCR Spectral Characterization for SORTIE (HPL180, HPE191, HSE192), WET-DN-00452, Rev A, 2007-08-30.

[16] HyperOCR Thermal Responsivity Characterization for SORTIE (HPL180, HPE191, HSE192), WET-DN-00453, Rev A, 2007-08-30.

[17] HyperOCR Spatial Characterization for SORTIE (HPL180), WET-DN-00454, Rev A, 2007-08-30.

[18] HyperOCR Spatial Characterization for SORTIE (HPE191, HSE192), WET-DN-00455, Rev A, 2007-08-30.

[19] HyperOCR Immersion Characterization for SORTIE (HPE191), WET-DN-00456, Rev A, 2007-08-30.

[20] Trees, C. (2005), Spectral Ocean Radiance Transfer Investigation and Experiment, Unsolicited proposal to NASA Ocean Biology and Biogeochemistry Program, Center for Hydro-Optics and Remote Sensing, San Diego State University, 2005-08-29.

[21] Zibordi, S., D. D'Alimonte, D. van der Linde, J.F. Berthon, S. Hooker, J. Mueller, G. Lazin, S. McLean (2002), The eighth SeaWiFS intercalibration round robin experiment (SIRREX-8), NASA Technical Memorandum 2002-206892, Vol 21, SeaWiFS Postlaunch Technical Report Series, 39pp.

[22] HyperOCR Spectral Calibration Procedure for SORTIE, WET-DN-00448, Rev A, 2007-08-30.

[23] HyperOCR Thermal Response Characterization Procedure for SORTIE, WET-DN-00449, Rev A, 2007-08-30.

[24] HyperOCR Spatial Characterization Procedure for SORTIE, WET-DN-00450, Rev A, 2007-08-30.

[25] HyperOCR Immersion Characterization Procedure for SORTIE, WET-DN-00451, Rev A, 2007-08-30.

[26] Mueller, J., R. Austin, A. Morel, G. Fargion, and C. McClain, Ocean Optics Protocols for Satellite Ocean Color Sensor Validation, Revision 4, Volume 1: Introduction, Background and Conventions, NASA-TM-2003-21621/Rev4-Vol I, Jan 2003, 50pp.

[27] Mueller, J., C. Pietras, S. Hooker, R. Austin, M. Miller, K. Knobelspiesse, R. Frouin, B. Holben, and K. Voss, Ocean Optics Protocols for Satellite Ocean Color Sensor Validation, Revision 4, Volume 2: Instrument Specifications, Characterization, and Calibration, NASA-TM-2003-21621/Rev4-Vol II, Jan 2003, 57pp.

[28] Mueller, J., A. Morel, R. Frouin, C. Davis, R. Arnone, K. Carder, Z.P. Lee, R. Stewart, S. Hooker, C. Mobley, S. McLean, B. Holben, M. Miller, C. Pietras, K. Knobelspiesse, G. Fargion, J. Porter, and K. Voss, Ocean Optics Protocols for Satellite Ocean Color Sensor Validation, Revision 4, Volume 3: Radiometric Measurements and Data Analysis Protocols, NASA-TM-2003-21621/Rev4-Vol III, Jan 2003, 78pp.

[29] Mueller, J., A. Morel, R. Frouin, C. Davis, R. Arnone, K. Carder, Z.P. Lee, R. Stewart, S. Hooker, C. Mobley, S. McLean, B. Holben, M. Miller, C. Pietras, K. Knobelspiesse, G. Fargion, J. Porter, and K. Voss, Ocean Optics Protocols for Satellite Ocean Color Sensor Validation, Revision 4, Volume 4: Radiometric Measurements and Data Analysis Protocols, NASA-TM-2003-21621/Rev4-Vol IV, Jan 2003, 78pp.

[30] Mueller, J., D. Clark, V. Kuwahara, G. Lazin, S. Brown, G. Fargion, M. Yarborough, M. Feinholz, S. Flora, W. Broenkow, Y.S. Kim, C. Johnson, M. Yuen, P. Strutton, T. Dickey, M. Abbott, R. Letelier, M. Lewis, S. McLean, F. Chavez, A. Barnard, R. Morrison, A. Subramanian, D. Manov, X. Zheng, L. Harding, R. Barnes, and K. Lykke, Ocean Optics Protocols for Satellite Ocean Color Sensor Validation, Revision 4, Volume 6: Special Topics in Ocean Optics Protocols and Appendices, NASA-TM-2003-21621/Rev4-Vol VI, Apr 2003, 141pp.

[31] Satlantic Instrument File Standard, Data Format Standard for Calibration and Telemetry Definition Files, Version 6 (5), May 2000.

[32] HyperOCR Spectral Characterization for SORTIE (HPL191, HPE235, HSE266), WET-DN-00472, Rev A, 2007-08-30.

[33] HyperOCR Thermal Responsivity Characterization for SORTIE (HPL191, HPE235, HSE266), WET-DN-00473, Rev A, 2007-08-30.

[34] HyperOCR Spatial Characterization for SORTIE (HPL191), WET-DN-00474, Rev A, 2007-08-30.

[35] HyperOCR Spatial Characterization for SORTIE (HPE235, HSE266), WET-DN-00475, Rev A, 2007-08-30.

[36] HyperOCR Immersion Characterization for SORTIE (HPE235), WET-DN-00476, Rev A, 2007-08-30.

[37] Morel, A., and S. Maritorena (2001), Bio-optical properties of oceanic waters: A reappraisal, Journal of Geophysical Research, 106(C4), 7163-7180.

[38] SORTIE1 Lab Intercomparison Data Report, WET-DN-00519, Rev A, 2008-06-01.

1.2 Symbols and Abbreviations

Symbol	Description	Units
AOP	Apparent Optical Property	
$E(\lambda)$	Instrument measured irradiance	$\mu W\ cm^{-2}\ nm^{-1}$
$E_d(\lambda)$	Downwelling spectral irradiance below the sea-surface	$\mu W\ cm^{-2}\ nm^{-1}$
$E_s(\lambda)$	Downwelling spectral irradiance above the sea-surface	$\mu W\ cm^{-2}\ nm^{-1}$
$E_{s\ diff}(\lambda)$	Downwelling spectral irradiance above the sea-surface	$\mu W\ cm^{-2}\ nm^{-1}$
$E_v(\lambda)$	Upwelling spectral irradiance measured near the sea surface	$\mu W\ cm^{-2}\ nm^{-1}$
$E_{lamp}(\lambda)$	Spectral irradiance of standard lamp at a specified distance	$\mu W\ cm^{-2}\ nm^{-1}$
F1(λ)	Reduction in Field of View due to differences in refractive index	dimensionless
F2(λ)	Immersion reflectance changes at window - water interface	dimensionless
Imm(λ)	Total spectral immersion effects	dimensionless
IOP	Inherent Optical Property	
$L(\lambda)$	Instrument measured radiance	$\mu W\ cm^{-2}\ nm^{-1}\ sr^{-1}$
$L_u(\lambda)$	Upwelling spectral radiance below the sea-surface	$\mu W\ cm^{-2}\ nm^{-1}\ sr^{-1}$
$L_s(\lambda)$	Upwelling spectral radiance measured near the sea surface	$\mu W\ cm^{-2}\ nm^{-1}\ sr^{-1}$
$L_w(\lambda)$	Upwelling spectral radiance just above the sea-surface	$\mu W\ cm^{-2}\ nm^{-1}\ sr^{-1}$
$L_{wn}(\lambda)$	Normalized water leaving radiance	$\mu W\ cm^{-2}\ nm^{-1}\ sr^{-1}$
$L^{ex}_{wn}(\lambda)$	Exact Normalized water leaving radiance	$\mu W\ cm^{-2}\ nm^{-1}\ sr^{-1}$
$L_T(\lambda))$	Target Radiance	$\mu W\ cm^{-2}\ nm^{-1}\ sr^{-1}$
MOBY	Marine Optical BuoY	
$\eta_g(\lambda)$	Relative spectral index of refraction of optical window	dimensionless
$\eta_W(\lambda)$	Relative spectral index of refraction of water	dimensionless
NASA	National Aeronautics and Space Administration	
NIST	National Institute of Standards and Technology	
$\rho(\lambda)$	Spectral reflectance of standard target	dimensionless
Q(λ)	Q factor	sr
R_{rs}	Remote Sensing Reflectance	sr^{-1}
SORTIE	Spectral Ocean Radiance Transfer Investigation and Experiment	

2 Introduction

2.1 Scope

This document summarizes scientific investigations carried out by WETSAT Inc. under contract to the Center for Hydro-Optics and Remote Sensing (CHORS) at San Diego State University (SDSU) for the Spectral Ocean Radiance Transfer Investigation and Experiment (SORTIE) [RD20] in February and March of 2007, referred to as SORTIE-1.

2.2 Background and Rationale

Ocean color measurements from space, whether they are from polar orbiting or geostationary platforms, require similar calibration and validation efforts. An extensive pre-launch sensor characterization is critical for all ocean color missions and should include response versus scan angle, polarization sensitivity, stray light contamination and ray-trace modeling and validation among others. Because of changes and uncertainties in the sensor and its optical alignment after launch any pre-launch calibration provides only a starting point for the follow-on post-launch vicarious calibration and characterization (VC^2). After launch, there are other *in situ* match up measurements that are required to validate and diagnose systematic artifacts in both atmospheric aerosol models and ocean BRDF models.

The Marine Optical BuoY (MOBY) has been the quintessential vicarious calibration platform for over a decade with its radiometric data being used by a variety of national and international researchers and federal agencies to improve ocean color data retrievals. The MOBY site off Lanai Island, Hawaii, was selected based on convenience for routine servicing and reduced atmospheric and in-water radiometric variability. Maintenance of the MOBY site has been labor intensive and relatively expensive, providing only a single, highly calibrated point for vicarious calibration.

It is now important to consider additional VC^2 facilities and sites that augment a single-site MOBY-like facility, to cover the ranges of variability in oceanic and atmospheric conditions required for comprehensive calibration, characterizations and validations of the satellite measurement/model system. These facilities may be based on different deployment platform concepts and strategies than those used at MOBY, possibly including towers or vessel-based sortie surveys to measure *in situ* time-series of water-leaving radiances. A VC^2 facility must address and demonstrate the following criteria:

1. Alternative instrumentation and measurement methods must be experimentally validated by directly comparing derived exact, normalized water-leaving radiance, $L^{ex}_{wn}(\lambda)$, with results of concurrent measurements using MOBY instruments and methods at a common site. The comparison site might be the MOBY site, or another site with suitable bio-optical and atmospheric conditions.

2. A second level of site-to-site comparability must be demonstrated through direct comparisons of mean $L^{ex}_{wn}(\lambda)$ bias and random uncertainties (ie. Type-A Standard Uncertainty, National Institute of Standards and Technology (NIST)) with concurrent satellite sensor VC^2 experiments at MOBY and the proposed site. Comparative experiments must take into account systematic differences in spectral out-of-band responses to account for contrasts in water-leaving radiance spectra and atmospheric conditions at the two site locations.

3. Protocols are needed for screening measurements used to compute uncertainties and must carefully specify the criteria used to remove each type of data from the analysis. In an experimental analysis of an ensemble of differences between satellite and *in situ* determinations of water-leaving radiance pairs, the satellite and *in situ* data must be filtered separately and in the blind, and a pair removed if either does not pass its independent criteria.

The SORTIE project proposes a series of experiments to demonstrate that by combining hyperspectral apparent optical property (AOP) and hyperspectral inherent optical property (IOP) measurements in oligotrophic and coastal areas, with state-of-the-art radiative transfer modeling; substantial improvements can be made in the uncertainty associated with VC^2 of ocean color sensors.

To meet these objectives, the Satlantic HyperPro II hyperspectral radiometer has been selected as a portable radiometer of similar low radiometric uncertainty as that demonstrated for MOBY. Stray light characterizations of the HyperPro II have been performed at the NIST Spectral Irradiance and Responsivity Calibrations using Uniform Sources (SIRCUS) [RD11, 12] facility in 2005, 2006, and 2008. In addition, rigorous characterization and calibration protocols have been used for the SORTIE radiometers. This included immersion factor measurement [RD19], spectral calibration [RD15], thermal responsivity characterization [RD16], spatial characterization [RD17,18], and stray light characterization, in addition to calibration using a NIST scale standard lamp. These instruments are used to generate $L_w(\lambda)$ and $L_{wn}(\lambda)$ data products for the SORTIE Team.

2.3 SORTIE1 Mission Overview

In SORTIE1 the HyperPro II was compared against the MOBY system, both in the lab and *in situ* at the MOBY field site in Hawaii from 23 February to 13 March, 2007. MOBY field operations were conducted on the R/V Ka'imikai-O-Kanaloa (KOK) during a MOBY swap operation (SORTIE1-KOK / MOBY L143). Additional small boat operations were conducted without MOBY on the R/V Klaus Wyrtki (KW) (SORTIE1-KW).

Lab comparisons took place in the NOAA MOBY shore facility at Snug Harbor, Oahu. Lab comparisons used NIST provided radiance (OL420) and irradiance sources (FELs) verified by the NIST Visible Transfer Radiometer (VXR). These lab data will be summarized in [RD38].

In situ comparisons took place during a MOBY swap operation 01 to 05 March at the MOBY field site off Lanai. MOBY B236 was removed and the newly refurbished and calibrated MOBY B237 was deployed.

Small boat operations were conducted off the coast of Oahu in Mamala Bay to investigate the increased uncertainties of small boat operations. It was initially hoped to also make comparative measurements with the MOBY MOS ROV but the system was not available during this time period due to factory delays in ROV repairs.

The operational plan for SORTIE1-KOK and SORTIE1-KW is detailed in [RD14]. The standard operating procedures for the HyperPro II systems for SORTIE is documented in [RD13].

The WETSAT contract for the project began in January of 2007, so full characterization of the radiometer systems and subsequent modifications to the SORTIE data processor did not occur until after SORTIE1.

3 SORTIE Radiometric Profiler (HyperPro II) System

The HyperPro II is a hyperspectral profiling radiometer system, which can be converted to operate in both profiler and surface buoy mode. The HyperPro II data is accompanied by in-air surface irradiance (Es) reference measurements obtained from a HyperOCR hyperspectral irradiance sensor. The HyperPro II system typically has 138 surface irradiance channels, 138 downwelling irradiance channels and 138 upwelling radiance channels ranging from 350 to 800nm. For SORTIE, the HyperPro II system reports the full 255 channels from 300-1100nm for stray light corrections, but only channels from 350-900nm (which are calibrated to a NIST scale) can be processed to radiometric units. The HyperPro II also uses optical shutters for dark readings during deployment. Variable and adaptive integration times are used for all spectrometers and the values for these integration times are included in the telemetry.

Optical Specifications:	**HyperOCR**	
Spectral range	HyperPro: 350-800nm	
Entrance slit	70 x 2500μm	
Detector type	256 channel Silicon photodiode array	
Pixel size	25 x 2500μm	
Spectral sampling	3.3nm/pixel	
Spectral resolution	10nm (3 pixel slit image)	
Spectral accuracy	0.3nm	
Stray light	$< 1x10^{-3}$	
Field of view	Irradiance	Cosine corrected single collector
	Radiance	8.5° half angle baffled Gershun tube
Electrical specifications:	**HyperOCR**	
Acquisition module	16 bit ADC	
Digital resolution	16 bits	
Frame rate	0.5 Hz	
Data rate	57.6 kbps	
Data format	Binary	
Data interface	RS-422 / RS-232	
Power	18-72 VDC at 3 Watts	
Telemetry options	Real time	
Physical specifications:	**HyperOCR**	
Size	6 cm diameter x 32cm long (sensor length)	
Weight	1.07 kg	
Operating temp. range	-10°C to +50°C	
Absolute maximum spectrometer storage temperature range	-40°C to +60°C	

Table 1. HyperPro II HyperOCR Radiometers Specifications

In descriptions of SORTIE data the instruments used are referred to by system they are part of or by their type and serial number as shown in Table 2 below:

AOP Instrument	Measurement	System
HPL191	Upwelling radiance (on HyperPro)	HyperPro MPR012 (system "A")
HPE235	Upwelling or downwelling irradiance (on HyperPro)	HyperPro MPR012 (system "A")
HSE266	Incident irradiance (surface reference)	Reference HSE266 (system "A")
HPL180	Upwelling radiance (on HyperPro)	HyperPro MPR071 (system "B")
HPE191	Upwelling or downwelling irradiance (on HyperPro)	HyperPro MPR071 (system "B")
HSE192	Incident irradiance (surface reference)	Reference HSE192 (system "B")

Table 2 - AOP Instrument Identifier Descriptions

3.1 HyperPro II – profiler mode

In profiler mode, the HyperPro II free-falls through the water column, providing a profile of spectral upwelling radiance ($L_u(\lambda)$) using a HyperOCR (sensor code HPL) and downwelling irradiance (Ed(λ)) using a HyperOCR (sensor code HPE). Coincident above water measurements of the surface downwelling irradiance ($E_s(\lambda)$) are also made by a HyperOCR (sensor code HSE) mounted to the ship. These measurements provide data for the computation of key quantities needed to characterize the underwater light field, such as profiles of reflectance, attenuation coefficients, spectral water-leaving radiance, and remote sensing reflectance.

3.2 Profiler Mode Configuration for SORTIE

Two HyperPro systems were used for SORTIE1, MPR012 (Dalhousie University) and MPR071 (CHORS/SDSU). For SORTIE1 MPR012 was always be configured for profiling mode. MPR071 was configured for both profiling and surface buoy mode (see section 5.3). For both

systems the $E_d(\lambda)/L_u(\lambda)$ offset is 31.5cm (E_d to top of clamp 11.5cm, L_u to top of clamp 20.0cm). It is important to set these distances correctly for data processing, particularly in coastal waters.

Figure 1 - HyperPro II system configured for profiling

For HyperPro II profiler mode when configured as described in the standard operating procedures [RD13], the sensor distances are as follows:

E_d to surface 0.000m
L_u to surface 0.315m
E_d to pressure 0.868m
L_u to pressure 0.553m

For data processing in ProSoft the sensor distances must be set in the processing configuration (described in Appendix A). For profiler mode, the distances to surface need be set as in the tables below. Both pressure tare modes were used in SORTIE1. For future experiments, on deck tare only is recommended as this reduces zero depth uncertainty.

In Water Pressure Tare

	E_d	L_u
Distance to Surface	0	0.315
Distance to Pressure	0.868 (use zero in ProSoft)	0.553 (use zero in ProSoft)

On Deck Pressure Tare

	E_d	L_u
Distance to Surface	0	0.315
Distance to Pressure	0.868	0.553 (use zero in ProSoft)

Table 3. Pressure Tare Values for HyperPro in Profiler Mode

3.3 HyperPro II – surface buoy mode

The HyperPro II can also be operated in buoy mode to obtain upwelling radiance and irradiances near the surface at subwave period sampling rates, away from vessel perturbations in the optical light field. The HyperPro II irradiance sensor is inverted and placed at the same depth as the L_u radiance sensor to measure upwelling irradiance, $E_v(\lambda)$, near the surface. Coincident above water measurements of the surface downwelling irradiance ($E_s(\lambda)$) are also made by a HyperOCR (sensor code HSE) mounted to the ship. These measurements provide data for the computation of key quantities needed to characterize the near surface light field, such as reflectance, attenuation coefficients (modeled), spectral water-leaving radiance,remote sensing reflectance and Q factor.

3.4 Surface Buoy Mode Configuration for SORTIE

While on station and other operations are underway (ie ROV MOS, CTD, etc) surface $L_u(\lambda)$ and $E_v(\lambda)$ measurements may be taken using the HyperPro II in surface buoy mode (see Fig 2). To switch the profiler into this configuration, the $E_d(\lambda)$ sensor is inverted to measure $E_v(\lambda)$. The sensor is placed so that the E_v / L_u offset is 0.0cm ($E_v(\lambda)$ to bottom of clamp 14.5cm). It is important to set these distances correctly for data processing, particularly in coastal waters.

For SORTIE1 only MPR071 was be deployed in this manner.

Figure 2 - HyperPro II system configured for surface buoy mode

For HyperPro II surface buoy mode when configured as described in the standard operating procedures [RD13], the sensor distances are as follows:

E_v to surface 0.200m
L_u to surface 0.200m
E_v to pressure 0.553m
L_u to pressure 0.553m

For data processing in ProSoft the sensor distances must be set in the processing configuration (described in the Appendices). For surface mode, only the distance to surface need be set as in the tables below. Both pressure tare modes were used in SORTIE1. For future experiments, on deck tare only is recommended.

In Water Pressure Tare

	E_d	L_u
Distance to Surface	0.200	0.200
Distance to Pressure	0.553 (use zero in ProSoft	0.553 (use zero in ProSoft)

On Deck Pressure Tare

	E_d	L_u
Distance to Surface	0.200	0.200
Distance to Pressure	0.553	0.553 (use zero in ProSoft)

Table 4. Pressure Tare Values for HyperPro in Surface Mode

3.5 Global/Diffuse Measurements

Global/diffuse measurements were taken to enable estimation of self shading corrections and for cosine corrections. To collect this data, two E_s sensors are used, one measures the total irradiance as usual, while the other Es sensor has the direct beam of the sun blocked (similar to as shown in Fig 3) using an occultor.

Figure 3 - Collecting diffuse irradiance data

4 Radiometric Calibration and Characterization

4.1 Characterization

The SORTIE instruments have been characterized according to the detailed community consensus of measurements and protocols embodied in the NASA Ocean Optics Protocols [RD26,27,28.29.30], augmented with advances made by Satlantic in conjunction with NASA and NIST.

Spectral Range

The spectral range for SORTIE is determined using the NIST scale on the primary calibration lamp used, F409, which is 350-900nm. A reduced wavelength range of 350-700nm has been used for data processing for SORTIE to retrieve high quality Lwn data.

Spectral Resolution

The spectral resolution for each radiometer was measured per [RD22] and detailed results are available in [RD15, 32]. The nominal spectral resolution is 9nm.

Spectral Accuracy

The spectral accuracy is determined to within ± 0.1nm by calibrating the radiometers with spectral line lamps as detailed in [RD22]. Calibrated radiometer wavelengths (documented in [RD15, 32]) are incorporated into SORTIE calibration files.

Field of View

Field of view of the radiance sensor is determined by placing the instrument in a stepper motor controlled rotation table, and performing a rotation about the entrance optics center of rotation in a collimated light beam as detailed in [RD24]. SORTIE radiance sensors have a Full Width Half Maximum (FWHM) field of view of approximately 9.6 degrees in air (approximately 7 degrees in water) [RD17, 34].

Cosine Response

The cosine response of the radiance sensor is determined by placing the instrument in a stepper motor controlled rotation table, and performing a rotation about the entrance optics center of rotation in a collimated light beam as detailed in [RD24]. The acceptable range of response is within 3% from 0 to 60 degrees, and 10% from 60 to 85 degrees of the perfect cosine response to angle of incidence. Measurement results are summarized in [RD18, 35].

Thermal Response

The thermal response of the dark current is compensated for by using a shutter that measures the dark current every 6 frames. The thermal responsivity effects are compensated by correction factors determined by characterizing the changes in response with temperature while the radiometer views a stable source as detailed in [RD23]. Thermal responsivity coefficients are incorporated into the calibration files for SORTIE as per experimental results summarized in [RD16, 33].

Immersion Effects (Radiance)

Due to the difference in indices of refraction between air (where the instrument is characterized and calibrated) and water (where it is operated), a correction factor must be applied to obtain the effective in water radiances. This correction factor is referred to as the immersion factor. There are two effects contributing. First, the reduction in solid angle viewed by the sensors effectively reduces the amount of flux into the sensor. This correction is given by F1:

$$F1(\lambda) = (\eta_W(\lambda))^2$$

where η_W is the index of refraction of water.

To correct for the calibration values in air, the in-water values are multiplied by the effective loss of viewing area in water (F1).

The second effect is due to the change in index of refraction at the glass/air (glass/water) interface. This correction is given by F2:

$$F2(\lambda) = (\eta_w(\lambda) + \eta_g(\lambda))^2 / ((\eta_w(\lambda) \cdot (1 + \eta_g(\lambda))^2)$$

where η_g is the index of refraction of the window.

Since the indices of refraction of water and glass are better matched, there are less reflection losses at the window. The immersion factor thus increases the in-water values to correct for this effect.

The total immersion effect is then:

$$Imm(\lambda) = F1(\lambda) \cdot F2(\lambda)$$

Thus the correction for actual in-water radiance values is:

$$L_{wl}(\lambda) = L(\lambda) \cdot \mathrm{Imm}(\lambda)$$

Immersion Effects (Irradiance)

Irradiance immersion factors for in water irradiance sensors for SORTIE are measured using procedures documented in [RD21, 25]. Results are summarized in [RD19, 36] and are incorporated into SORTIE radiometer calibration files.

4.2 Calibration

Each instrument is calibrated according to procedures detailed in [RD10]. Documented uncertainties for the Satlantic calibration lab are 2.7% for radiance and 2.3% for irradiance [RD10]. A NIST standard lamp, F409, is used for all radiometer calibrations for SORTIE.

Absolute Radiometric Calibration, Radiance

Absolute radiometric radiance calibration is performed with a calibrated 1000W FEL lamp on a 5m optical bar using the 'plaque method'. The lamp is powered by an Optronics 83A current source. The flux from the lamp is normally incident on a 50cm diffuse reflectance target standard at a distance of *D* cm. The instrument views the target at an angle of 45.0° such that the field of view of all the sensors is completely covered by the target. The calibration radiances are determined using:

$$L(\lambda) = (E_{lamp}(\lambda, 50\text{cm}) / \pi) * (50.0 \text{ cm} / D \text{ cm})^2 * \rho(\lambda)$$

where:

$L(\lambda)$ is the calibration radiance

$E_{lamp}(\lambda, 50\text{cm})$ is the lamp standard spectral irradiance at 50cm

$(50.0 \text{ cm} / D \text{ cm})^2$ is the $1/r^2$ distance

$\rho(\lambda)$ is the target 0/45 standard reflectance

Reflection Target: (Labsphere, calibration traceable to NIST)

Standard Lamp: (for SORTIE, NIST standard lamp)

Absolute Radiometric Calibration, Irradiance

Absolute radiometric irradiance calibration is done using a calibrated 1000W FEL on a 5m optical bar using direct radiation from the lamp. The lamp is powered by an Optronics 83A current source. The flux from the lamp is normally incident on the irradiance sensor cosine

collector at a distance of 50cm. The calibration irradiances are determined using the following equation :

$$E(\lambda) = E_{lamp}(\lambda, 50cm)$$

where:

E(λ) is the calibration irradiance

E(λ, 50 cm) is the lamp calibration at 50 cm

Standard Lamp: (for SORTIE, NIST standard lamp)

All SORTIE radiometers were calibrated at Satlantic facilities using procedures documented in the SIRREX-7 Technical Memorandum [RD10]. Calibrations were be done with a NIST calibrated FEL lamp F409N [RD10] and 50cm plaque standard T26466H with a 0/45 reflectance calibration. The radiometers report the full 255 channels from 300-1150nm for stray light corrections, but the NIST scale calibrations are valid only from 350-900nm. F409 also has an Optronics scale, F409B, valid from 300-1200nm which was used for initial data processing. A comparison for the Optronics F409B and NIST F409N scales is shown for the overlapping range of 350-900nm in Figure 3. The NIST calibration reported here was dated 1996-07-21 and is based on the NIST ITS-90 Scale.

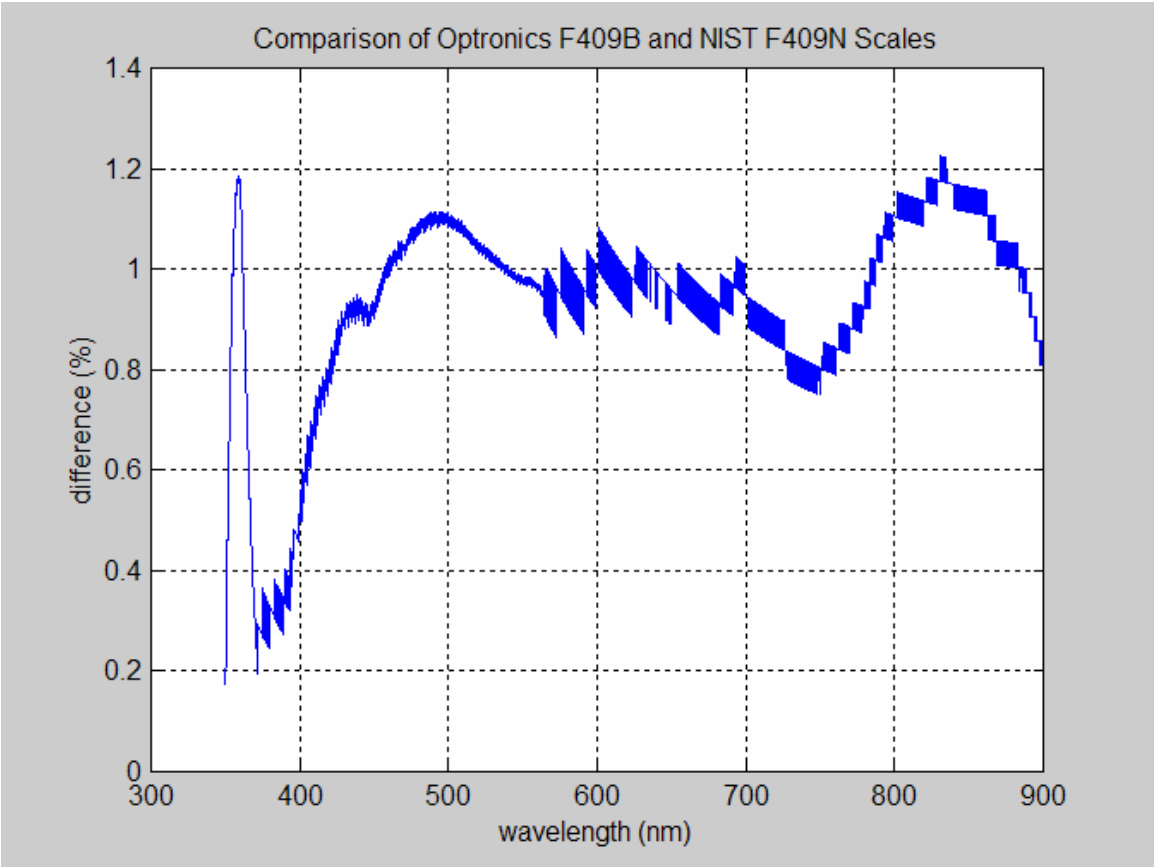


Figure 4 - F409 NIST vs Optronics Irradiance Scale Comparison

F409 was recalibrated by NIST in 2008-04-18. This scale is not used for SORTIE-1 data, but the recalibration shows a less than 1% offset (see Figure 5). This also represents a scale shift between the NIST 2000 Spectral Irradiance Scale and the NIST 1990 Spectral Irradiance Scale.

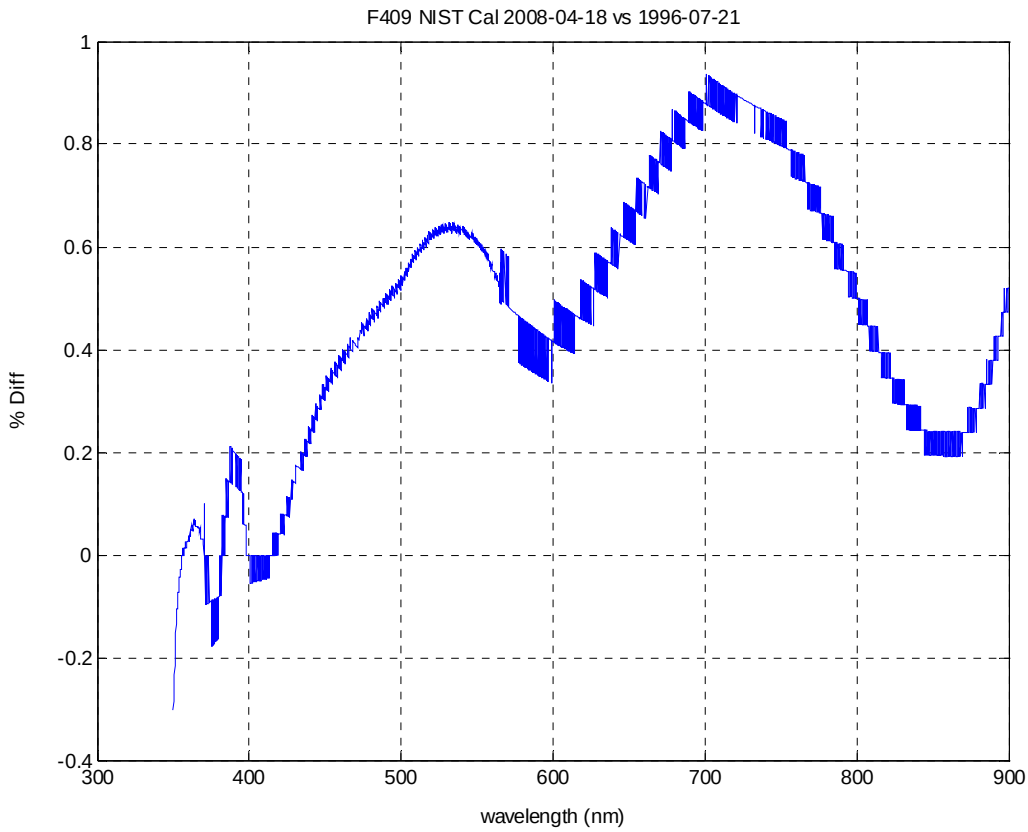


Figure 5 - Recalibration of NIST Lamp F409 in 2008

Final data processing uses a combination of the two files to allow the full radiometer output of 300-1150nm for stray light correction (at the digital counts level). Final results are only produced for the NIST scale region of 350-900nm.

For experiments SORTIE-1-KOK and SORTIE-1-KW the pre mission calibrations are “E” (HPL180, HPE191, and HSE192), “D” (HPL191 and HPE235), “B” (HSE266) series .CAL files. These have been reprocessed to add the calibrated wavelengths [RD15, 32], thermal responsivity corrections [RD16, 33], and measured immersion factors for these specific instruments [RD19, 36]. These updated .CAL files are designated “EX” (HPL180, HPE191, and HSE192), “DX” (HPL191 and HPE235), and ‘BX” (HSE266).

The cal files are also stray light corrected using NIST SIRCUS [RD11, RD12] correction matrices provided by NIST in 2005 for HPL180, HPE191 and HSE192 and in 2008 for HPL191, HPE235, and HSE266. These updated .CAL files, designated “ES” (HPL180, HPE191, and HSE192), “DS” (HPL191 and HPE235), and “BS” (HSE266), have been used to process all SORTIE-1 data from 2007.

Calibration File	Cal Type	Date
HPL180ES.CAL / PLD180ES.CAL	Radiance $L_u(\lambda)$	2007-02-02 (calibration) 2007-07-28 (update)
HPL191DS.CAL / PLD191DS.CAL	Radiance $L_u(\lambda)$	2007-02-02 (calibration) 2008-03-24 (update)
HPE191ES.CAL / PED191ES.CAL	Irradiance $E_d(\lambda)$	2007-02-12 (calibration) 2007-07-28 (update)
HPE191ES_Eu.CAL / PED191ES_Eu.CAL	Irradiance $E_v(\lambda)$	2007-02-12 (calibration) 2007-07-28 (update)
HPE235DS.CAL / PED235DS.CAL	Irradiance $E_d(\lambda)$	2007-02-12 (calibration) 2008-03-24 (update)
HPE235DS_Eu.CAL / PED235DS_Eu.CAL	Irradiance $E_v(\lambda)$	2007-02-12 (calibration) 2008-03-24 (update)
HSE192ES.CAL / HED192ES.CAL	Irradiance $E_s(\lambda)$	2007-02-12 (calibration) 2007-07-28 (update)
HSE266BS.CAL / HED266BS.CAL	Irradiance $E_s(\lambda)$	2007-02-12 (calibration) 2007-03-24 (update)

Table 5 - AOP Instrument Calibration Files for SORTIE1

Note PLD, PED and HED files are calibrated shutter dark files and contain the same calibration data with a different frame header for data processing purposes only. Also the _Eu calibration data is the same information as the $E_d(\lambda)$ calibration files with a different identifier for each channel (ie $E_v(\lambda)$) for data processing purposes only.

4.3 SORTIE1 Pre and Post Cruise Calibration Analysis

Post experiment calibrations were performed after the experiment in April 2007.

Post calibration of HPL180 show the system was within 2.7% of the previous calibration over the entire wavelength interval from 350-900nm. This is within the documented uncertainty of

radiance calibrations of 2.7% [RD10] using calibration methods documented during SIRREX-7 [RD10] (see Figure 6).

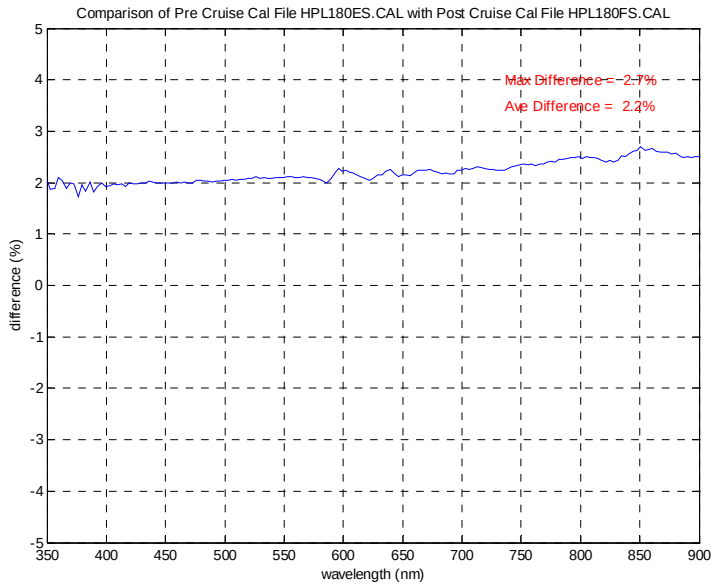


Figure 6 - Pre and Post Cruise Calibration Comparison for HPL180

Post calibration of HPE191 show the system was within 3.6% of the previous calibration from 350-900nm. This exceeds the documented uncertainty of irradiance calibrations of 2.3% [RD10] using calibration methods documented during SIRREX-7 [RD10]; however, the difference was well within established calibration uncertainties over the range 350-700 nm (see Figure 7). $E_d(\lambda)$ is not used in the computation of $L_w(\lambda)$ or $L_{wn}(\lambda)$.

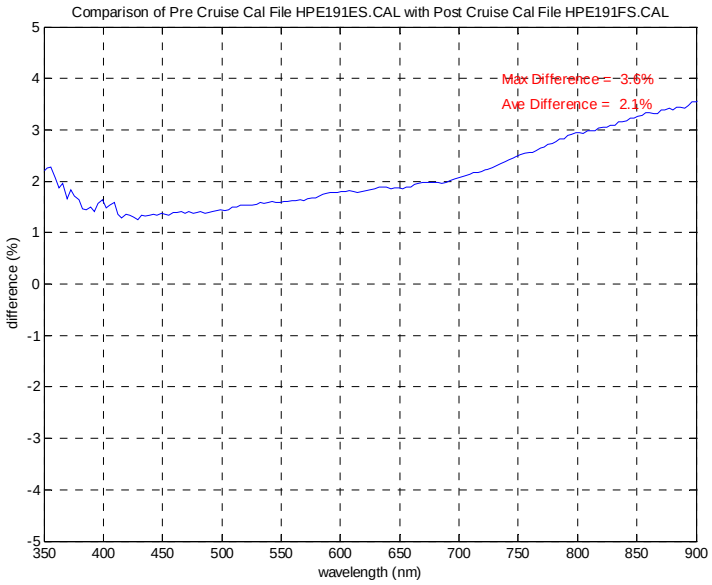


Figure 7 - Pre and Post Cruise Calibration Comparison for HPE191

Post calibration of HSE192 show the system was within 1.8% from 350-900nm. This is within the documented uncertainty of irradiance calibrations of 2.3% [RD10] using calibration methods documented during SIRREX-7 [RD10] (see Figure 8).

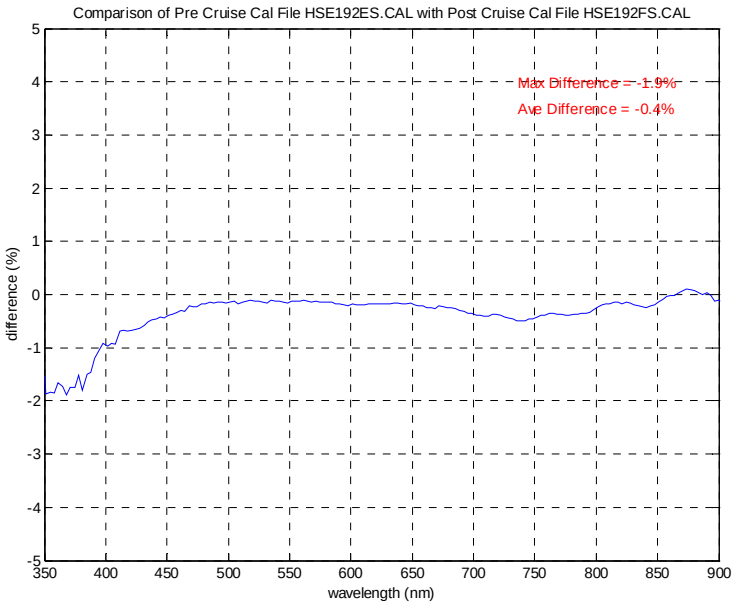


Figure 8 - Pre and Post Cruise Calibration Comparison for HSE192

Post calibration of HPL191 show the system was within 2.1% of the previous calibration over the entire wavelength interval from 350-900nm. This is within the documented uncertainty of radiance calibrations of 2.7% [RD10] using calibration methods documented during SIRREX-7 [RD10] (see Figure 9).

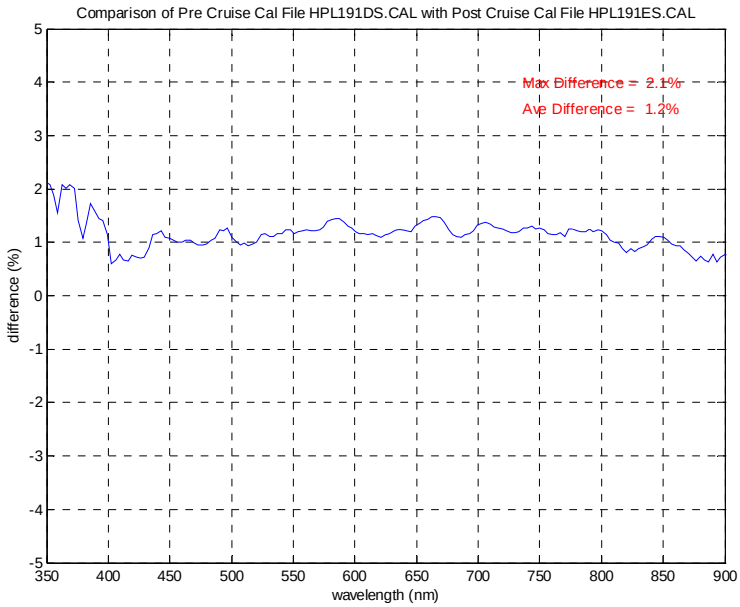


Figure 9 - Pre and Post Cruise Calibration Comparison for HPL191

Post calibration of HPE235 show the system was within 3.7% of the previous calibration from 350-900nm. This exceeds the documented uncertainty of irradiance calibrations of 2.3% [RD10] using calibration methods documented during SIRREX-7 [RD10]; however, the difference was well within established calibration uncertainties over the range 350-700 nm (see Figure 10). $E_d(\lambda)$ is not used in the computation of $L_w(\lambda)$ or $L_{wn}(\lambda)$.

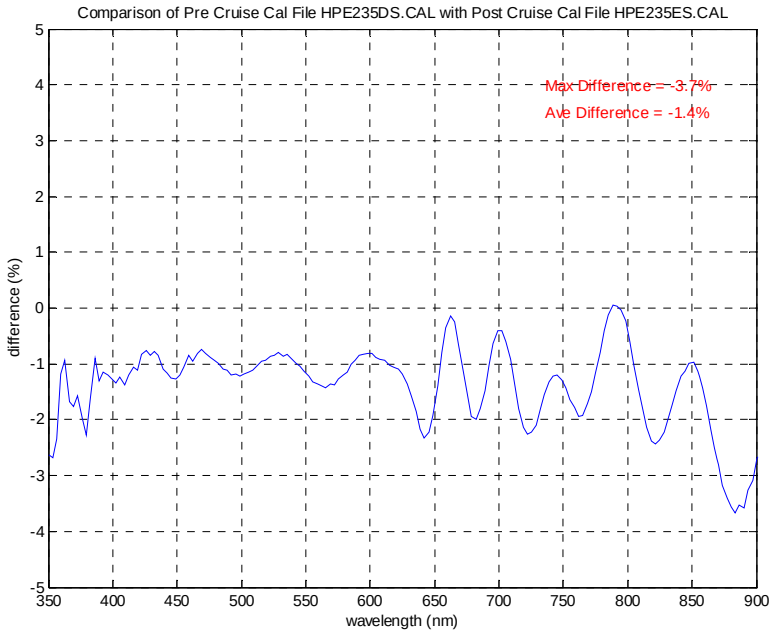


Figure 10 - Pre and Post Cruise Calibration Comparison for HPE235

Post calibration of HSE266 show the system was within 2.5% from 350-900nm. This is within the documented uncertainty of irradiance calibrations of 2.3% [RD10] for channels >357nm using calibration methods documented during SIRREX-7 [RD10] (see Figure 11).

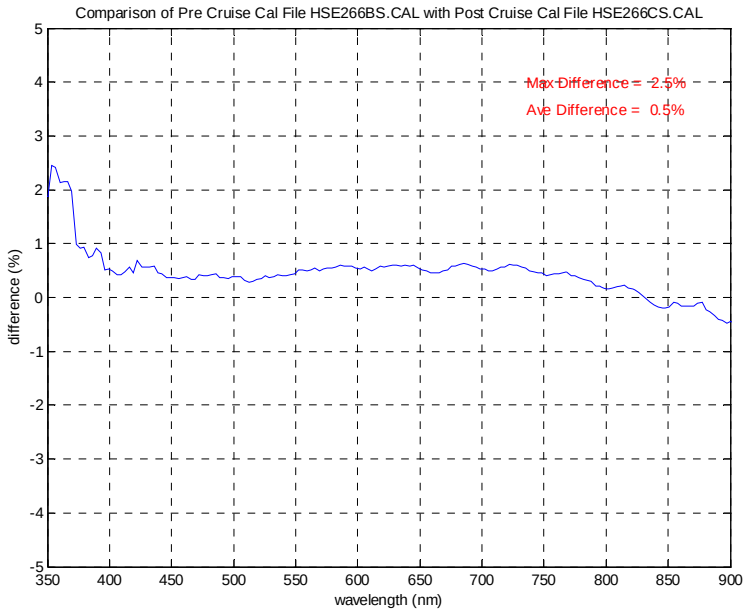


Figure 11 - Pre and Post Cruise Calibration Comparison for HSE266

4.4 MPR071 Calibration File Summary for SORTIE1

MPR071C.CAL – MicroPro hub ancillary sensors

Post cruise calibrated pressure sensor, accuracy 3cm (0-20m), 5cm (0-200m)

HPL180ES.CAL – Pre cruise calibration light frames F409N scale

Wavelength calibration

Thermal responsivity correction

Stray light corrected

PLD180ES.CAL – Pre cruise calibration dark frames F409N scale

Wavelength calibration

Thermal responsivity correction

Stray light corrected

HPL180_SIRCUS_Correction.DAT (saved as a .mat file and renamed LU180_StrayLight.mat for ProSoft)

Stray light correction matrix

HPE191ES.CAL – Pre cruise calibration light frames F409N scale

Wavelength calibration

Thermal responsivity correction

Stray light corrected

Immersion factor characterized

PED191ES.CAL – Pre cruise calibration dark frames F409N scale

Wavelength calibration

Thermal responsivity correction

Stray light corrected

Immersion factor characterized

HPE191_SIRCUS_Correction.DAT (saved as a .mat file and renamed ED191_StrayLight.mat and EU191_StrayLight.mat for ProSoft)

Stray light correction matrix

SATBB2F139.TDF – Calibration file for ECO-BB2FL

BB2F measurements unavailable for SORTIE1

4.5 MPR012 Calibration File Summary for SORTIE1

MPR012G.CAL – MicroPro hub ancillary sensors

Post cruise calibrated pressure sensor, accuracy 3cm (0-20m), 5cm (0-200m)

HPL191DS.CAL – Pre cruise calibration light frames F409N scale

Wavelength calibration

Thermal responsivity correction

Stray light corrected

PLD191DS.CAL – Pre cruise calibration dark frames F409N scale

Wavelength calibration

Thermal responsivity correction

Stray light corrected

HPL191_SIRCUS_Correction.DAT (saved as a .mat file and renamed LU191_StrayLight.mat for ProSoft)

Stray light correction matrix

HPE235DS.CAL – Pre cruise calibration light frames F409N scale

Wavelength calibration

Thermal responsivity correction

Stray light corrected

Immersion factor characterized

PED235DS.CAL – Pre cruise calibration dark frames F409N scale

Wavelength calibration

Thermal responsivity correction

Stray light corrected

Immersion factor characterized

HPE235_SIRCUS_Correction.DAT (saved as a .mat file and renamed ED235_StrayLight.mat and EU235_StrayLight.mat for ProSoft)

Stray light correction matrix

BB2F-077.TDF – Calibration file for ECO-BB2FL

SATFLCD150.TDF – Calibration file for ECO-FLCD

4.6 HSE192 Calibration File Summary for SORTIE1

HSE192ES.CAL – Pre cruise calibration light frames F409N scale

Wavelength calibration

Thermal responsivity correction

Stray light corrected

HED191ES.CAL – Pre cruise calibration dark frames F409N scale

Wavelength calibration

Thermal responsivity correction

Stray light corrected

HSE192_SIRCUS_Correction.DAT (saved as a .mat file and renamed ES192_StrayLight.mat for ProSoft)

Stray light correction matrix

4.7 HSE266 Calibration File Summary for SORTIE1

HSE266BS.CAL – Pre cruise calibration light frames F409N scale

Wavelength calibration

Thermal responsivity correction

Stray light corrected

HED266BS.CAL – Pre cruise calibration dark frames F409N scale

Wavelength calibration

Thermal responsivity correction

Stray light corrected

HSE266_SIRCUS_Correction.DAT (saved as a .mat file and renamed ES266_StrayLight.mat for ProSoft)

Stray light correction matrix

5 Data Collection

Data collection procedures for SORTIE are documented in [13].

5.1 RAW Data File Naming Protocol

EEEEE_YYYY-MM-DD_TSx.RAW

EEEE = Experiment Name

TEST = Precruise Field Testing

SORTIE1 = MOBY Cruise/SORTIE-1-KOK or SORTIE-1-KW

YYYY = Year

MM = Month

DD = Day

T = Type of Measurement

P = deep (100m profile) ($E_s(\lambda)$,$E_d(\lambda)$,$L_u(\lambda)$)

S = multicast surface replicates (five 10m profiles) ($E_s(\lambda)$,$E_d(\lambda)$,$L_u(\lambda)$)

T = surface buoy mode ($E_s(\lambda)$,$E_v(\lambda)$,$L_u(\lambda)$)

G = Global Irradiance ($E_s(\lambda)$)

D = Diffuse Irradiance (($E_{s\ diff}(\lambda)$)

S = System ID

A = MPR012 and/or HSE266

B = MPR071 and/or HSE192

x = SatView Sequence Letters (A..Z)

6 In Situ Data Processing

6.1 In Situ Data Processing Procedures

All field data is processed with ProSoft 7.8.2-RC15 which has special processing features for SORTIE. These include stray light correction, thermal responsivity correction, multicast processing, and Thuillier SOLSPEC9 extra terrestrial solar irradiance. Additional processing for multicast include Ked and Klu range checking (if less than Kw from RD37), automated selection of extrapolation depth per wavelength to a user selected number of optical depths, data filtering at a given number of standard errors (SEs), smoothing of Es spectrum time series and normalization of profile data with Es data to correct for the change in solar angle during the cast. New plots are available to show all data points (Ed and Lu) for a multicast profile sequence, overlaying the regression line, along with the points selected and rejected for the regression. The plot also shows the value of one optical depth, and for Ed plots the Ed/Es ratio.

Details on ProSoft may be found in the ProSoft User's Manual [RD20].

6.2 Data Reduction/Analysis

The data collection is followed by a defined series of analysis steps, which reduce the collected data to geo-referenced, calibrated, and averaged data products for further statistical analysis. The steps include calibration, time- or depth-binning, and derivation of products, and encompass transitions from Level 1 (raw data) to Level 4 (derived products). Native output formats for ProSoft data is Hierarchical Data Format (.HDF). These files are converted to ASCII tab delimited files suitable for Excel using ProSoft ASCII conversion utilities. HDF files are also saved for all processed levels for viewing with ProSoft HDF Viewer tools see [RD20].

Collected and processed data archiving and organization is based on the level of processing. Data processing was divided into four levels: Level 1, 2, 3 and 4.

- Level 1 - binary data with the extension .RAW obtained as a result of data acquisition. **(submitted)**
- Level 1a - binary data is extracted from RAW data under the control of the instrument (calibration) files. Extracted information is grouped along with its calibration information and placed into Level la hdf files. File nametag is _L1a.
- Level 1b – Level 1a data is calibrated. No data editing is applied. File nametag is _L1b.
- Level 2 – includes Level 1b data, which is further modified per request basis. File nametag is _L2 **(submitted HDF only)**:
    - Shutter dark correction is applied; reference and dark data deglitching is applied.
    - Profiler's data is tilt edited
- Level 2s - level 2 data is interpolated onto a common co-ordinates vector, which is either depth (profiler mode) or time (buoy mode). File nametag is _L2s **(submitted HDF, SeaBASS, ASCII)**.

- Level 3 - ASCII data obtained by depth-binning HyperPro data taken in profiler mode and time-binning data collected in buoy mode. Wavelength interpolation to equal interval can also be done in Level3. This is not done for SORTIE, but all radiometers are wavelength interpolated to match up with the Lu wavelength. File nametag is L3 **(submitted HDF, SeaBASS, ASCII)**
- Level 4 files produced from L3 data **(submitted HDF, ASCII)**:
  - K_d and K_u for all wavelengths
  - Surface optical data, E_d and L_u propagated to surface level
  - Water leaving radiances, L_w, L_{wn}
  - Surface remote sensing reflectances
  - Q factor if surface E_u and L_u are available

6.2.1 Level 1 to Level 2 conversion

The first step in the analysis of the hyperspectral data is the conversion from Level 1 to Level 2 data. The calibration file is used, along with the shutter dark corrections, to derive upwelling radiances ($L_u(\lambda)$), and downwelling irradiances ($E_s(\lambda)$,$E_d(\lambda)$), in calibrated physical units (μW cm^{-2} nm^{-1} sr^{-1} and μW cm^{-2} nm^{-1} respectively). The steps involved are:

1. Convert raw binary optical (light and shutter dark) and ancillary data into an integer representation in counts.

2. Convert data counts into engineering units in accordance with the calibration equations (see Satlantic Instrument File Standard V6.0 [RD31]). The calibration equation for optical hyperspectral (OPTIC3) data is:

$$L_{DarktDat} = L_{CountsDarkDat} \cdot a \cdot ic \frac{it_1}{it_2}$$

$$L_{LightDat} = L_{CountsLightDat} \cdot a \cdot ic \frac{it_1}{it_2} \qquad (2)$$

   where *a* is a slope, *ic* is an immersion coefficient, it_1 is the first integration time and it_2 is the second integration time. *a, ic* and it_2 are taken from a calibration file, and it_1 is obtained from the same log file as optical data.

3. Deglitch dark data using a first difference filter (optional – not done for SORTIE).

4. Interpolate shutter darks as a function of measurement time to match the number of dark and light data measurements.

5. Correct light data using shutter darks:

$$L = L_{LightDat} - L_{DarkDat} \qquad (3)$$

In Multicast mode each profile in the multicast sequence is separated and output as individual HDF files so they can be reprocessed in single cast mode for comparison purposes. These files use the file naming convention SORTIE1-2007-MM-DD-Sxx_Pn_L2.hdf (where Pn specifies the profile number, typically 1..5).

6.2.2 Level 1b – Level 2s Conversion

All optical data sensors are checked for wavelength sequence. The columns of optical data are organized from left to right as a function of the increasing wavelength.

Optical data can be also deglitched if respective settings in processing parameters are set. As a rule the deglitching is not required (no deglitching is done for SORTIE).

Optional deglitching module is applied to data to remove obvious glitches in dark data (no deglitching is done for SORTIE). First, a first difference operator is applied to the time series of N frames of optical data at each channel:

$$dL_\lambda(i) = L_\lambda(i+1) - dL_\lambda(i), i = 1,\ldots, N-1$$

Second, the standard deviation is calculated for each channel:

$$stdL(\lambda) = \sqrt{\frac{1}{N-2}\sum_{i=1}^{N-1}\left(dL_\lambda(i) - \langle dL_\lambda \rangle\right)^2}$$

Third, any data which values are higher than 10 $stdL(\lambda)$ is blanked by a blanking constant NaN.

Profiler data has a number of corrections and checks before the level 2 data files are created. These include pressure tare (offset) correction, wavelength sequence check and a tilt quality control edit.

Synchronization of optical data frames with pressure at Hyperspectral Profiler

Optical data frames are synchronized with pressure using timetags that are appended to each frame by SatView. Once the pressure frames are synchronized with the optical frames, TIMER time values are used to take into account the differences in integration times of the different optical data frames (i.e. Lu integration time may exceed the integration time of Ed). As a result interpolated pressure vector is appended to each sensor which contains any of the optical light frames. Note that if integration times, i.e. for Lu and Ed, are different, the appended pressure vector values also will be slightly different.

Pressure TARE Correction

Pressure sensors often have a small offset value that will change with atmospheric pressure. The offset is removed by a pressure tare. This value is stored in the header records by SatView when the data is collected. The pressure tare is defined as the pressure value that is measured when a profiler's Ed sensor is located just at the surface. This value has to be later subtracted from the measured pressure values of a profile. If the profiler measurements were logged with

SatView, the pressure tare value is automatically inserted into the file header. If no information is obtained, pressure tare value is set to 0.

Tilt Edit

Profiler measurements can be edited interactively or automatically removing any tilt contaminated records. In manual mode, a plot is shown with profiler tilts (if available) and profiler velocity as a function of depth. With the interactive graphical editor the user defines an upper z_{min} and lower depth z_{max} (we assume that z co-ordinate is directed downwards i.e. depth is z_{min} surface and z_{max} at the bottom of a profile). Data above z_{min} or below z_{max} will be removed. A tilt $Tilt(z)$ threshold $Tilt_{limit}$ (default is 5 degrees) usually is used for estimation of z_{min} and z_{max}. In a case of missing tilt sensor, the freefall velocity of the profiler can be used (zero or negative velocity is assumed to be high tilt). Automated editor module determines z_{min} and z_{max} in 10% of the upper and lower part of profiler measurements. The upper depth and the lower depth are defined as the first depth level (z) where the following conditions are met:

$$Tilt(z) < Tilt_{\lim it}$$

$$\min(z) \le z < 0.1\max(z) \quad \text{for top layer of the profile}$$

$$(\max(z) - 0.1\max(z)) < z \le \max(z) \quad \text{for bottom layer of the profile}$$

If a reference instrument is present, then the matching records in the reference data are also removed.

In Multicast mode each profile in the multicast sequence is separated and output as individual HDF files so they can be reprocessed in single cast mode for comparison purposes. These files use the file naming convention SORTIE1-2007-MM-DD-Sxx_Pn_L2s.hdf (where Pn specifies the profile number, typically 1..5).

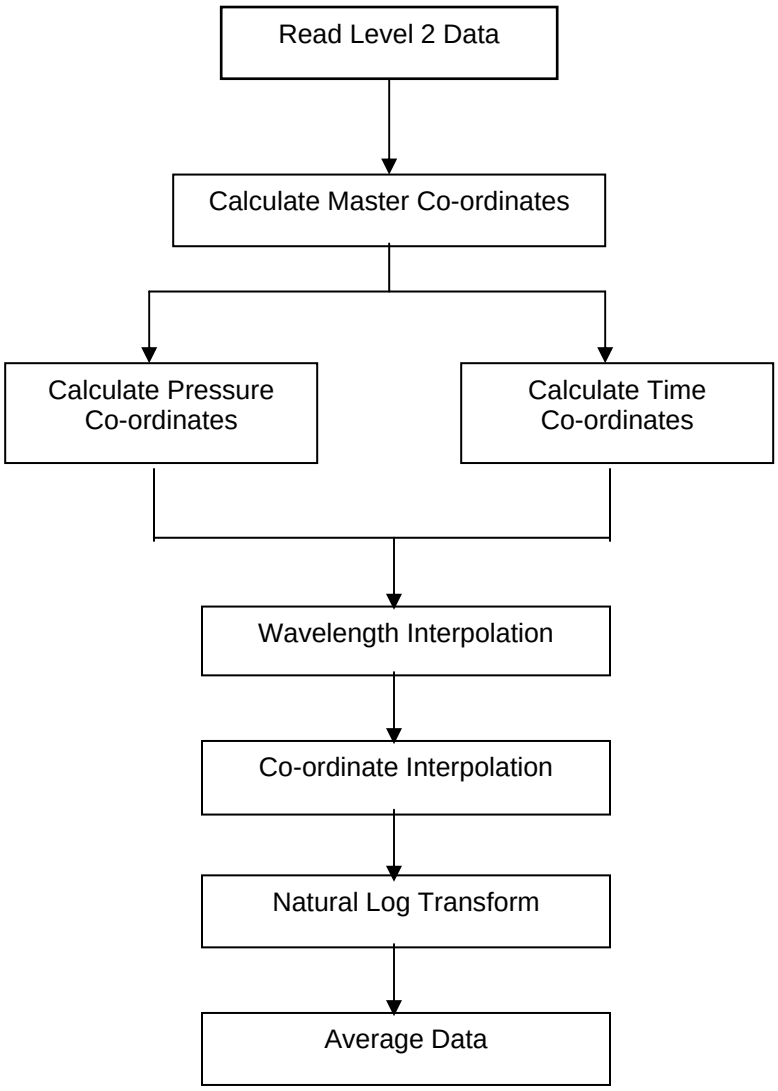
Also in Multicast mode the new ASCII files are generated automatically. These files are named SORTIE1-2007-MM-DD-Sxx_Pn_ss_L2s.dat (where Pn specifies the profile number, typically 1..5 and ss specifies the sensor – Ed, Es, Lu).

In Single Cast mode a new ASCII file is generated automatically. These files are named SORTIE1-2007-MM-DD-xxx_ss_L2s.dat (where ss specifies the sensor – Ed, Es, Lu, Ev, Ls).

SeaBASS files are automatically produced in Multicast. These files are named SORTIE1-2007-MM-DD-Sxx_Pn_SB_ss_L2s.dat (where Pn specifies the profile number, typically 1..5 and ss specifies the sensor – Ed, Es, Lu).

In Single Cast mode SeaBASS files are generated automatically. These files are named SORTIE1-2007-MM-DD-xxx_SB_ss_L2s.dat (where ss specifies the sensor – Ed, Es, Lu, Eu). Note that to be SeaBASS compliant Ev (surface irradiance in ProSoft terminology) is renamed Eu and Ls (surface radiance in ProSoft terminology) is renamed Ls.

6.2.3 Level 2s to Level 3a conversion (Single Cast Mode Only)



1. Data from the Level 2 hdf file is read and organized depending on the type of instrument (i.e. Satnet Hyperspectral Profiler/Reference).
2. At level 3a processing, the averaging of data is done within intervals based on a system of co-ordinates. For systems with a profiler the co-ordinates are based on pressure (averaging in depth). For systems with a reference only or SAS the co-ordinates are based on time (averaging in time).
3. There exists in most instruments a difference in distance between sensors. For example for HyperPro II the distance between the Ed sensor at the top and the Lu sensor at the bottom is usually set to 0.315 m. This presents a problem when defining a pressure co-

ordinate system that is common to all sensors that make up the instrument. When processing optical data, the data closest to the surface is usually of greater importance than data at the deepest of the profile. Therefore it makes sense to choose the sensor nearest the surface which in all profiler cases is the Ed sensor. The pressure values for the Ed sensor, hereafter referred to as master pressure, are then used to derive the pressure co-ordinates. It should be noted that if no Ed sensor is present then the Lu sensor pressure must be used instead. The master pressure is then filtered to eliminate frames where pressure is not increasing.

$$depth(n+1) - depth(n) \leq 0$$

The pressure co-ordinates are created by rounding up the first master pressure value to the nearest 0.1 m then increasing the pressure by intervals equal to the depth resolution until reaching the highest (deepest) master pressure value which is rounded down to the nearest 0.1 m.

4. The systems reference instrument has an Es sensor which ProSoft uses to calculate the time co-ordinate system. The master time for the very first frame is taken as the first Timetag2 value if available else Time Stamp, the time at which logging data begins, is used. The timer values give the elapsed time for each frame since the time of the first frame which is used to calculate the absolute time for each frame.
5. Profiler and reference data can be interpolated onto a constant wavelength interval by setting the level 3 parameter Wavelength Interpolation to the desired interval. Equal interval wavelength interpolation can only be used for Hyperspectral instruments. This is not done for SORTIE and a new module interpolates other radiometers to match up with the Lu wavelengths.
6. The data to be averaged is interpolated onto the master co-ordinates ensuring that all the data is mapped to a common co-ordinate system prior to averaging. The co-ordinates are based on either pressure or time. The interpolation method used for both Profiler and Reference instruments is ‘linear’. This interpolated data is then written to a level 2s hdf file for viewing by the user.
7. Optical sensor data (Es, Ed, Lu) are natural log transformed to “straighten” the data prior to averaging.
8. The data is then averaged based on the level 3 parameters Bin Interval and Bin Width for pressure co-ordinates and Time Interval and Time Width for time co-ordinates. The Bin Interval or Time Interval determines the points at which to average with the Bin Width or Time Width determining the number of data points to use for averaging.

6.2.4 Level 3 to Level 4 conversion (Single Cast Mode)

The Level 3 data serve as the basis for the production of a number of derived information products. For the HyperPro, four are relevant: Surface Products, Water Leaving Radiance, Remote Sensing Reflectance, Diffuse attenuation coefficient and Photosynthetically Available Radiation (PAR). These represent a series of mathematical manipulations of the data in the Level 3 files.

The “Surface Products” represent the propagation of both radiance and irradiance to a common depth horizon, which is specified as just below the sea surface (0-). For upwelling radiance taken at some depth below the sea-surface (0.15m in the buoy mode), the radiance just below the surface is estimated by first computing the spectral attenuation coefficient for spectral radiance based on statistical computations using a ratio of blue to green wavebands as input. This attenuation coefficient governs the propagation of radiance to the surface based on an exponential model, and this model is used to determine the upwelling radiance just below the sea-surface. For irradiance, the above-water measurement is used and propagated through the sea-surface using an estimated fresnel reflectance.

In profiler mode, the subsurface values are derived from the near-surface data recorded at the start of a cast. For buoy mode subsurface values, all the data for a log are averaged into a single radiance and a single irradiance spectrum. Each set of these spectra is then combined to produce the Level 4 data.

Remote sensing reflectances are produced by propagating the radiance at a level just below the sea-surface through the surface by use of Fresnel reflectances, giving water-leaving radiances (Lw(λ)). These are then divided by the above-water irradiances on a band by band basis to produce remote sensing reflectances.

Under typical conditions for which incident lighting is provided by sun and sky, the various radiance's and irradiances all decrease exponentially with depth, at least far enough below the surface (and far enough above the bottom in shallow water) to be free of boundary effects. This effect can be generally expressed as the diffuse attenuation coefficient calculated for Ed as follows:

$$E_d(z,\lambda) = E_d(0^-,\lambda)e^{-\int_0^z k_d(z',\lambda)dz'}$$

$E_d(z,\lambda)$ - downwelling irradiance as a function of depth and wavelength.

$E_d(0^-,\lambda)$ - surface value of downwelling irradiance as a function of wavelength.

$e^{-\int_0^z k_d(z',\lambda)dz'}$ - effect of the diffuse attenuation coefficient as a function of depth and wavelength.

The traditional method of k analysis (Smith and Baker 1984 and 1986) is to estimate k(z) as the local slope of measured ln(Ed(z)) in an interval of a few meters centered on depth z_m.

6.2.5 Level 2 to Level 4 conversion (Multicast Mode)

In Multicast Mode, Level 4 products are generated directly from tilt edited profiles for the purposes of obtaining accurate water leaving radiances **(no other Level 4 products are generated).** Instead of binning data and generating averaged profiles, multicast uses all of the data points that meet tilt criteria, greatly increasing the number of data points. Other processing enhancements for Multicast mode include:

1) normalization of Ed and Lu to Es data to compensate for the change in incident irradiance during the cast.

2) check for Klu and Ked values less than Kw (from Morel 2001 [RD37]), this can trigger for the recalculation of regressions for a fixed number of optical depths, optimizing for each wavelength

3) data filtering is also available, this eliminates extreme outliers, particularly useful for Ed in clear waters near the surface.

4) statistics on the regressions are also calculated including the standard error of K and the surface intercept Lu(0-) or Ed(0-).

5) the user may select up to two wavelengths to view processing results for data QA

In multicast mode only selected "Surface Products" are computed. This includes the following:

Level 4 Product	Description
Lu(0-)	profiler radiance extrapolated to just below the sea surface
Lw	Lu(0+) or water leaving radiance
Lw+SE	water leaving radiance plus one standard error
Lw-SE	water leaving radiance minus one standard error
Lwn	Normalized water leaving radiance (using F0/Es)
Es	averaged irradiance
Ed(0-)	profiler irradiance extrapolated to just below the sea surface
Ed(0+)	profiler irradiance projected through the sea surface as a quality check compared to Es
F0	mean extraterrestrial solar irradiance – for SORTIE1 this is Thuillier SOLSPEC9 data [RD7]
KLu	diffuse attenuation coefficient for Lu
SE KLu	standard error for KLu regression
KEd	diffuse attenuation coefficient for Ed
SE KEd	standard error for KLu regression

Table 6 - Level 4 Multicast Data Products

When multicast data processing is selected on a multicast file a special editor separates the file into cast segments based on tilt criteria (for SORTIE <5 degrees) which typically removes the upcast data. In multicast processing, both upcast and downcast data will be used unless the tilt exceeds the selected threshold. Even for hyperspectral sensors over 100 samples per meter can be obtained from a multicast sequence of five profiles.

Once the file is segmented, the data goes through Level 2 and 2s processing which are output to separate HDF files for further analysis if it is desired to review each cast individually.

To obtain a better estimate of the mean surface solar irradiance all of the Es data is smoothed using a linear regression. This assumes that the time period of the multicast is short (ie <10 minutes) and is thus approximately linear. The regression removes ship motion from the data and allows for an accurate normalization of the Lu and Ed data to account for the change in solar flux levels due to the change in solar angle. As a quality check the Es near 490 is plotted showing the data (blue) and regression (red) as can be seen in the example below.

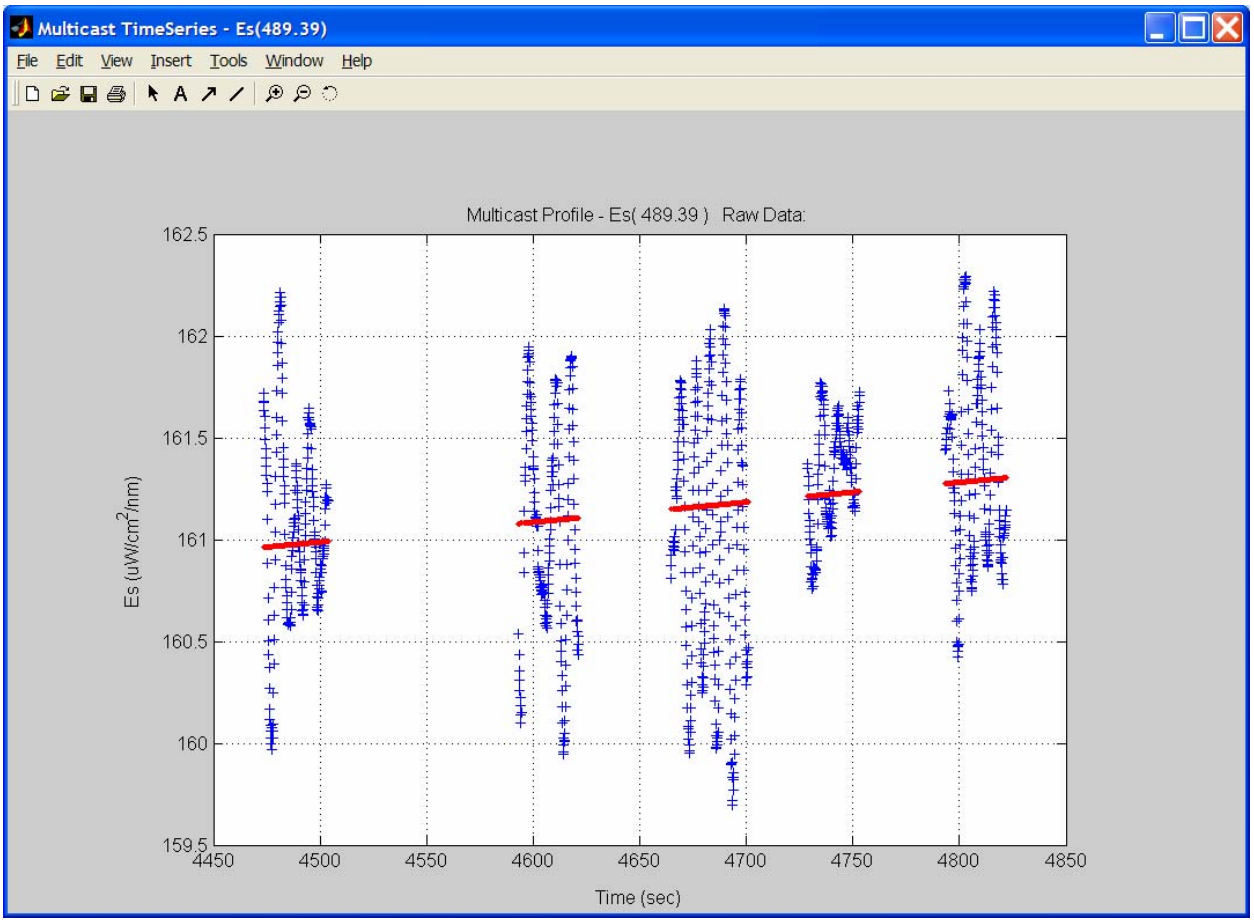


Figure 12 - Example of Multicast Es data

Once the Es data regression is complete the Ed and Lu data is normalized to the Es regression line for the same time as the Ed and Lu data samples were taken. Once processing is complete this data can be “unnormalized” and referenced to any given time (within 10-20 minutes). For all SORTIE1 data the reference time is the beginning of the cast. The exceptions to this are MOBY matchup profiles which are referenced to MOBY data collection time. This matchup in time is necessary as the primary comparison between MOBY and the SORTIE HyperPros is done using Lw, which is time dependant.

To compute the profile regressions for K and the surface intercept (Lu(0-) and Ed(0-)), an iterative approach is used to optimize the regression for each wavelength. Previous processing runs of this data showed that using a fixed regression depth of 5.2m (ie the depth of the Mid MOBY arm used for our comparisons) was a poor choice in the blue due to insufficient depth for extrapolation (ie generated negative values or K < Kw) due to the clarity of the water and also in the red due to it being too many optical depths (also generating negative or complex K's). The new version of the processor was designed to minimize the chance of generating bad results.

For Multicast processing of the profile data, it is first normalized as described above. The data is then checked for zero or negative values (these may occur if the data is very close to darks). These are replaced with 1E-07 to avoid regression errors. An initial attempt at regression is completed. This data is then filtered at ±10 Standard Errors from the regression line to remove outliers and the regression is repeated. After filtering the regression K values are checked to see if they are lower than Kw (pure water from Morel 2001 [RD37]) on a pixel by pixel basis. If they are K is set to Kw – 0.001 and optical depth is determined from this. The regression is then recalculated using 1.5 optical depths or the bottom of the cast, whichever is smaller. The data is then refiltered and a final regression is done with these points removed. The final results are saved and a warning is generated if the result is still less than Kw (for Kd this would mean the profile was not deep enough to properly regress the data, which is the case from some of the Multicast data sets from SORTIE-1 in the blue – casts deeper than 10m will be used for future Case-I experiments). As a quality check and to help the user visualize the effect of the processing settings plots can be generated at two wavelengths showing the extreme cases (for SORTIE-1 490 and 700nm were selected). The following figures show examples of the results.

The plots show all the data points (note that these are normalized values, so for Lu they are Lu/Es and for Ed they are Ed/Es). They are colored blue for "good" and red for "rejected" by the data filter. The total number of points and the number of points rejected are reported on the plot. The green line shows the final regression line, the two red lines show the limits of the outlier rejection filter. For Ed the ratio of Ed to Es is also shown as a quality check. Ideally this should be 1.000, which in practice is very hard to achieve. The data is shown to the depth set by the user or to the automated extrapolation depth computed, whichever is shallower. One optical depth and the K value are also shown on the plots. Note that on the Ed490 plot, Ked is 0.0154/m, which is well below Kw reported by Morel 2001 (0.0166/m). However the results show an Es/Ed ratio of 1.020 which is almost perfect.

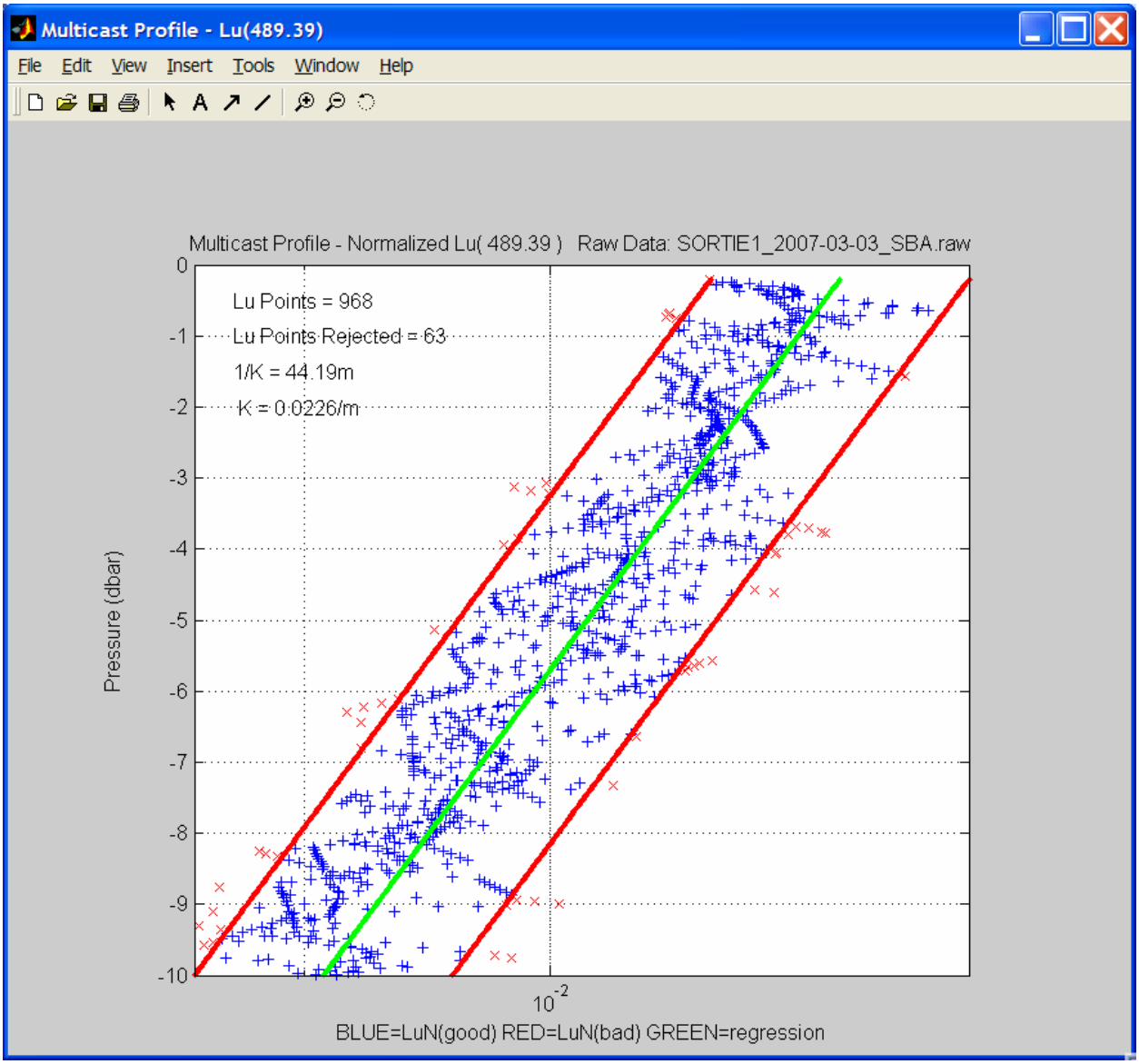


Figure 13 - Example of Multicast Lu490 data

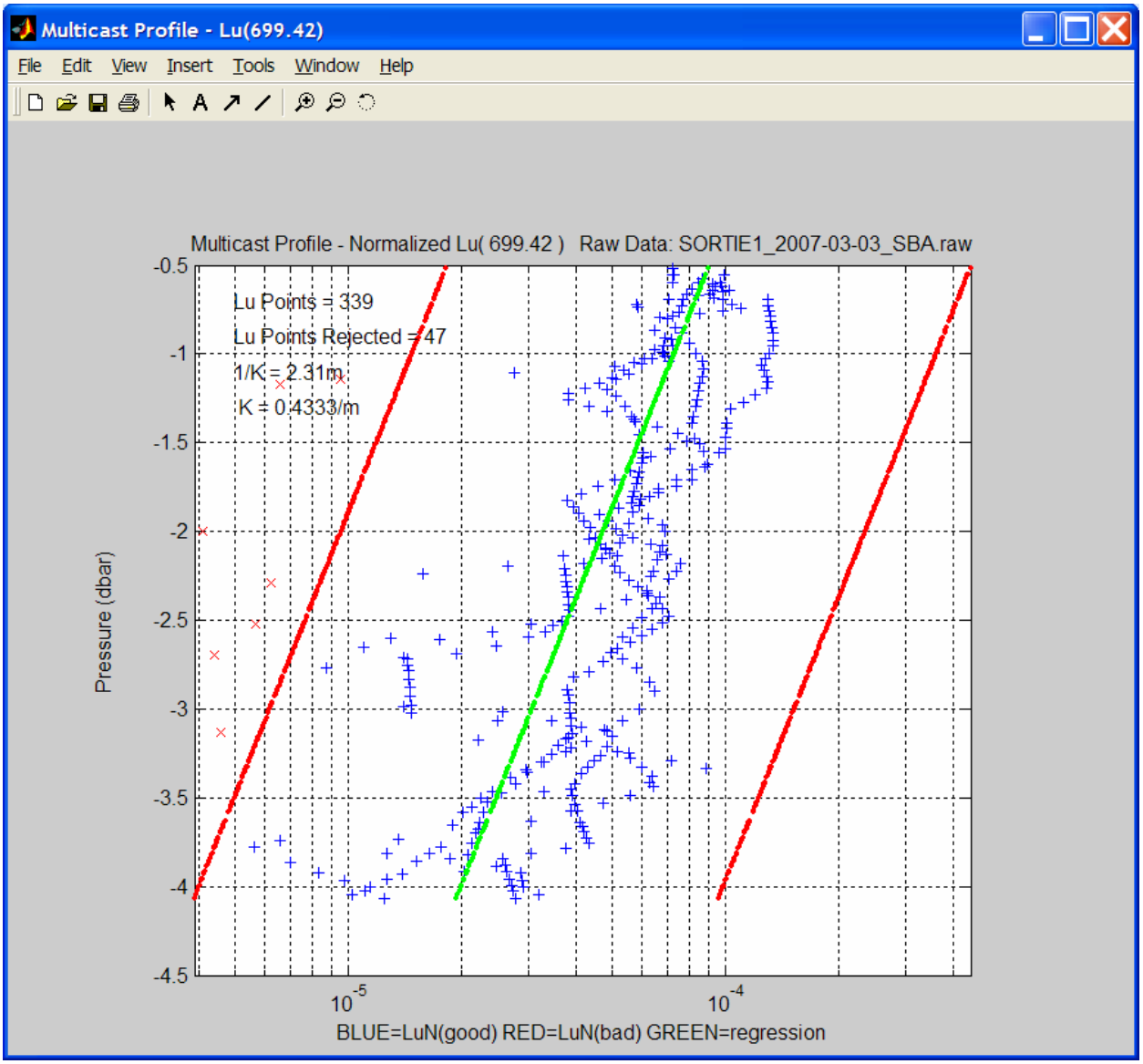


Figure 14 - Example of Multicast Lu700 data

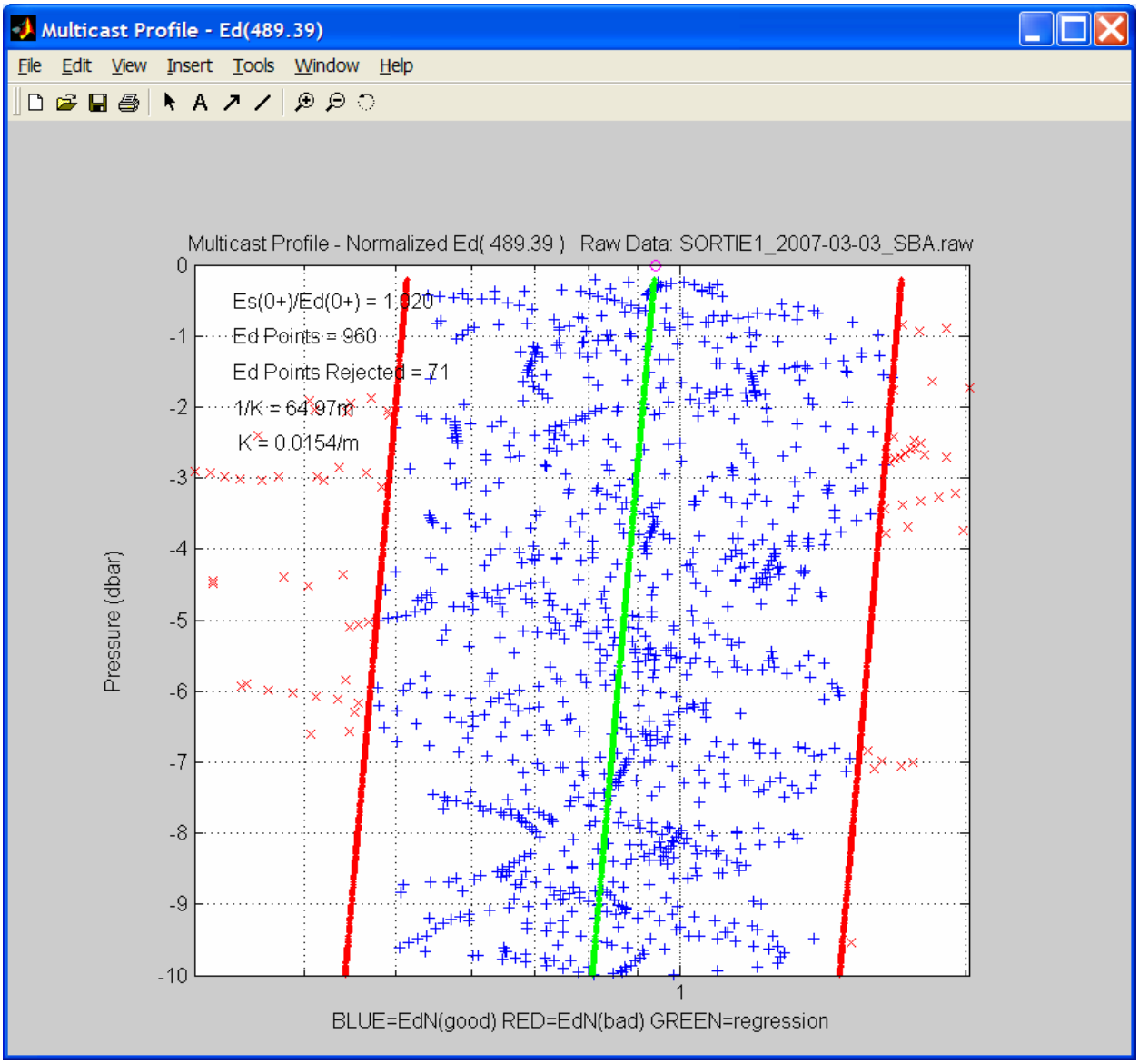


Figure 15 - Example of Multicast Ed490 data.

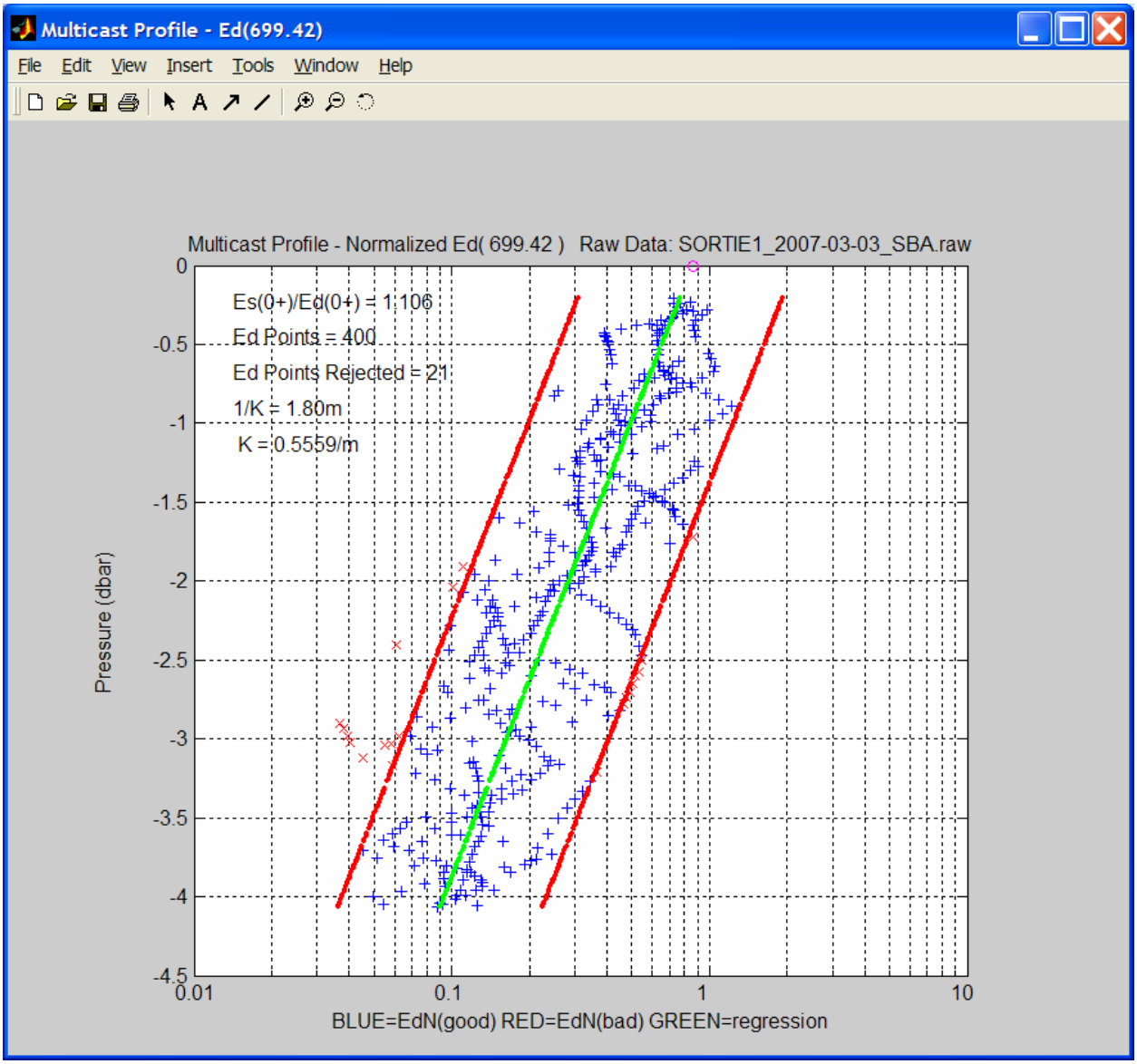


Figure 16 - Example of Multicast Ed700 data

6.2.6 ASCII Output Files for SORTIE

The following is a summary of routine tab delimited ASCII processing levels produced for SORTIE:

File Type	File Codes	ProSoft Instrument Context File	ProSoft Processing Parameters File	Processing Levels for SORTIE in ASCII
Reference only	GAx, DAx, GBx, DBx	MPR012_SORTIE1_WATERTARE MPR012_SORTIE1_DECKTARE MPR071_SORTIE1_WATERTARE MPR071_SORTIE1_DEKTARE	SORTIE1_SINGLE	2s, 3a, 4
Conventional Single Cast Profile	PAx, PBx	MPR012_SORTIE1_WATERTARE MPR012_SORTIE1_DECKTARE MPR071_SORTIE1_WATERTARE MPR071_SORTIE1_DEKTARE	SORTIE1_SINGLE	2s, 3a, 4
Multicast Profile	SAx, SBx	MPR012_SORTIE1_WATERTARE MPR012_SORTIE1_DECKTARE MPR071_SORTIE1_WATERTARE MPR071_SORTIE1_DEKTARE	SORTIE1_MULTI_BEGIN (default), SORTIE1_MULTI_MOBY (for MOBY matchups)	2s (individual profiles), MC 4
Surface Buoy Mode	TBx	MPR071_SORTIE1_Surface_WATERTARE MPR071_SORTIE1_Surface_DECKTARE	SORTIE1_SINGLE	2s, 3a, 4

Table 7 - ASCII Data Products Produced for SORTIE

Multicast data processing is experimental, although preliminary results show this data to have the highest quality $L_{wn}(\lambda)$ values. ASCII output for multicast (MC) processing is non-standard and produces Level 2s files with each profile extracted to its own file. These files are named SORTIE1-2007-MM-DD-SBx_Pn_ss_L2s.dat (where Pn specifies the profile number, typically 1..5 and ss specifies the sensor – Ed, Es, Ev, Ls, Lu). Multicast Level 4 file names have the format SORTIE1_2007-MM-DD_SBx_MC_L4.dat. Multicast processing does not have a Level 3 output since all profiles are regressed together.

6.3 ASCII File In Situ Data Formats

Tab delimited ASCII file output data files are available for further analysis. Each processing level contains a series of header records that are initially generated in SatView which is then appended with additional metadata records as the data is processed to higher levels. The description of each header record is listed in Table 8.

File Header	Units	Description
PROSOFT	None	ProSoft software version used in analysis
PROSOFT_INSTRUMENT_CONFIG	None	Name of instrument context file used for processing
PROSOFT_PARAMETERS_FILE_NAME	None	Name of ProSoft data processing parameters
CAL_FILE_NAMES	None	List of calibration file names used for data processing
WAVELENGTH_UNITS	As specified	Units of wavelengths – usually nm
LU_UNITS	As specified	Units of Lu/Ls – usually uW/cm^2/nm/sr
ED_UNITS	As specified	Units of Ed/Eu – usually uW/cm^2/nm
ES_UNITS	As specified	Units of Es – usually uW/cm^2/nm
RAW_FILE_NAME	None	Name of Level 1 binary file
CRUISE-ID	None	Identifies the cruise on which the current series of log files is taken.
INVESTIGATOR	None	Identifies PI for project
AFFILIATION	None	Affiliation for project PI
CONTACT	None	Email address for project lead PI
EXPERIMENT	None	Experiment identifier
WIND_SPEED	m/s	Wind speed for station
CLOUD_PERCENT	None	0-100 percent cloud cover
WAVE_HEIGHT	M	Average wave height
DOCUMENT	None	Cruise report file name
OPERATOR	None	Identifies the operator of the data acquisition software for the current log file.
LATITUDE	Decimal Degrees Or Degrees	Identifies the latitude coordinates of the instrument for the current log file.

File Header	Units	Description
	and Decimal Minutes	
LONGITUDE	Decimal Degrees Or Degrees and Decimal Minutes	Identifies the longitude coordinates of the instrument for the current log file.
ZONE	None	Identifies the data acquisition time zone of the current log (ie UTC-4).
COMMENT	None	Comment field for ancillary sky and sea observations
STATION-ID	None	Identifies the station for the current series of log files.
CAST	None	Identifies the current log file in a series of related log files.
TIME-STAMP	None	Identifies the time on the data acquisition computer as of the beginning of the current log file.
MODE	None	Identifies the data acquisition software mode.
PRESSURE-TARE	Meters (m)	Pressure tare taken at the surface for current log file.
TIMETAG	None	Obsolete.
DATETAG	None	Switch to include date/time tagging.
TIMETAG2	None	Switch to include timetag2 tagging.
PROFILER	None	Identifies the status of the profiler instrument.
REFERENCE	None	Identifies the status of the reference instrument.
PRO-DARK	None	Profiler dark correction method.
REF-DARK	None	Reference dark correction method.
PRO-ID	None	This field is the identifier for the profiler.
PROCESSING_LEVEL	None	Identifies the processing level of the current file.
FILE_CREATION_TIME	None	Date of file creation.
DEGLITCH_PRODAT	None	Switch to include deglitching of profiler data.
DEGLITCH_REFDAT	None	Switch to include deglitching of reference data.
STRAY_LIGHT_CORRECT	None	Indicates if stray light corrections were applied to the data
THERMAL_RESPONSIVITY_CORRECT	None	Indicates if thermal responsivity corrections were applied to the data

File Header	Units	Description
PRESS_TARE_CORRECTION	Meters (m)	Pressure tare value applied to current log file.
DEPTH_RESOLUTION	Meters (m)	Depth resolution used for Level 2s data interpolation.
BIN_INTERVAL	Meters (m)	Level 3a variable that determines which depth interval to average.
BIN_WIDTH	Meters (m)	Level 3a variable that determines depth range within which to average.
TIME_INTERVAL	Seconds	Level 3a variable that determines which time interval to average.
TIME_WIDTH	Seconds	Level 3a variable that determines the time range within which to average.
WAVEL_INTERP	(nm)	Level 4 variable that determines wavelength interpolation interval.
INTEGRATION_POINTS	None	Level 4 variable that determines number of data points to use for regression analysis.
LU_REGRESSION_POINTS	None	Maximum number of points that can be used in a regression
ES/ED(0+)_RATIO_490	None	Ratio of Es to Ed(0)+ at 490nm. A quality check for Ed regression, ideally 1.000
ES/ED(0+)_RATIO_700	None	Ratio of Es to Ed(0)+ at 700nm. A quality check for Ed regression, ideally 1.000
EXTRAPOLATION_NORMALIZATION_TIME	HH:MM:SS	Time that data normalization is referenced to. Typically start of the cast. For MOBY matchups it is set to MOBY data collection time.
K_RANGE_CHECK_LU	None	If ON it will set any Klu and data products using Klu to zero if Klu < Kw. Not recommended
K_RANGE_CHECK_ED	None	If ON it will set any Ked and data products using Ked to zero if Ked < Kw.
MULTICAST_DATA_FILTER	SE per 100 points	Sets the number of Standard Errors (SE) above and below the regression line to reject points, typically 10
EXTRAP_DEPTH_AUTO_LU	None	Number of optical depths to calculate regression over, typically 2.5
REFLECTION_ALBEDO	None	Reflection albedo value used in level 4 processing.
REFLECTANCE_INDEX	None	Reflectance index value used in level 4 processing.
REFRACTIVE_INDEX	None	Refractive index value used in level 4

File Header	Units	Description
		processing.
WATER_MEDIUM	None	Indicates if data processed for seawater or fresh water

Table 8 - Header Record Metadata Desciptions for ASCII FIles

Label	Units	Description
TIMETAG2	HHMMSSsss	Time data appended to frame.
DATETAG	YYYYDDD	Date data appended to frame.
PRES	Meters (m)	Used to define a pressure sensor measurement. Pressure measurements are usually used with submersible instruments to gauge their depth.
ALTIM	Meters (m)	Used to define an altimeter sensor measurement. Altimeter measurement is normally used to gauge the distance from a submersible instrument to the ocean floor.
FRAMECOUNTER	None	The value of a frame counter is simply a numerical counter that can help ensure all frames received are sequential.
CHECKSUM	None	The value of the check sum is the last byte of the sum of all bytes, up to but not including the check sum sensor, in a frame of telemetry subtracted from 0.
INTTIME	Seconds	Defines the adaptive or adjusted integration time for all subsequent optical sensors for which the sensor was defined.
DARK	None	Some optical sensors are shielded from light exposure to establish a dark noise floor for a related optical sensor grouping.
DARK_SAMP	None	Indicates the number of dark sensors used to calculate a dark average.
DARK_AVE	None	Defines the actual average dark value.
T	Degrees Celsius (°C)	Used to define a temperature sensor measurement. Temperature sensors can be placed anywhere on an instrument.
TILT	Degrees	Used to define a tilt or attitude measurement for an instrument. A tilt measurement is normally used to determine the alignment of an instrument with the vertical.

Label	Units	Description
PITCH	Degrees	Used to define a tilt sensor along the horizontal axis. A pitch sensor can be used to determine an instruments orientation relative to the horizon.
ROLL	Degrees	Used to define a tilt sensor about the horizontal axis. A roll sensor can be used to determine an instruments orientation relative to the horizon.
COMP	Degrees	Used to define a flux gate compass sensor measurement. These sensors measure magnetic flux to establish direction.
COND	(mmho/cm)	Used to define a seawater conductivity sensor measurement. A conductivity measurement is necessary for calculation of salinity.
FLUOR	(ug/l)	Used to define a fluorometer sensor measurement.
TRANS	(/m)	Used to define a transmissometer sensor measurement. A transmissometer measurement indicates the attenuation of a light beam in a given media.
PAR	($\mu E/m^2$)	Used to define a sensor for measuring photosynthetically active radiation. PAR measurements indicate the total light energy available for photosynthesis per unit area.
TIMER	Seconds	Used to define a timer sensor for indicating the number of seconds that have elapsed since the instrument was powered up.

Table 9 - Level 2 and Level 3 ASCII Ancillary Data Descriptors

Table Label	Units	Description
K_Lu , K_Ed, K_Eu	(/m)	K values

Ls(0-), Lu(0-), Ed(0-), Eu(0-), Es(0-), Ev(0-)	(μw/cm^2/nm) or (μw/cm^2/nm/sr)	Surface optical data
Lw, Lwn	(μw/cm^2/nm/sr)	These may be computed from Es and Ed as indicated in the data descriptors. Ed is intended as a check only and only Es or Ls derived Lwn should be considered for cal/val
RSR-Lu(0+)/Ed(0+), RSR-Lu(0+)/Es, RSR-Ls(0+)/Es	(/sr)	Surface remote sensing reflectance.
Q(0-)	(sr)	Q factor
F0	(μw/cm^2/nm)	Extraterrestrial irradiance used in Lwn computation
Profiler Par	(quanta/cm^{2}s)	Photosynthetically available radiation
Water Properties Table	Depth (m) Temp (°C) Conductivity (mmho/cm) Salinity (psu) Density (Kg/m^3)	Water Properties

Table 10 - Level 4 ASCII Data Descriptors

6.3.1 ASCII File Naming Protocol

EEEEE_YYYY-MM-DD_TSx_(MC_)(Pi_)(ss_)(SRF_)Ln.DAT

( ) indicates field may not be present in all cases

EEEE = Experiment Name

SORTIE1 = MOBY Cruise/SORTIE-1-KOK or SORTIE-1-KW

YYYY = Year

MM = Month

DD = Day

T = Type of Measurement

P = deep (100m profile) ($E_s(\lambda)$,$E_d(\lambda)$,$L_u(\lambda)$)

S = multicast surface replicates (five 10m profiles) ($E_s(\lambda)$,$E_d(\lambda)$,$L_u(\lambda)$)

T = surface buoy mode ($E_s(\lambda)$,$E_v(\lambda)$,$L_u(\lambda)$)

G = Global Irradiance ($E_s(\lambda)$)

D = Diffuse Irradiance (($E_{s\ diff}(\lambda)$)

S = System ID

A = MPR012 and/or HSE266

B = MPR071 and/or HSE192

x = SatView Sequence Letters (A..Z)

(MC_) = Multicast identifier for Level 4 files

(Pi_) = Profile identifier for separated multicast files (typically P1 to P5)

ss = Optical sensor type (Es, Ed, Eu, Lu)

SRF = special Single Cast Mode level 4 file containing only surface products

Ln = Processing Level (2, 2s, 3a, 4)

6.4 SeaBASS File In Situ Data Formats

ProSoft 7.8.2-RC15 also produces SeaBASS compliant ASCII files automatically. SeaBASS files are output at Level 2s (time/pressure interpolated to a common base and unbinned) and 3a (binned Level 2s) files. Level 4 files are produced for SeaBASS only in Multicast. These are not submitted to the SeaBASS database.

6.4.1 SeaBASS File Naming Protocol

EEEEE_YYYY-MM-DD_TSx_(MC_)(Pi_)SB_ss_Ln.DAT

( ) indicates field may not be present in all cases

EEEE = Experiment Name

SORTIE1 = MOBY Cruise/SORTIE-1-KOK or SORTIE-1-KW

YYYY = Year

MM = Month

DD = Day

T = Type of Measurement

P = deep (100m profile) ($E_s(\lambda)$,$E_d(\lambda)$,$L_u(\lambda)$)

S = multicast surface replicates (five 10m profiles) ($E_s(\lambda)$,$E_d(\lambda)$,$L_u(\lambda)$)

T = surface buoy mode ($E_s(\lambda)$,$E_v(\lambda)$,$L_u(\lambda)$)

G = Global Irradiance ($E_s(\lambda)$)

D = Diffuse Irradiance (($E_{s\ diff}(\lambda)$)

S = System ID

A = MPR012 and/or HSE266

B = MPR071 and/or HSE192

x = SatView Sequence Letters (A..Z)

(MC_) = Multicast identifier for Level 4 files

(Pi_) = Profile identifier for separated multicast files (typically P1 to P5)

SB = SeaBASS compliant file

ss = Optical sensor type (Es, Ed, Eu, Lu)

Ln = Processing Level (2s, 3a, 4)

6.4.2 SeaBASS Compliant Header Records

All SeaBASS files begin with SeaBASS compliant header records

```
/begin_header
/investigators=Chuck_Trees
/affiliations=CHORS/SDSU
/contact=chuck@chors.sdsu.edu
/experiment=SORTIE
/cruise=SORTIE1
/station=SORTIE1_2007-03-03_G
/data_file_name=SORTIE1_2007-03-03_GAA.raw
/calibration_files=HED266BS.CAL,HSE266BS.CAL
/data_type=cast
/data_status=preliminary
/start_date=20070303
/end_date=20070303
/start_time=22:02:17[GMT]
/end_time=22:07:21[GMT]
/north_latitude=20.8313[DEG]
/south_latitude=20.8313[DEG]
```

/east_longitude=-157.2067[DEG]
/west_longitude=-157.2067[DEG]
/cloud_percent=20
/secchi_depth=NA
/water_depth=NA
/wave_height=1.0
/wind_speed=4.0
/documents=SORTIE1_2007_Data_Report_WET-DN-00509.pdf

Additional information that is not SeaBASS compliant is added as comments

!
!PROSOFT : ProSoft 7.8.2-RC15
!PROSOFT_INSTRUMENT_CONFIG : MPR012_SORTIE1_DECKTARE
!PROSOFT_PARAMETERS_FILE_NAME : SORTIE1_SINGLE.mat
!OPERATOR : Scott
!ZONE : UTC
!COMMENT : Missing
!CAST : AA
!MODE : NONE
!PRESSURE-TARE : 0.000000
!TIMETAG : OFF
!DATETAG : ON
!TIMETAG2 : ON
!PROFILER : WET
!REFERENCE : OFF
!PRO-DARK : OFF
!REF-DARK : OFF
!PRO-ID : MPR0012
!PROCESSING_LEVEL : 4
!FILE_CREATION_TIME : 13-May-2008 23:38:17
!DEGLITCH_PRODAT : OFF
!DEGLITCH_REFDAT : OFF
!STRAY_LIGHT_CORRECT : ON
!THERMAL_RESPONSIVITY_CORRECT : ON
!DEPTH_RESOLUTION : 0.1 m
!

Level 2s and Level 3a data files are separated into individual sensor files (ie Es, Lu, Ed, Eu) to maintain a SeaBASS compliant data structure.

6.5 Data QA/QC

Data QA/QC is performed at various stages to assure high quality $L_{wn}(\lambda)$ retrievals. The HyperPro II instruments themselves are designed for optimal AOP data collection allowing the radiometers to profile near vertical, slowly through the water column, far from ship perturbations in the light field. Data collection procedures, data collection notes, data processing parameter, and processed data review, all contribute to improved data quality.

Data are collected with minimal clouds (none blocking the solar disk), typically between 1000-1400h local time and at least 50m from the vessel which is typically oriented with the sun on the instrument side and drifting away from the instrument. This is not always achievable and conditions which do not match these conditions are noted in the cruise log.

Data processing parameters are set to remove data records that may be contaminated by excessive tilts, or problems during the profile. Parameters are set to process only downcasts with tilts less than 5 degrees and velocities greater than 0.1m/sec.

Once the data are processed they are reviewed for quality. For multicast data, all radiance casts must vary about the mean of the profile. Profiles that are offset indicate contamination of the data set by clouds or ship based effects (usually ship shadow). Surface reference records are reviewed for dips that usually indicate cloud effects. K profiles are checked to make sure that the profile is consistent with a profile consistent with the optical properties of the water.

Data is flagged as follows:

Data Quality Flag	Selection Criteria
INVALID	Poor profile noted in cruise log, usually an aborted cast. These casts are not usually processed
POOR	Indicates data significantly affected by ship shadow, clouds or other affects
GOOD	Indicates data noted in log as having a potential problem (ie excessive tilts), but resulting data upon review appears to be of high quality
EXCELLENT	Perfect casts with no data flags or quality concerns

Table 11 - Data Quality Flags and Criteria

7 Radiometric Data – In Situ

The daily Cruise Log Files contain a list of all measurements logged by all groups (including special MOBY data sets and satellite overpasses) during the day including location, time and data file names. These logs are included in Appendix B.

Day	Cruise Log	Notes
2007-03-02	SORTIE1_KOK_Log_2007-03-02.pdf	M236 still in, Global/diffuse measurement, four deep profiles, four multicast and three surface mode deployments Winds 2m/s, clouds 1/10, waves 1m
2007-03-03	SORTIE1_KOK_Log_2007-03-03.pdf	M237 deployed Global/diffuse measurement, six deep profiles and four multicast Winds 4m/s, clouds 3/10, waves 1m
2007-03-04	SORTIE1_KOK_Log_2007-03-04.pdf	Two MOBY M237 matchups, best conditions Global/diffuse measurement, Sixteen deep profiles and fourteen multicast Winds 5m/s, clouds 0/10, waves 1m
2007-03-11	SORTIE1_KW_Log_2007-03-11.pdf	Off Oahu, good conditions High quality data for two deep profiles, four multicast and two surface mode deployments Winds 7.5m/s, clouds 1/10, waves 1m
2007-03-12	SORTIE1_KW_Log_2007-03-12.pdf	Off Oahu, poor conditions for radiometry, Global irradiance measurements only Winds 7.5m/s, clouds 8/10, waves 0.5m

Table 12 - Daily Cruise Log Summaries

The daily Processing Logs contain a list o all AOP files processed, processing parameters used, output file types, data quality flags, and processing notes. These logs are included in Appendix C.

Day	Cruise Log	Notes
2007-03-02	SORTIE1_KOK_AOP_Processing_Log _2007-03-02.pdf	M236 still in, High quality data for three deep profiles, three multicast and two surface mode deployments Winds 2m/s, clouds 1/10, waves 1m
2007-03-03	SORTIE1_KOK_AOP_Processing_Log _2007-03-03.pdf	M237 deployed, one possible matchup High quality data for three deep profiles and three multicast Winds 4m/s, clouds 3/10, waves 1m
2007-03-04	SORTIE1_KOK_AOP_Processing_Log _2007-03-04.pdf	M237 matchups, best conditions High quality data for twelve deep profiles and ten multicast Winds 5m/s, clouds 0/10, waves 1m
2007-03-11	SORTIE1_KW_AOP_Processing_Log_ 2007-03-11.pdf	Off Oahu, good conditions High quality data for four deep profiles, seven multicast and two surface mode deployments Winds 7.5m/s, clouds 1/10, waves 1m
2007-03-12	SORTIE1_KW_AOP_Processing_Log_ 2007-03-12.pdf	Off Oahu, poor conditions for radiometry, no high quality data Winds 7.5m/s, clouds 8/10, waves 0.5m

Table 13 – Daily Data Processing Log Summaries

SORTIE AOP data files are referred to by their coded file names. The file naming convention describes the experiment name, date of collection and type of data logged as follows:

EEEEE_YYYY-MM-DD_TSx.RAW

EEEE = Experiment Name

SORTIE1 = MOBY Cruise/SORTIE-1-KOK or SORTIE-1-KW

YYYY = Year

MM = Month

DD = Day

T = Type of Measurement

P = deep (100m profile) ($E_s(\lambda)$,$E_d(\lambda)$,$L_u(\lambda)$)

S = multicast surface replicates (five 10m profiles) ($E_s(\lambda)$,$E_d(\lambda)$,$L_u(\lambda)$)

T = surface buoy mode ($E_s(\lambda)$,$E_v(\lambda)$,$L_u(\lambda)$)

G = Global Irradiance ($E_s(\lambda)$)

D = Diffuse Irradiance (($E_{s\ diff}(\lambda)$)

S = System ID

A = MPR012 and/or HSE266

B = MPR071 and/or HSE192

x = SatView Sequence Letters (A..Z)

7.1 MOBY Data Matchups for SORTIE1-KOK

7.1.1 SORTIE1-KOK 2007-03-02 (HST)

See SORTIE1_KOK_2007-03-02.pdf log file for station details.

No MOBY matchup data available (B236 not programmed for hourly matchups)

7.1.2 SORTIE1-KOK 2007-03-03 (HST)

See SORTIE1_KOK_2007-03-03.pdf log file for station details.

7.1.2.1 MOBY Data 2007-03-03T2225UTC (2007-03-03T1225HST)

MOBY Position: 20 49.456N 157 11.823W

(L_w computed from B237 L_uTop (1.2m) and L_uMid (5.2m))

MOBY Data quality flag: QUESTIONABLE

Radiometry: MPR012 (HPL191, HPE235, HSE266)

SORTIE1_2007-03-03_GAA.RAW – E_s only 6:07min log

SORTIE1_2007-03-03_DBA.RAW – $E_{s\ diff}$ Diffuse Es only 2:00min log

SORTIE1_2007-03-03_PAA.RAW – 100m profile

Position: 20 49.880N 157 12.400W

SORTIE1_2007-03-03_PAB.RAW – 100m profile

SORTIE1_2007-03-03_SAA.RAW – multiple profiles to 10m

SORTIE1_2007-03-03_SAB.RAW – multiple profiles to 10m

MPR071 (HPL180, HPE191, HSE192)

SORTIE1_2007-03-03_PBA.RAW – 100m profile

SORTIE1_2007-03-03_PBB.RAW – 100m profile

SORTIE1_2007-03-03_SBA.RAW – multiple profiles to 10m

SORTIE1_2007-03-03_SBB.RAW – multiple profiles to 10m

7.1.3 SORTIE1-KOK 2007-03-04 (HST)

See SORTIE1_KOK_2007-03-04.pdf log file for station details.

7.1.3.1 MOBY Data 2007-03-04T2125UTC (2007-03-04T1125HST)

MOBY Position: 20 49.265N 157 12.039W

MOBY Data quality flag: GOOD

L_w computed from B237 L_uTop (1.2m) and L_uMid (5.2m))

Radiometry: MPR012 (HPL191, HPE235, HSE266)

SORTIE1_2007-03-04_PAC.RAW – 100m profile

Position: 20 50.014N 157 13.664W

SORTIE1_2007-03-04_PAD.RAW – 100m profile

SORTIE1_2007-03-04_SAB.RAW – multiple profiles to 10m

SORTIE1_2007-03-04_SAC.RAW – multiple profiles to 10m

MPR071 (HPL180, HPE191, HSE192)

SORTIE1_2007-03-04_PBC.RAW – 100m profile

SORTIE1_2007-03-04_PBD.RAW – 100m profile

SORTIE1_2007-03-04_SBB.RAW – multiple profiles to 10m

SORTIE1_2007-03-04_SBC.RAW – multiple profiles to 10m

7.1.3.2 MOBY Data 2007-03-04T2324UTC (2007-03-04T1324HST)

MOBY Position: 20 49.283N 157 11.998W

L_w computed from B237 L_uTop (1.2m) and L_uMid (5.2m)

MOBY Data quality flag: GOOD

Radiometry: None

7.1.3.3 MOBY Data 2007-03-05T0025UTC (2007-03-04T1425HST)

MOBY Position: 20 49.288N 157 11.971W

L_w computed from B237 L_uTop (1.2m) and L_uMid (5.2m)

MOBY Data quality flag: GOOD

Radiometry: MPR012 (HPL191, HPE235, HSE266)

SORTIE1_2007-03-04_PAG.RAW – 100m profile

Position: 20 49.548N 157 12.204W

SORTIE1_2007-03-04_PAH.RAW – 100m profile

SORTIE1_2007-03-04_SAF.RAW – multiple profiles to 10m

SORTIE1_2007-03-04_SAG.RAW – multiple profiles to 10m

MPR071 (HPL180, HPE191, HSE192)

SORTIE1_2007-03-04_PBG.RAW – 100m profile

SORTIE1_2007-03-04_PBH.RAW – 100m profile

SORTIE1_2007-03-04_SBF.RAW – multiple profiles to 10m

SORTIE1_2007-03-04_SBG.RAW – multiple profiles to 10m

Figure 17 - Sky conditions for 2007-03-05T0025UTC

Figure 18 - Sea conditions for 2007-03-05T0025UTC

7.2 HyperPro II Lw Comparisons

A summary of final L_w values computed using ProSoft 7.8.2-RC15 are shown in figures 19-22 for each day of SORTIE-1. Solid lines indicate L_w values for which the data passes QA/QC criteria, and the dotted lines indicate ones which failed. Note that Lw spectra do not compare well due to the change in Es during the day as the solar elevation changes (Lwn in the next section show much better matchups as it is normalized to Es). For detailed notes on the analysis of each data set, see the respective AOP Processing Analysis Log (see Table 9, and Appendix C).

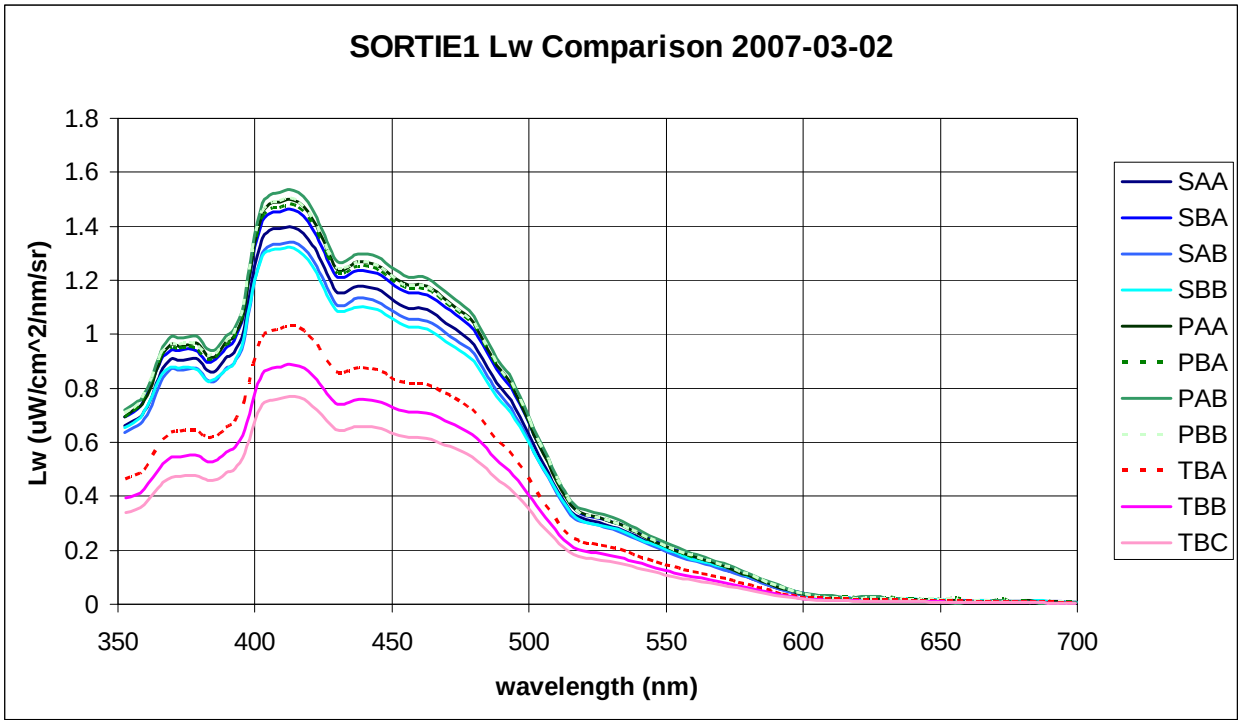


Figure 19 - Lw comparisons for SORTIE1_KOK_2007-03-02

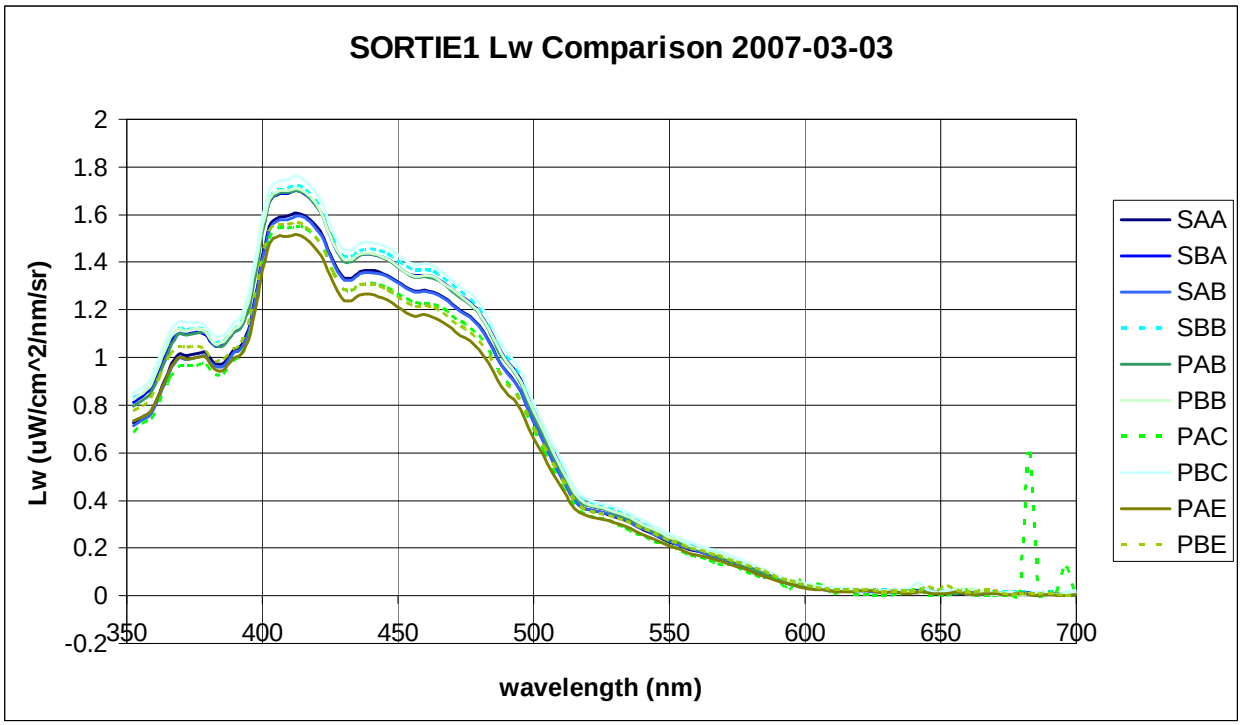


Figure 20 - Lw comparisons for SORTIE1_KOK_2007-03-03

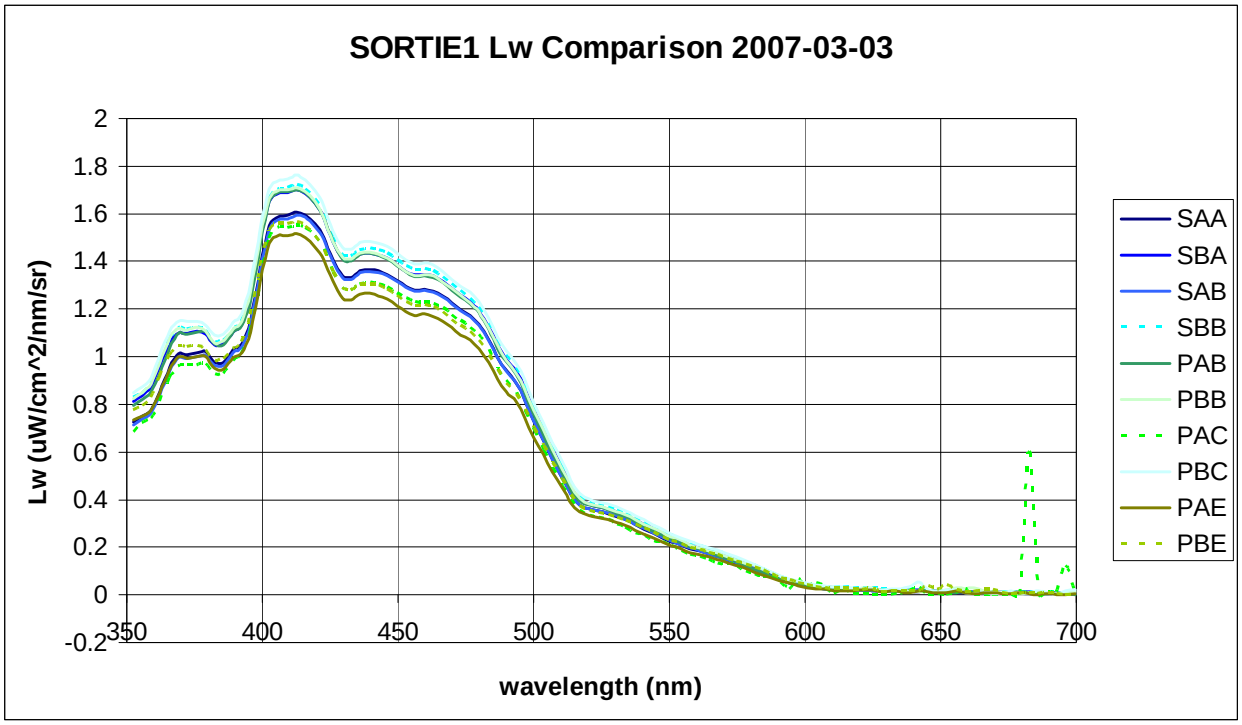


Figure 21 - Lw comparisons for SORTIE1_KOK_2007-03-04

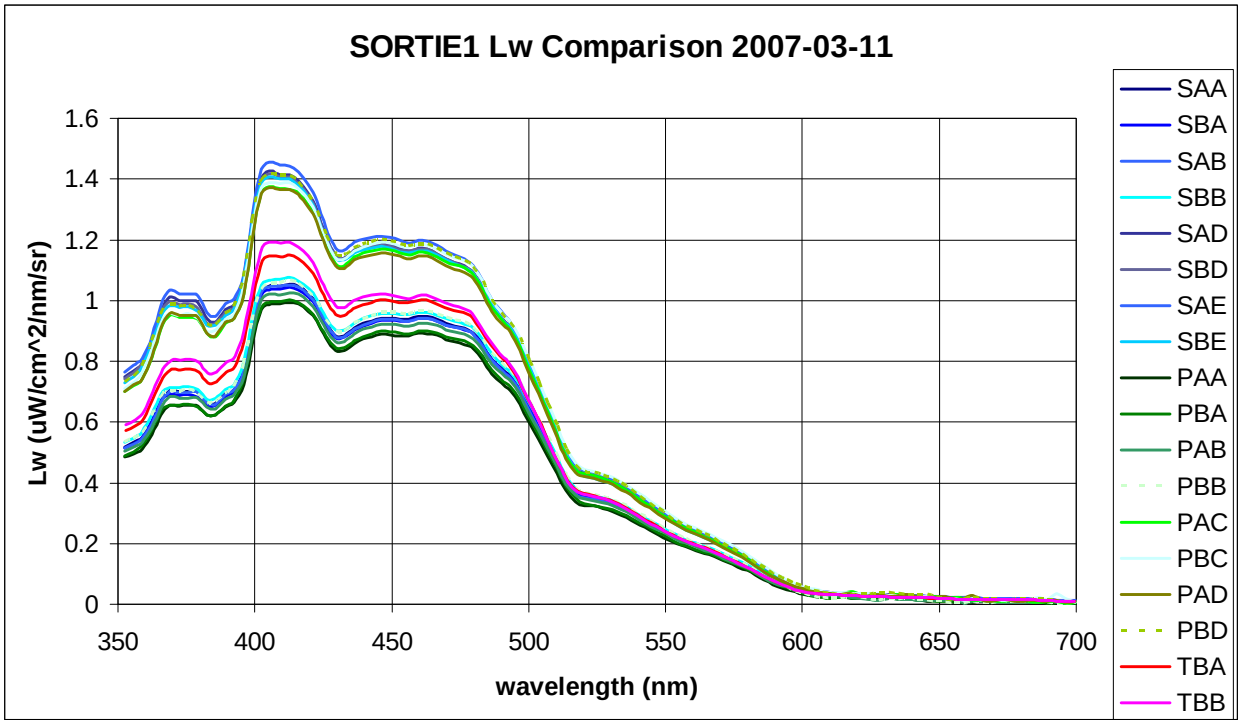


Figure 22 - Lw comparisons for SORTIE1_KW_2007-03-11

7.3 HyperPro II Lwn Comparisons

A summary of final L_{wn} values computed using ProSoft 7.8.1-RC13 are shown in figures 23-30 for each day of SORTIE-1. Solid lines indicate L_{wn} values for which the data passes QA/QC criteria, and the dotted lines indicate ones which failed. For each day the Percent Standard Deviation = Standard Deviation / Mean *100 is also plotted to show the spread of Lwn values for all three processing techniques (multicast, single cast and surface mode) for all samples and for just those with a good or excellent quality flag. For detailed notes on the analysis of each data set, see the respective AOP Processing Analysis Log (see Table 9 and Appendix C).

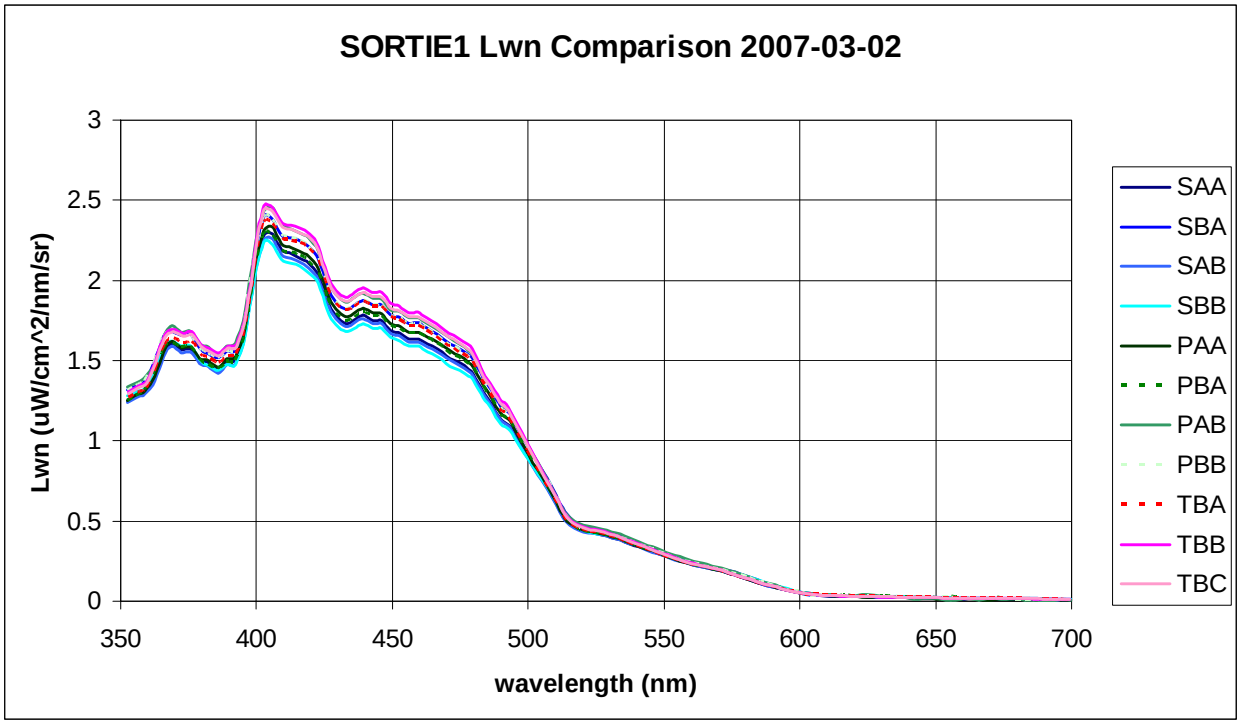


Figure 23 - Lwn comparisons for SORTIE1_KOK_2007-03-02

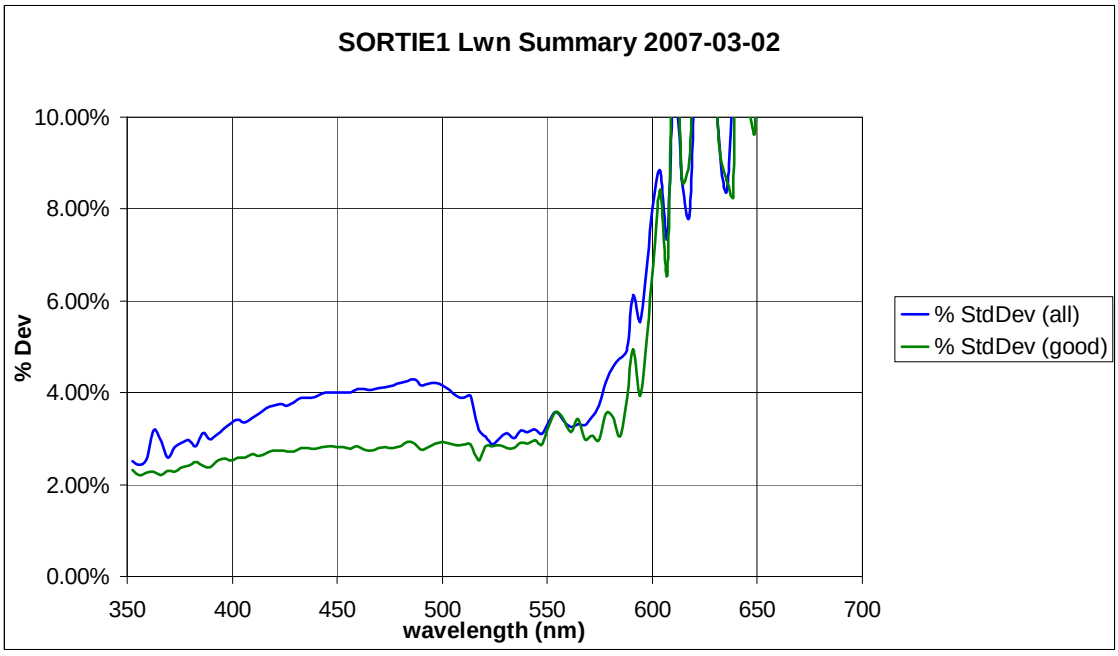


Figure 24 - Lwn comparisons for SORTIE1_KOK_2007-03-02 as % Deviation

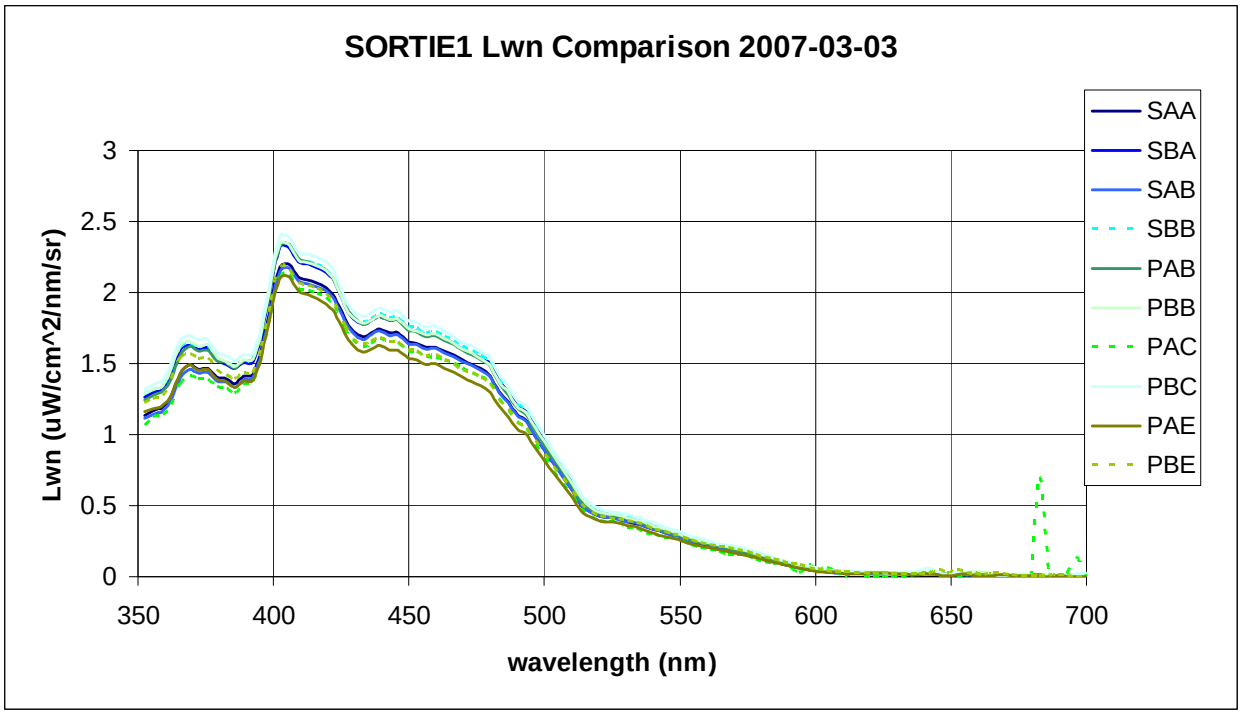


Figure 25 - Lwn comparisons for SORTIE1_KOK_2007-03-03

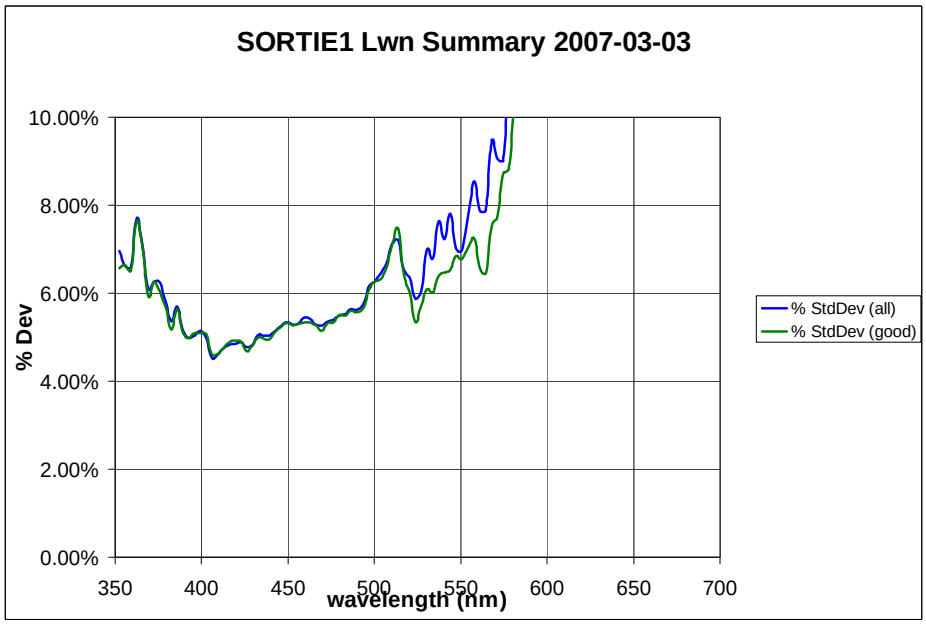


Figure 26 - Lwn comparisons for SORTIE1_KOK_2007-03-03 as % Deviation

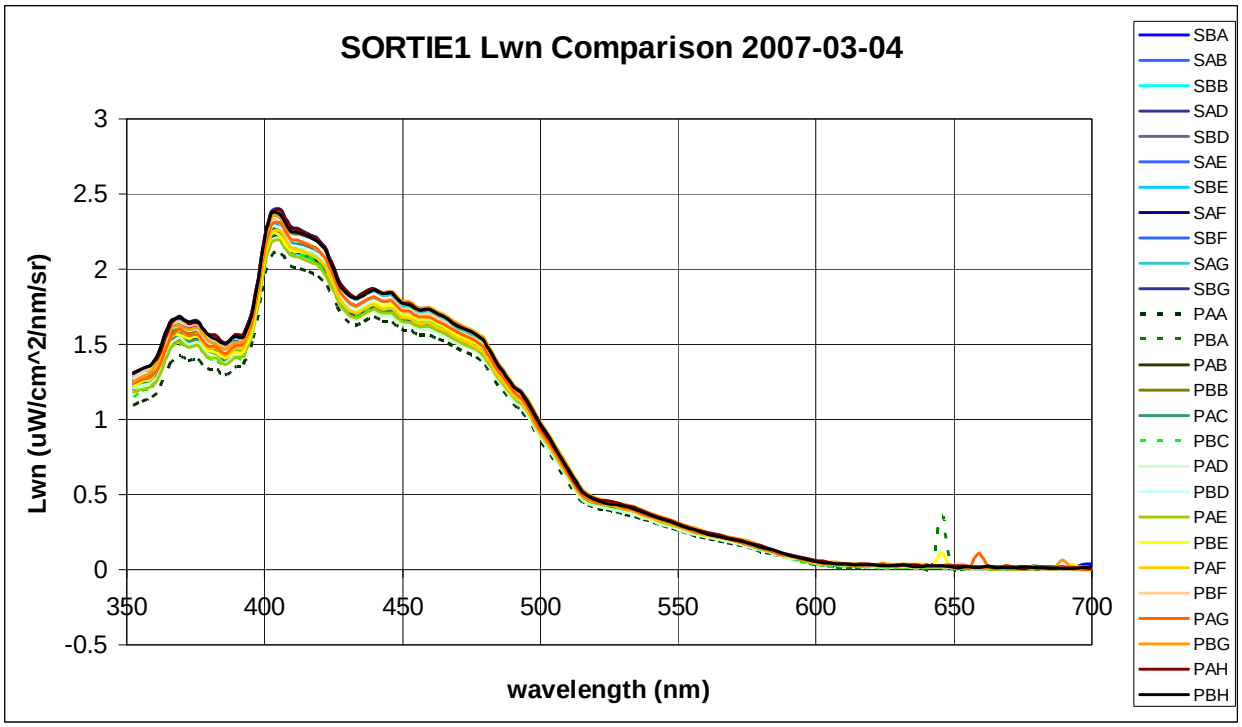


Figure 27 - Lwn comparisons for SORTIE1_KOK_2007-03-04

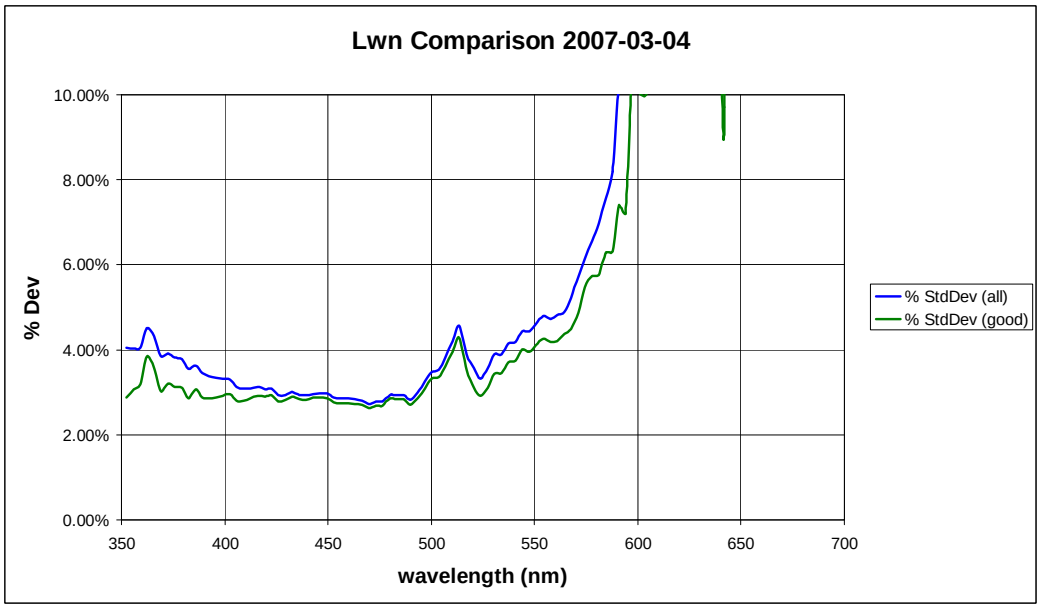


Figure 28 - Lwn comparisons for SORTIE1_KOK_2007-03-04 as % Deviation

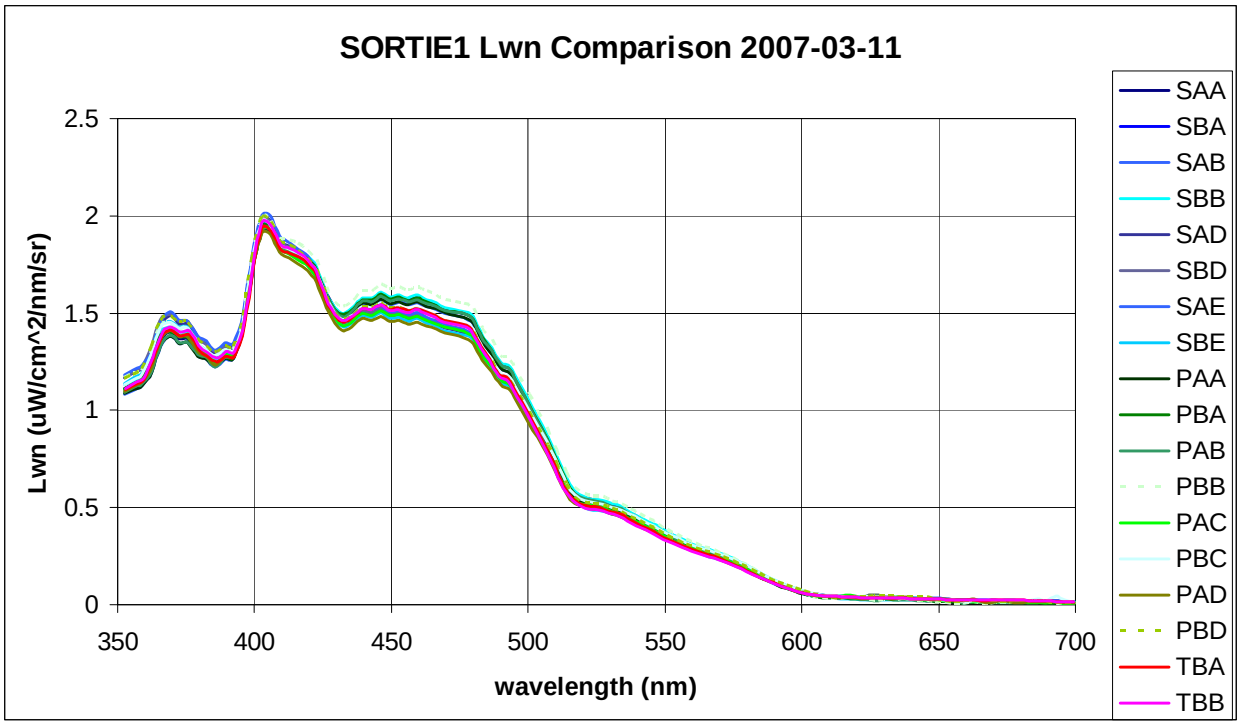


Figure 29 - Lwn comparisons for SORTIE1_KW_2007-03-11

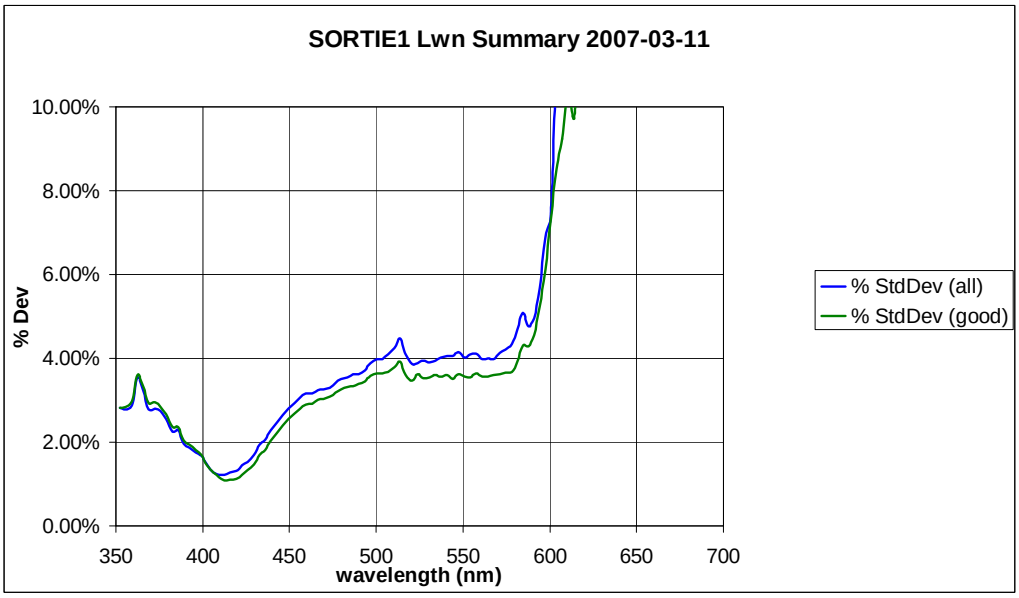


Figure 30 - Lwn comparisons for SORTIE1_KOK_2007-03-04 as % Deviation

8 Conclusions and Recommendations

With the generous help of the NOAA/NIST/MLML MOBY Team, SORTIE1 was a huge success and resulted in a highly repeatable data set with fully characterized field radiometers. Final conclusions and analysis are pending release of lab intercomparison data and a final MOBY data set. A number of recommendations for future work are listed below.

Calibration

- Purchase new NIST lamp and possibly recalibrate F409. Transfer NIST scale to two other lamps, reducing possible systematic bias in radiometer calibration (included in this updated report)
- Work with NIST/MOBY team to complete lab intercomparison analysis (ongoing)

Change measurement protocols

- Only use on deck tare to reduce uncertainty of pressure offset (done for SORTIE-2)
- Make sure vessel crew understand the vessel orientation requirements during radiometer deployment (done for SORTIE-2)
- More multicast profiles, fewer deep, single cast (done for SORTIE-2)
- Simultaneous multicast and surface buoy measurements (done for SORTIE-2)

Data processing

- Develop more objective QC/QA criteria for rejecting profiles. Difficult with single cast profiles, thus the need for more multicast mode. (data processor has been improved)
- Develop higher level L_{wn} statistical analysis for comparing and flagging anomalous data (data processor has been improved)
- Develop self shading corrections for both profiler and surface buoy mode using IOP measurements (ongoing)
- Determine stray light correction matrices for MPR012 system from SIRCUS data collected in fall of 2006. (this data has been included in this updated report)
- Process all of MPR012 data from SORTIE1 once stray light correction matrices are complete (this data has been included in this updated report)
- Generate final characterization reports for MPR012 (done)

9 APPENDIX A – ProSoft Processing Configuration Files

ProSoft requires to configurations to process data, which include the current instrument and the current parameters (these are available as described on the project DVD and on the project ftp site). These are selected from a list in the main ProSoft GUI.

The current instrument is a configuration file (.cfs) for the physical configuration of the instrument systems logged in the Level 0 file and it is stored in a folder in the ProSoft 7.8.2 directory under \Instruments and in a subfolder with the same name as the .cfs file. These files may be created using the "new" function in the ProSoft GUI and using the settings described in this Appendix. This process requires the calibration files described in the Appendix as well. These files can also be obtained by contacting Scott McLean at scott.mclean@wetsat.com. If the files are obtained directly, they only need to be imported using the "import" function in the ProSOft GUI.

The current parameter set is a configuration file (.mat) for the processing parameters used at various levels of ProSoft. It is stored in a folder in the ProSoft 7.8.2 directory under \Processing parameters. These files may be created using the "new" function in the ProSoft GUI and using the settings described in this Appendix. These files can also be obtained by contacting Scott McLean at scott.mclean@wetsat.com. If the files are obtained directly, they only need to be imported using the "import" function in the ProSoft GUI.

9.1 Instrument Context – MPR012_SORTIE1_DECKTARE

Processing Parameters for all "PAx", "SAx", and "GAx" series data files collected on 2007-03-03, 2007-03-11 and 2007-02-12.

On deck pressure tare

Water Medium	Seawater
Pressure Tare	On Deck
HPE235DS.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterLight
	Distance to Surface: 0.0
	Distance to Pressure: 0.868
PED235DS.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water

	Measurement Mode: FreeFall
	Frame Type: ShutterDark
	Distance to Surface: 0.0
	Distance to Pressure: 0.868
HPL191DS.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterLight
	Distance to Surface: 0.315
	Distance to Pressure: 0.0
PLD191DS.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterDark
	Distance to Surface: 0.315
	Distance to Pressure: 0.0
MPR012G.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: Anc
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
HSE266BS.CAL	Instrument Type: Reference
	Immersion Coefficient: Air
	Measurement Mode: Surface
	Frame Type: ShutterLight
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
HED266BS.CAL	Instrument Type: Reference
	Immersion Coefficient: Air
	Measurement Mode: Surface
	Frame Type: ShutterDark
	Distance to Surface: 0.0

	Distance to Pressure: 0.0
BB2F-077.TDF	Instrument Type: ECO Series IOP
	Immersion Coefficient: Not Required
	Measurement Mode: FreeFall
	Frame Type: Not Required
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
SATFLCD150.TDF	Instrument Type: ECO Series IOP
	Immersion Coefficient: Not Required
	Measurement Mode: FreeFall
	Frame Type: Not Required
	Distance to Surface: 0.0
	Distance to Pressure: 0.0

9.2 Instrument Context – MPR012_SORTIE1_WATERTARE

Processing Parameters for all "PAx", "SAx", "GAx" series data files collected on 2007-03-02 and 2007-03-04.

In Water pressure tare

Water Medium	Seawater
Pressure Tare	In Water
HPE235DS.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterLight
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
PED235DS.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterDark
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
HPL191DS.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterLight
	Distance to Surface: 0.315
	Distance to Pressure: 0.0
PLD191DS.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterDark
	Distance to Surface: 0.315

	Distance to Pressure: 0.0
MPR012G.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: Anc
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
HSE266BS.CAL	Instrument Type: Reference
	Immersion Coefficient: Air
	Measurement Mode: Surface
	Frame Type: ShutterLight
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
HED266BS.CAL	Instrument Type: Reference
	Immersion Coefficient: Air
	Measurement Mode: Surface
	Frame Type: ShutterDark
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
BB2F-077.TDF	Instrument Type: ECO Series IOP
	Immersion Coefficient: Not Required
	Measurement Mode: FreeFall
	Frame Type: Not Required
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
SATFLCD150.TDF	Instrument Type: ECO Series IOP
	Immersion Coefficient: Not Required
	Measurement Mode: FreeFall
	Frame Type: Not Required
	Distance to Surface: 0.0
	Distance to Pressure: 0.0

9.3 Instrument Context – MPR071_SORTIE1_DECKTARE

Processing Parameters for all "PBx", "SBx", "GBx", and "DBx" series data files collected on 2007-03-03, 2007-03-11 and 2007-02-12.

On deck pressure tare

Water Medium	Seawater
Pressure Tare	On Deck
HPE191ES.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterLight
	Distance to Surface: 0.0
	Distance to Pressure: 0.868
PED191ES.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterDark
	Distance to Surface: 0.0
	Distance to Pressure: 0.868
HPL180ES.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterLight
	Distance to Surface: 0.315
	Distance to Pressure: 0.0
PLD180ES.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterDark

	Distance to Surface: 0.315
	Distance to Pressure: 0.0
MPR071D.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: Anc
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
HSE192ES.CAL	Instrument Type: Reference
	Immersion Coefficient: Air
	Measurement Mode: Surface
	Frame Type: ShutterLight
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
HED192ES.CAL	Instrument Type: Reference
	Immersion Coefficient: Air
	Measurement Mode: Surface
	Frame Type: ShutterDark
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
SATBB2F139.TDF	Instrument Type: ECO Series IOP
	Immersion Coefficient: Not Required
	Measurement Mode: FreeFall
	Frame Type: Not Required
	Distance to Surface: 0.0
	Distance to Pressure: 0.0

9.4 Instrument Context (Surface Mode) – MPR071_SORTIE1_Surface_WATERTARE

Processing Parameters for all "TBx" series data files on 2007-03-02

In water pressure tare

Water Medium	Seawater
Pressure Tare	In Water
HPE191ES_Eu.CAL	Instrument Type: Reference
	Immersion Coefficient: Water
	Measurement Mode: Surface
	Frame Type: ShutterLight
	Distance to Surface: 0.200
	Distance to Pressure: 0.0
PED191ES_Eu.CAL	Instrument Type: Reference
	Immersion Coefficient: Water
	Measurement Mode: Surface
	Frame Type: ShutterDark
	Distance to Surface: 0.200
	Distance to Pressure: 0.0
HPL180ES.CAL	Instrument Type: Reference
	Immersion Coefficient: Water
	Measurement Mode: Surface
	Frame Type: ShutterLight
	Distance to Surface: 0.200
	Distance to Pressure: 0.0
PLD180ES.CAL	Instrument Type: Reference
	Immersion Coefficient: Water
	Measurement Mode: Surface
	Frame Type: ShutterDark
	Distance to Surface: 0.200

	Distance to Pressure: 0.0
MPR071D.CAL	Instrument Type: Reference
	Immersion Coefficient: Water
	Measurement Mode: Surface
	Frame Type: Anc
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
HSE192ES.CAL	Instrument Type: Reference
	Immersion Coefficient: Air
	Measurement Mode: Surface
	Frame Type: ShutterLight
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
HED192ES.CAL	Instrument Type: Reference
	Immersion Coefficient: Air
	Measurement Mode: Surface
	Frame Type: ShutterDark
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
SATBB2F139.TDF	Instrument Type: ECO Series IOP
	Immersion Coefficient: Not Required
	Measurement Mode: FreeFall
	Frame Type: Not Required
	Distance to Surface: 0.0
	Distance to Pressure: 0.0

9.5 Instrument Context – MPR071_SORTIE1_WATERTARE

Processing Parameters for all "PBx", "SBx", "GBx", and "DBx" series data files collected on 2007-03-02 and 2007-03-04.

In Water pressure tare

Water Medium	Seawater
Pressure Tare	In Water
HPE191ES.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterLight
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
PED191ES.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterDark
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
HPL180ES.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterLight
	Distance to Surface: 0.315
	Distance to Pressure: 0.0
PLD180ES.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: ShutterDark
	Distance to Surface: 0.315

	Distance to Pressure: 0.0
MPR071D.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: FreeFall
	Frame Type: Anc
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
HSE192ES.CAL	Instrument Type: Reference
	Immersion Coefficient: Air
	Measurement Mode: Surface
	Frame Type: ShutterLight
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
HED192ES.CAL	Instrument Type: Reference
	Immersion Coefficient: Air
	Measurement Mode: Surface
	Frame Type: ShutterDark
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
SATBB2F139.TDF	Instrument Type: ECO Series IOP
	Immersion Coefficient: Not Required
	Measurement Mode: FreeFall
	Frame Type: Not Required
	Distance to Surface: 0.0
	Distance to Pressure: 0.0

9.6 Instrument Context – MPR071_SORTIE1_Surface_DECKTARE

Processing Parameters for all "TBx" series data files collected on 2007-03-03 and 2007-03-11

On deck pressure tare

Water Medium	Seawater
Pressure Tare	On Deck
HPE191ES_Eu.CAL	Instrument Type: Reference
	Immersion Coefficient: Water
	Measurement Mode: Surface
	Frame Type: ShutterLight
	Distance to Surface: 0.200
	Distance to Pressure: 0.553
PED191ES_Eu.CAL	Instrument Type: Reference
	Immersion Coefficient: Water
	Measurement Mode: Surface
	Frame Type: ShutterDark
	Distance to Surface: 0.200
	Distance to Pressure: 0.553
HPL180ES.CAL	Instrument Type: Reference
	Immersion Coefficient: Water
	Measurement Mode: Surface
	Frame Type: ShutterLight
	Distance to Surface: 0.200
	Distance to Pressure: 0.0
PLD180ES.CAL	Instrument Type: Reference
	Immersion Coefficient: Water
	Measurement Mode: Surface
	Frame Type: ShutterDark
	Distance to Surface: 0.200

	Distance to Pressure: 0.0
MPR071D.CAL	Instrument Type: Profiler
	Immersion Coefficient: Water
	Measurement Mode: Surface
	Frame Type: Anc
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
HSE192ES.CAL	Instrument Type: Reference
	Immersion Coefficient: Air
	Measurement Mode: Surface
	Frame Type: ShutterLight
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
HED192ES.CAL	Instrument Type: Reference
	Immersion Coefficient: Air
	Measurement Mode: Surface
	Frame Type: ShutterDark
	Distance to Surface: 0.0
	Distance to Pressure: 0.0
SATBB2F139.TDF	Instrument Type: ECO Series IOP
	Immersion Coefficient: Not Required
	Measurement Mode: FreeFall
	Frame Type: Not Required
	Distance to Surface: 0.0
	Distance to Pressure: 0.0

9.7 Processing Context (Single Cast Mode) – Parameters SORTIE1_SINGLE.mat

Processing Parameters for all "P", "T", "G", and "D" series data files

STRAY LIGHT = ON
THERMAL CORRECTION = ON
PROFILE EDIT = ON
MULTICAST PROFILE = OFF
MINIMUM WAVELENGTH = 350
MAXIMUM WAVELENGTH = 700

AUTO DARK CORRECTION = SHUTTER
DARK BINS = 20
SHUTTER DARK DEGLITCH = OFF

AUTO EDIT = ON
LOW VELOCITY = -1
HIGH TILT = 5

MINIMUM PRESSURE = 0
MAXIMUM PRESSURE = 10
NORMALIZATION = OFF
DISPLAY GRAPHS = OFF
LOWER WAVELENGTH = 490
UPPER WAVELENGTH = 700

DEGLITCH PROFILER DATA = OFF
PROFILER NOISE = 5
UPPER DEPTH LEVEL = 0
LOWER DEPTH LEVEL = 10000
DEGLITCH REFERENCE = OFF

REFERENCE NOISE = 20

DEPTH RESOLUTION = 0.10

BIN INTERVAL = 1.0

BIN WIDTH = 1.0

TIME INTERVAL = 2

TIME WIDTH = 1

WAVELENGTH INTERP = OFF

INTEGRATION POINTS = 5

REFLECTION ALBEDO = 0.043

REFLECTANCE INDEX = 0.021

REFRACTIVE INDEX = 1.345

SELF SHADING = OFF

ET Solar = Thuillier

9.8 Processing Context (Single Cast Mode) – Parameters SORTIE1_SINGLE.mat

Processing Parameters for all "P", "T", "G", and "D" series data files

STRAY LIGHT = ON
THERMAL CORRECTION = ON
PROFILE EDIT = ON
MULTICAST PROFILE = OFF
MINIMUM WAVELENGTH = 350
MAXIMUM WAVELENGTH = 700

AUTO DARK CORRECTION = SHUTTER
DARK BINS = 20
SHUTTER DARK DEGLITCH = OFF

AUTO EDIT = ON
LOW VELOCITY = -1
HIGH TILT = 5

MINIMUM PRESSURE = 0
MAXIMUM PRESSURE = 10
NORMALIZATION = OFF
DISPLAY GRAPHS = OFF
LOWER WAVELENGTH = 490
UPPER WAVELENGTH = 700

DEGLITCH PROFILER DATA = OFF
PROFILER NOISE = 5
UPPER DEPTH LEVEL = 0
LOWER DEPTH LEVEL = 10000
DEGLITCH REFERENCE = OFF

REFERENCE NOISE = 20

DEPTH RESOLUTION = 0.10

BIN INTERVAL = 1.0

BIN WIDTH = 1.0

TIME INTERVAL = 2

TIME WIDTH = 1

WAVELENGTH INTERP = OFF

INTEGRATION POINTS = 5

REFLECTION ALBEDO = 0.043

REFLECTANCE INDEX = 0.021

REFRACTIVE INDEX = 1.345

SELF SHADING = OFF

ET Solar = Thuillier

9.9 Processing Context (Multicast Cast Mode) – Parameters SORTIE1_MULTI_MOBY.mat

Processing Parameters for all "S" series data files for normalization referenced to user selected time beginning of cast (for MOBY matchups)

STRAY LIGHT = ON

THERMAL CORRECTION = ON

PROFILE EDIT = ON

MULTICAST PROFILE = ON

MINIMUM WAVELENGTH = 350

MAXIMUM WAVELENGTH = 700

AUTO DARK CORRECTION = SHUTTER

DARK BINS = 20

SHUTTER DARK DEGLITCH = OFF

AUTO EDIT = ON

LOW VELOCITY = -1

HIGH TILT = 5

MINIMUM PRESSURE = 0

MAXIMUM PRESSURE = 10

NORMALIZATION = ENTER TIME

DISPLAY GRAPHS = ON

LOWER WAVELENGTH = 490

UPPER WAVELENGTH = 700

DEGLITCH PROFILER DATA = OFF

PROFILER NOISE = 5

UPPER DEPTH LEVEL = 0

LOWER DEPTH LEVEL = 10000

DEGLITCH REFERENCE = OFF

REFERENCE NOISE = 20

DEPTH RESOLUTION = 0.10

BIN INTERVAL = 1.0

BIN WIDTH = 1.0

TIME INTERVAL = 2

TIME WIDTH = 1

WAVELENGTH INTERP = OFF

INTEGRATION POINTS = 5

REFLECTION ALBEDO = 0.043

REFLECTANCE INDEX = 0.021

REFRACTIVE INDEX = 1.345

SELF SHADING = OFF

ET Solar = Thuillier

10 APPENDIX B – SORTIE-1 Cruise Logs

SORTIE-1 Cruise Logs:

SORTIE1_KOK_Log_2007-03-02

SORTIE1_KOK_Log_2007-03-03

SORTIE1_KOK_Log_2007-03-04

SORTIE1_KW_Log_2007-03-11

SORTIE1_KW_Log_2007-03-12

SORTIE-1-KOK Cruise Log **2007-03-02 (HST)** **Friday**

CTD	CTD/Rosette	Local = HST	UTC-10	
HYP	HyperPro			
HYT	HyperTSRB	MOBY	20 49.170	157 11.160
GDF	HyperRef Global/Diffuse			
GGR	HyperRef Global/Global			
MAS	MASCOT			
MOS	MOS ROV			
DOL	DOLPHIN			
ECO	ECO-VSF3 with pressure			
SRF	Surface water sample			
MOB	MOBY			
SEA	SeaWiFS overpass			
MOT	MODIS Terra overpass			
MOA	MODIS Aqua overpass			
GOES	GOES11 vis from www.nrlmry.navy.mil			

Time/Date (UTC)	Lat	Lon	Time/Date (local)	STATION	OPERATION	ACTION	CODE	LOG FILE	Comments
2007-03-02T1800			2007-03-02T0800	Snug Harbor					Depart
2007-03-02T2029			2007-03-02T1029	In transit	MODIS Terra	overpass	MOT		sky clear
2007-03-02T2223	20 57.358	157 23.556	2007-03-02T1223	In transit	Global/Diffuse		GDF	SORTIE1_2007-03-02_GAA.RAW SORTIE1_2007-03-02_DBA.RAW	2:00 Diffuse HSE192 6:07 Global HSE266
2007-03-02T2230			1230	Hawaii			GOES	20070302.2230.goes11.vis.x.hawaii.x.jpg	
2007-03-02T2236	20 56.250	157 21.788	2007-03-02T1236	In transit	Global/Global		GGR	SORTIE1_2007-03-02_GAB.RAW SORTIE1_2007-03-02_GBB.RAW	30:00 HSE266 30:00 HSE192
2007-03-02T2245			2007-03-02T1245	In transit	Photos		PHO		sky/sea photos
2007-03-02T2336			2007-03-02T1336	In transit	MODIS Aqua		MOA		sky clear
2007-03-02T2356			2007-03-02T1356	In transit	SeaWiFS	overpass	SEA		sky clear
2007-03-03T0003	20 49.747	157 12.097	2007-03-02T1403	MOBY	MASCOT	deploy MASCOT	MAS	RUN.000 start	MASCOT deployed to 10m
2007-03-03T0013			1413	MOBY	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-02_PAA.RAW SORTIE1_2007-03-02_PBA.RAW	4:25 MPR012 100m 4:23 MPR071 100m
2007-03-03T0020			1420	MOBY	Surface Water		SRF		surface water sample from seachest
2007-03-03T0023			1423	MOBY	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-02_PAB.RAW SORTIE1_2007-03-02_PBB.RAW	4:18 MPR012 100m 4:20 MPR071 100m
2007-03-03T0029			1429	MOBY	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-02_PAC.RAW SORTIE1_2007-03-02_PBC.RAW	aborted
2007-03-03T0030			1430	MOBY	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-02_SAA.RAW SORTIE1_2007-03-02_SBA.RAW	5 casts to 10m
2007-03-03T0030			1430	Hawaii			GOES	20070303.0030.goes11.vis.x.hawaii.x.jpg	
2007-03-03T0035			1435	MOBY	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-02_SAB.RAW SORTIE1_2007-03-02_SBB.RAW	5 casts to 10m
2007-03-03T0044	20 50.058	157 12.481	1444	MOBY	ECO-VSF3	hold at 10m	ECO		at 10m
2007-03-03T0101			1501	MOBY	ECO-VSF3	hold at 1m	ECO		at 1m
2007-03-03T0109			1509	MOBY	MASCOT	recovered	MAS		tricho at surface
2007-03-03T0115			1515	MOBY	Photos		PHO		sky/sea photos
2007-03-03T0123			1523	MOBY	MASCOT	deployed for darks	MAS	RUN.001 start	profile to 250m (darks)
2007-03-03T0139			1539	MOBY	HyperTSRB	deployed	HYT	SORTIE1_2007-03-02_TBA.RAW	10:35 logged at surface stopped log for cloud
2007-03-03T0149			1549	MOBY	HyperTSRB	end log	HYT		
2007-03-03T0153			1553	MOBY	MASCOT	recovered	MAS		
2007-03-03T0153			1558	MOBY	MASCOT	deployed	MAS	RUN.002 start	
2007-03-03T0203	20 50.363	157 12.551	1603	MOBY	HyperTSRB	start log	HYT	SORTIE1_2007-03-02_TBB.RAW	moved out farther from ship
2007-03-03T0203			1603	MOBY	MASCOT	profile to 250m	MAS		profile to 250m
2007-03-03T0215	20 50.406	157 12.563	1615	MOBY	HyperTSRB	end log	HYT		11:12 logged
2007-03-03T0215			1615	MOBY	MASCOT	start upcast	MAS		
2007-03-03T0222			1622	MOBY	HyperTSRB	start log	HYT	SORTIE1_2007-03-02_TBC.RAW	
2007-03-03T0222	20 50.401	157 12.614	1622	MOBY	MASCOT	hold at 5m	MAS		MASCOT 5m
2007-03-03T0229			1629	MOBY	HyperTSRB	end log	HYT		4:21 logged
2007-03-03T0229			1629	MOBY	MASCOT	recovered	MAS		
2007-03-03T0245	20 50.593	157 12.606	1645	STN4	DOLPHIN	deployed	DOL	HI030307.001 start	DOLPHIN deployed tail up at 5m to purge
2007-03-03T0313			1713	STN4	DOLPHIN	start deep cast	DOL		
2007-03-03T0320	20 50.854	157 12.505	1720	STN4	DOLPHIN	hold	DOL	HI030307.002 start	hold at 150m
2007-03-03T0322			1722	STN4	DOLPHIN	start tow	DOL		start tow up to 4kts near STN4
2007-03-03T0322			1722	STN4	Surface Water		SRF		surface water sample from seachest
2007-03-03T0341	20 50.092	157 12.900	1741	transit			DOL		increase to 5kts,depth 13.5m

2007-03-03T0405			1805	transit	DOLPHIN	start log	DOL	HI030307.003 start	start new log file
2007-03-03T0412	20 50.600	157 12.900	1812	STN6			DOL		pass STN6, DOPLHIN at 10m
2007-03-03T0415			1815	transit	Surface Water		SRF		surface water sample from seachest
2007-03-03T0421	20 47.917	157 12.363	1821	transit	DOLPHIN	came to surface	DOL	HI030307.004 start	DOLPHIN came to surface, all stop
2007-03-03T0425	20 48.088	157 12.270	1825	transit	DOLPHIN	start tow	DOL		restart tow
2007-03-03T0426			1826	transit	DOLPHIN	came to surface	DOL		DOLPHIN came to surface, all stop
2007-03-03T0429			1829	transit	DOLPHIN	start tow	DOL	HI030307.005 start	restart tow
2007-03-03T0443	20 49.081	157 11.276	1843	transit			DOL		passing MOBY
2007-03-03T0512	20 50.709	157 09.553	1912	STN1			DOL		pass STN1, DOLPHIN towing at 20m
2007-03-03T0520			1920		Surface Water		SRF		surface water sample from seachest
2007-03-03T0530			1930		DOLPHIN	add dynamometer	DOL	HI030307.006 start	150-200lbs pull
2007-03-03T0552	20 47.600	157 09.700	1952	STN3			DOL		pass STN3, DOLPHIN towing at 10m
2007-03-03T0600			2000		Surface Water		SRF		surface water sample from seachest
2007-03-03T0608			2008		DOLPHIN	start new log	DOL	HI030307.007 start	
2007-03-03T0612	20 49.200	157 11.000	2022	MOBY			DOL		pass MOBY
2007-03-03T0630			2030	MOBY	Surface Water		SRF		surface water sample from seachest
2007-03-03T0639	20 50.600	157 11.304	2039	STN7			DOL		pass STN7, DOLPHIN towing at 10m
2007-03-03T0714	20 49.073	157 12.056	2114	STN8			DOL		pass STN8, DOLPHIN towing at 10m
2007-03-03T0734	20 49.044	157 10.436	2134	STN9	DOLPHIN	start new log	DOL	HI030307.008 start	pass STN9, DOLPHIN towing at 10m
2007-03-03T0755	20 47.579	157 11.316	2155	STN10			DOL		pass STN10, DOLPHIN towing at 10m
2007-03-03T0800			2200	transit	DOLPHIN	start recovery	DOL		start DOLPHIN recovery
2007-03-03T0809			2209	transit	DOLPHIN	pay out cable	DOL		pay out cable to tighten spool
2007-03-03T0835	20 49.594	157 11.307	2235	transit	DOLPHIN	start recovery	DOL		500m cable out, start recovery
2007-03-03T0858	20 51.655	157 09.797	2258	transit	DOLPHIN	start profile	DOL	HI030307.009 start	all stop, cable at 170m, let profile
2007-03-03T0905			2305	transit	DOLPHIN	start recovery	DOL		at 100m start recovery
2007-03-03T0915			2315	transit	DOLPHIN	winch failure	DOL		winch failure, recover with capstan
2007-03-03T0927			2327		DOLPHIN	stop log	DOL		stop file log
2007-03-03T0930	20 50.892	157 08.956	2330		DOLPHIN	on board	DOL		on board
2007-03-03T0945			2345						end SORTIE operations

SORTIE-1-KOK Cruise Log **2007-03-03 (HST)** **Saturday**

CTD	CTD/Rosette	Local = HST	UTC-10	
HYP	HyperPro			
HYT	HyperTSRB	MOBY	20 49.170	157 11.160
GDF	HyperRef Global/Diffuse			
GGR	HyperRef Global/Global			
MAS	MASCOT			
MOS	MOS ROV			
DOL	DOLPHIN			
ECO	ECO-VSF3 with pressure			
SRF	Surface water sample			
MOB	MOBY			
SEA	SeaWiFS overpass			
MOT	MODIS Terra overpass			
MOA	MODIS Aqua overpass			
GOES	GOES11 vis from www.nrlmry.navy.mil			

Time/Date (UTC)	Lat	Lon	Time/Date (local)	STATION	OPERATION	ACTION	CODE	LOG FILE	Comments
2007-03-03T1700			2007-03-03T0700	MOBY	MOBY	start MOBY deployment	MOB		
2007-03-03T2100			1100	MOBY	MOBY	MOBY deployment complete	MOB		
			1112	MOBY	MODIS Terra	overpass	MOA		may be contaminated with clouds
2007-03-03T2115			1115	MOBY	MOBY	MOBY logging data	MOB		MOBy will turn on at the hour, 15min cool, 15min Lu, 15min Ed/Es
									standing by for clouds to clear over MOBY
2007-03-03T2200			1200	MOBY	MOBY	MOBY logging data	MOB		MOBy will turn on at the hour, 15min cool, 15min
2007-03-03T2201			1201	MOBY	HyperRef	measure global/diffuse	GDF	SORTIE1_2007-03-03_GAA.RAW SORTIE1_2007-03-03_DBA.RAW	2:00 Diffuse HSE192 6:07 Global HSE266
				MOBY	DOLPHIN	deployed	DOL		
2007-03-03T2217	20 49.880	157 12.400	1217	MOBY	HyperPro	abort -12 30m cable tangle	HYP	SORTIE1-2007-03-03_PAA.RAW SORTIE1-2007-03-03_PBA.RAW	
2007-03-03T2222			1222		Surface Water		SRF		surface water sample from seachest
2007-03-03T2223	20 49.947	157 12.447	1223	MOBY	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-03_PAB.RAW SORTIE1_2007-03-03_PBB.RAW	re-tared pressure 4:08 MPR012 100m 4:01 MPR071 50m
2007-03-03T2230			1230	Hawaii			GOES	20070303.2230.goes11.vis.x.hawaii.x.jpg	
2007-03-03T2232			1232	MOBY	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-03_PAC.RAW SORTIE1_2007-03-03_PBC.RAW	4:17 MPR012 100m 4:20 MPR071 100m
2007-03-03T2235	20 50.115	157 12.544	1235	MOBY	Photos		PHO		sky/water shots
2007-03-03T2339			1239	MOBY	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-03_SAA.RAW SORTIE1_2007-03-03_SBA.RAW	5 casts to 10m
2007-03-03T2240			1240	MOBY		deploy to 5m	DOL	HI030307.010	
2007-03-03T2248	20 50.328	157 12.676	1248	MOBY	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-03_SAB.RAW SORTIE1_2007-03-03_SBB.RAW	5 casts to 10m, cast 3 to 50m MPR012 close to
						move back to MOBY	HYP	note no PAD or PBD files	3kts DOLPHIN still in
2007-03-03T2258			1258	MOBY	SeaWiFS	overpass	SEA		may be contaminated with clouds
2007-03-03T2310			1310	MOBY	HyperPro		HYP	SORTIE1_2007-03-03_PAE.RAW SORTIE1_2007-03-03_PBE.RAW	4:08 MPR012 100m 4:01 MPR071 100m
2007-03-03T2316			1316	MOBY	HyperPro	abort due to cloud	HYP	SORTIE1_2007-03-03_PAF.RAW SORTIE1_2007-03-03_PBF.RAW	1:57 MPR012 40m 1:59 MPR071 40m
2007-03-03T2320	20 50.044	157 12.689	1320	MOBY		standing by for clouds			
2007-03-03T2322			1322	MOBY	Surface Water		SRF		surface water sample from seachest
2007-03-03T2330			1330	Hawaii			GOES	20070303.2330.goes11.vis.x.hawaii.x.jpg	
2007-03-03T2343	20 50.083	157 12.805	1343	MOBY	ECO-VSF3		ECO		surface darks
2007-03-03T2350	20 50.113	157 12.859	1350	MOBY	DOLPHIN	start new log file	DOL	HI030307.011	
2007-03-04T0000			1400	STN4		start new log file		HI030307.001	at 5m
2007-03-04T0007			1407	STN4				HI030307.002	at 10m
2007-03-04T0015			1415	STN4				HI030307.003	at 5m
2007-03-04T0019			1419	STN4	MODIS Aqua	overpass	MOA		may be contaminated with clouds
2007-03-04T0025	20 50.362	157 13.212	1425	STN4	ECO-VSF3	recover ECO VSF	ECO		drifted over to STN4
2007-03-04T0030			1430	STN4	DOLPHIN		DOL	HI030307.004	manuvering ship for CTD
2007-03-04T0030			1430	Hawaii			GOES	20070304.0030.goes11.vis.x.hawaii.x.jpg	
2007-03-04T0036			1436	STN4	SeaWiFS	overpass	SEA		may be contaminated with clouds
2007-03-04T0041			1441	STN4	ECO-VSF3		ECO		surface darks
2007-03-04T0043	20 50.375	157 13.245	1443	STN4	Surface Water		SRF		surface water sample from seachest
2007-03-04T0045	20 50.375	157 13.245	1445	STN4	CTD	deploy to 250m	CTD		water samples 10, 20, 130, 150m

2007-03-04T0110			1510	STN4	DOLPHIN	recover DOLPHIN	DOL		
2007-03-04T0120			1520	STN4	DOLPHIN	start dark cast	DOL	HI030307.005	hold at 5m
2007-03-04T0130			1530	STN4	DOLPHIN	start vertical profile to 150m	DOL	HI030307.006	
2007-03-04T0157			1557	STN4	DOLPHIN	recover DOLPHIN	DOL		
2007-03-04T0158			1558			steam to deep water			
	20 48.110	157 17.796		DEEP	CTD	deploy CTD to 1000m			
2007-03-04T0715	20 48.847	157 19.519	2115	DEEP	DOLPHIN/ MASCOT	soak at 20m	DOL/MAS	HI030307.007	at 20m
				DEEP	DOLPHIN/ MASCOT		DOL/MAS		at 1m
				DEEP	DOLPHIN/ MASCOT	recovered	DOL/MAS		

SORTIE-1-KOK Cruise Log **2007-03-04 (HST)** **Sunday**

CTD	CTD/Rosette	Local = HST	UTC-10	
HYP	HyperPro			
HYT	HyperTSRB	MOBY	20 49.170	157 11.160
GDF	HyperRef Global/Diffuse			
GGR	HyperRef Global/Global			
MAS	MASCOT			
MOS	MOS ROV			
DOL	DOLPHIN			
ECO	ECO-VSF3 with pressure			
SRF	Surface water sample			
MOB	MOBY			
SEA	SeaWiFS overpass			
MOT	MODIS Terra overpass			
MOA	MODIS Aqua overpass			
GOES	GOES11 vis from www.nrlmry.navy.mil			

Time/Date (UTC)	Lat	Lon	Time/Date (local)	STATION	OPERATION	ACTION	CODE	LOG FILE	Comments
2007-03-04T1700			2007-03-04T0700	MOBY	MOBY	start MOBY deployment	MOB		on station
2007-03-04T1828			828	MOBY	HyperRef	start logging	HYP	SORTIE1_2007-03-04_GAA.RAW SORTIE1_2007-03-04_GBA.RAW	05:31 HSE266 05:32 HSE192 (no data)
2007-03-04T1830				Hawaii			GOES	20070304.1830.goes11.vis.x.hawaii.x.jpg	
2007-03-04T1835	20 49.158	157 12.132	835	MOBY	HyperRef	start logging	HYP	SORTIE1_2007-03-04_GAB.RAW SORTIE1_2007-03-04_GBB.RAW	15:22 HSE266 15:22 HSE192
2007-03-04T1912			912	MOBY	MASCOT	start logging	MAS	HI030407.007	
2007-03-04T1915			915	MOBY	MOBY	MOBY off for cals			
2007-03-04T1916			916	MOBY	HyperRef	start logging	HYP	SORTIE1_2007-03-04_GAC.RAW SORTIE1_2007-03-04_GBC.RAW	09:00 HSE266 09:00 HSE192
2007-03-04T1927			927	MOBY	MASCOT	start logging	MAS	HI030407.008	profile 5 to 238m
2007-03-04T1927			927	MOBY	HyperRef	start logging	HYP	SORTIE1_2007-03-04_GAD.RAW SORTIE1_2007-03-04_GBD.RAW	36:51 HSE266 36:53 HSE192
2007-03-04T1930			930	Hawaii			GOES	20070304.1930.goes11.vis.x.hawaii.x.jpg	
2007-03-04T1954			954	MOBY	MASCOT	start logging		HI030407.009	profile 238 to 280m
2007-03-04T2001			1001	MOBY	MASCOT	start logging	MAS	HI030407.010	profile 280m to surface
2007-03-04T2008			1008	MOBY	HyperDiff	start logging	HYP	SORTIE1_2007-03-04_GAE.RAW SORTIE1_2007-03-04_DBE.RAW	06:12 HSE266 06:12 HSE192
2007-03-04T2020			1020	MOBY	MASCOT	start logging	MAS	HI030407.011	hold at 10m
2007-03-04T2030			1030	Hawaii			GOES	20070304.2030.goes11.vis.x.hawaii.x.jpg	
2007-03-04T2037	20 49.557	157 13.123	1037	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAA.RAW SORTIE1_2007-03-04_PBA.RAW	4:17 MPR012 100m 4:20 MPR071 100m MPR012 no Ed HPE235
2007-03-04T2043	20 49.608	157 13.207	1043	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAB.RAW SORTIE1_2007-03-04_PBB.RAW	4:11 MPR012 100m 4:13 MPR071 100m MPR012 no Ed HPE235
2007-03-04T2050	20 49.846	157 13.501	1050	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SAA.RAW SORTIE1_2007-03-04_SBA.RAW	5:20 MPR012 10m 5:09 MPR071 10m MPR012 no Ed HPE235
2007-03-04T2100			1100	MOBY	MOBY	MOBY on	MOB		
2007-03-04T2115			1115	MOBY	MOBY	MOBY logging Lu data	MOB		MOBy will turn on at the hour, 15min cool, 15min Lu, 15min Ed/Es
2007-03-04T2119	20 50.014	157 13.664	1119	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAC.RAW SORTIE1_2007-03-04_PBC.RAW	4:34 MPR012 100m 4:37 MPR071 100m
2007-03-04T2124			1124	MOBY	Photos		PHO		sky/water shots
2007-03-04T2126	20 50.068	157 13.715	1126	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAD.RAW SORTIE1_2007-03-04_PBD.RAW	4:33 MPR012 100m 4:36 MPR071 100m
2007-03-04T2130			1130	Hawaii			GOES	20070304.2130.goes11.vis.x.hawaii.x.jpg	
2007-03-04T2130			1130	MOBY	MOBY	end MOBY Lu log	MOB		
2007-03-04T2134	20 50.162	157 13.793	1134	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SAB.RAW SORTIE1_2007-03-04_SBB.RAW	4:19 MPR012 10m 4:20 MPR071 10m
2007-03-04T2139	20 50.219	157 13.844	1139	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SAC.RAW SORTIE1_2007-03-04_SBC.RAW	4:17 MPR012 10m 4:19 MPR071 10m
2007-03-04T2150			1150	MOBY	Surface Water		SRF		surface water sample from seachest
2007-03-04T2154			1154	MODIS Terra		overpass	MOT		sky conditions clear
2007-03-04T2200	20 50.473	157 14.041	1200	MOBY	MOBY	MOBY on	MOB		
2007-03-04T2200			1200	MOBY	MASCOT	start new log file	MAS	HI030407.012	10m
2007-03-04T2210	20 50.605	157 14.141	1210	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAE.RAW SORTIE1_2007-03-04_PBE.RAW	4:25 MPR012 100m 4:24 MPR071 100m
2007-03-04T2200			1213	MOBY	Photos		PHO		sky/water shots
2007-03-04T2215			1215	MOBY	MOBY	MOBY logging Lu data (file did not log)	MOB		MOBy will turn on at the hour, 15min cool, 15min Lu, 15min Ed/Es
2007-03-04T2218	20 50.688	157 14.204	1218	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAF.RAW SORTIE1_2007-03-04_PBF.RAW	4:29 MPR012 100m 4:29 MPR071 100m

2007-03-04T2226	20 50.789	157 14.265	1226	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SAD.RAW SORTIE1_2007-03-04_SBD.RAW	5:40 MPR012 10m 5:42 MPR071 10m
2007-03-04T2230			1230	MOBY	MOBY	end MOBY Lu log	MOB		
2007-03-04T2230			1230	MOBY	Surface Water		SRF		surface water sample from seachest
2007-03-04T2230			1230	Hawaii			GOES	20070304.2230.goes11.vis.x.hawaii.x.jpg	
2007-03-04T2232	20 50.857	157 14.307	1232	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SAE.RAW SORTIE1_2007-03-04_SBE.RAW	5:30 MPR012 10m 5:30 MPR071 10m
						steam back to MOBY			pressure tare check on deck vertical MPR071 -0.69 MPR012 -1.36
2007-03-04T2324			1324	MOBY	MODIS Aqua	overpass	MOA		sky conditions clear
2007-03-04T2338			1338	MOBY	SeaWiFS	overpass	SEA		sky conditions clear
2007-03-05T0000			1400	MOBY	MOBY	MOBY on	MOB		
2007-03-05T0000			1400	MOBY	MASCOT	start logging	MAS	HI030507.001	profile from 40m to surface
2007-03-05T0010	20 49.548	157 12.204	1410	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAG.RAW SORTIE1_2007-03-04_PBG.RAW	4:29 MPR012 100m 4:29 MPR071 100m
2007-03-05T0015			1415	MOBY	MOBY	MOBY logging Lu data	MOB		MOBy will turn on at the hour, 15min cool, 15min Lu, 15min Ed/Es
2007-03-05T0015			1415	MOBY	MASCOT	start logging	MAS	H1030507.002	at 10m
2007-03-05T0015			1415	MOBY	Surface Water		SRF		surface water sample from seachest
2007-03-05T0017			1417	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAH.RAW SORTIE1_2007-03-04_PBH.RAW	4:27 MPR012 100m 4:26 MPR071 100m
2007-03-05T0019	20 49.645	157 12.243	1419	MOBY	Photos		PHO		sky/water shots
2007-03-05T0025	20 49.695	157 12.267	1425	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SAF.RAW SORTIE1_2007-03-04_SBF.RAW	5:30 MPR012 10m 5:30 MPR071 10m
2007-03-05T0030			1430	Hawaii			GOES	20070305.0030.goes11.vis.x.hawaii.x.jpg	
2007-03-05T0031	20 49.768	157 12.304	1431	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SAG.RAW SORTIE1_2007-03-04_SBG.RAW	5:27 MPR012 10m 5:27 MPR071 10m
				MOBY	MASCOT	recover	MAS		
2007-03-05T0455	20 49.783	157 11.904	1855	MOBY	MASCOT	deploy	MAS		lower to 40m
2007-03-05T0500			1900	MOBY	MASCOT	profile	MAS	H1030507.003	from 40m to surface then down to 365m
2007-03-05T0644	20 51.043	157 12.544	2044	MOBY	MASCOT	recovered	MAS		
2007-03-05T0705	20 51.272	157 12.685	2105	MOBY	MASCOT	dark profile	MAS	HI030507.004	dark count and dissolved AC9
2007-03-05T0800	20 51.964	157 12.900	2200	MOBY	MASCOT	recovered	MAS		

SORTIE-1-KW Cruise Log **2007-03-11 HST**

CTD	CTD/Rosette	Local = HST	UTC-10	
HYP	HyperPro			
HYT	HyperTSRB	MOBY	20 49.170	157 11.160
GDF	HyperRef Global/Diffuse			
GGR	HyperRef Global/Global			
MAS	MASCOT			
MOS	MOS ROV			
DOL	DOLPHIN			
ECO	ECO-VSF3 with pressure			
SRF	Surface water sample			
MOB	MOBY			
MCT	Microtops	Every 1/2 hour		
AC9	AC9 flow through			
NRD	NuRADS			
GOES	GOES11 vis from www.nrlmry.navy.mil			

Time/Date (UTC)	Lat	Lon	Time/Date (local)	STATION	OPERATION	ACTION	CODE	LOG FILE	Comments
2007-03-11T1800			2007-03-02T0800	Snug Harbor		leave			Depart
2007-03-11T1828	21 16.605N	157 54.665W						070311_SORTIE01_A.DAT	winds calm
2007-03-11T1830	21 16.456N	157 55.070W		STN1					350m
2007-03-11T1835			0835		NRD	deployed			
2007-03-11T1851			0851		NRD	logging		multiple files (12 files evry 2minutes)	
2007-03-11T1852			0852		MAS	deployed			
2007-03-11T1857	21 16.454N	157 55.026W	0857		GGR	logging		SORTIE1_2007-03-11_GAA.RAW SORTIE1_2007-03-11_GBA.RAW	
2007-03-11T1900			0900		MAS	logging		HI031107.001	at 10m profile to 150m
2007-03-11T1900			0900	Hawaii			GOES	20070311.1900.goes11.vis.x.hawaii.x.jpg	
2007-03-11T1920	21 16.454N	157 55.026W	0920					HI031107.002	hold at 10m
2007-03-11T1930			0930	Hawaii			GOES	20070311.1930.goes11.vis.x.hawaii.x.jpg	
								SORTIE1_2007-03-11_GAB.RAW SORTIE1_2007-03-11_DBB.RAW	
2007-03-11T1939			0939			moving to avoid cloouds			
	21 16.495	157 55.221		STN2					winds picking up 10-15kts ESE
2007-03-11T1958	21 16.455	157 55.232	0958		HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-11_PAA.RAW SORTIE1_2007-03-11_PBA.RAW	4:50 MPR012 100m 4:49 MPR071 100m on deck tare
2007-03-11T2000			1000	Hawaii			GOES	20070311.2000.goes11.vis.x.hawaii.x.jpg	
2007-03-11T2007			1007		HyperPro	profile to 100m MPR012,	HYP	SORTIE1_2007-03-11_PAB.RAW SORTIE1_2007-03-11_PBB.RAW	4:16 MPR012 100m 4:16 MPR071 100m
2007-03-11T2014			1014		HyperPro	profile to 10m MPR012,	HYP	SORTIE1_2007-03-11_SAA.RAW SORTIE1_2007-03-11_SBA.RAW	5 casts to 10m
2007-03-11T2017			1017		HyperPro	profile to 10m MPR012,	HYP	SORTIE1_2007-03-11_SAB.RAW SORTIE1_2007-03-11_SBB.RAW	5 casts to 10m
2007-03-11T2034			1034		HyperTSRB	logging	HYT	SORTIE1_2007-03-11_TBA.RAW	8:05 log
2007-03-11T2039	21 16.795N	157 55.333W	1039		Surface water		SRF		pumped surface sample from 1.5m
2007-03-11T2043			1043		HyperTSRB	logging	HYT	SORTIE1_2007-03-11_TBB.RAW	8:39 log
2007-03-11T2121	21 16.338N	157 54.930W	1121	STN_4	MAS	logging	MAS	HI031107.006	dark cast, winds 15kts ESE
2007-03-11T2142	21 16.520N	157 54.857W	1142		MAS	recovred			
2007-03-11T2146			1146		MAS	logging	MAS	H031107.007	hold at 10m
2007-03-11T2159	21 16.616N	157 54.811W	1159	STN_5	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-11_PAC.RAW SORTIE1_2007-03-11_PBC.RAW	4:56 MPR012 100m 4:56 MPR071 100m HPE191 not working
2007-03-11T2200			1200	Hawaii			GOES	20070311.2200.goes11.vis.x.hawaii.x.jpg	
2007-03-11T2207			1207		HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-11_PAD.RAW SORTIE1_2007-03-11_PBD.RAW	4:56 MPR012 90m 4:58 MPR071 90m reboot MPR071 HPE191 ok
2007-03-11T2210			1210		Surface water		SRF		pumped surface sample from 1.5m
2007-03-11T2216			1216		HyperPro	profile to 10m MPR012,	HYP	SORTIE1_2007-03-11_SAC.RAW SORTIE1_2007-03-11_SBC.RAW	abort
2007-03-11T2219	21 16.771N	157 54.804	1219		HyperPro	profile to 10m MPR012,	HYP	SORTIE1_2007-03-11_SAD.RAW SORTIE1_2007-03-11_SBD.RAW	5 casts to 10m
2007-03-11T2225			1225		HyperPro	profile to 10m MPR012,	HYP	SORTIE1_2007-03-11_SAE.RAW SORTIE1_2007-03-11_SBE.RAW	5 casts to 10m
					MAS	begin tow	MAS		tow to STN_6 at 2kts
2007-03-11T2256			1256	STN_6	MAS	recovred	MAS		
2007-03-11T2320	21 16.020N?	157 54.860W?	1320		DOLPHIN	deployed			
2007-03-11T2337			1337		DOLPHIN	deployed			

2007-03-11T2342	21 16.334	157 54.351	1342		DOLPHIN	logging	DOL	HI031107.010	profile to 150m
2007-03-11T2352	21 16.366	157 54.393	1352		DOLPHIN	start towing	DOL		tow to STN_8
2007-03-12T0008	21 15.280	157 54.833	1408	STN_8				HI031107.011	
2007-03-12T0011			1411			new log file		HI031107.012	
2007-03-12T0120	21 15.996	157 52.887	1520		DOLPHIN	on deck			steaming back

SORTIE-1-KW Cruise Log **2007-03-12 HST**

CTD	CTD/Rosette	Local = HST	UTC-10	
HYP	HyperPro			
HYT	HyperTSRB	MOBY	20 49.170	157 11.160
GDF	HyperRef Global/Diffuse			
GGR	HyperRef Global/Global			
MAS	MASCOT			
MOS	MOS ROV			
DOL	DOLPHIN			
ECO	ECO-VSF3 with pressure			
SRF	Surface water sample			
MOB	MOBY			
MCT	Microtops	Every 1/2 hour		
AC9	AC9 flow through			
NRD	NuRADS			
GOES	GOES11 vis from www.nrlmry.navy.mil			

Time/Date (UTC)	Lat	Lon	Time/Date (local)	STATION	OPERATION	ACTION	CODE	LOG FILE	Comments
2007-03-12T1800			2007-03-12T0800	Snug Harbor		leave			Depart
2007-03-12T1900			0900	Hawaii			GOES	20070312.1900.goes11.vis.x.hawaii.x.jpg	
2007-03-12T1904	21 13.920N	157 53.269W	0904	STN_101	NRD	deployed			low cumulus 6/10
2007-03-12T1910			0910		GGR	logging		SORTIE1_2007-03-12_GAA.RAW SORTIE1_2007-03-12_GBA.RAW	600m winds 15kts S 30:00 logs
2007-03-12T1914			0914		NRD	logging		SORTIEA	
2007-03-12T1919			0919		MAS	deployed			
2007-03-12T1920			0920		MAS	logging		HI031207.004	at 10m
2007-03-12T1921	21 13.998	157 53.008	0921		SRF				sample bottle 2
2007-03-12T1929			0929		PHO	sky/water photos			camera time 2007-03-12T1929
2007-03-12T1930			0930	Hawaii			GOES	20070312.1930.goes11.vis.x.hawaii.x.jpg	
2007-03-12T1936			0936		NRD	logging		SORTIEB	
2007-03-12T1941			0941		MAS	recovered			
2007-03-12T1942	21 14.056N	157 52.701W	0942		GGR	logging		SORTIE1_2007-03-12_GAB.RAW SORTIE1_2007-03-12_GBB.RAW	low cumulus, high cirrus 8/10 32:30 logs
2007-03-12T1955			0955		MAS	logging		HI031207.005	at 15m
2007-03-12T1957			0957		NRD	logging		SORTIEC	fish in images
2007-03-12T2000			1000	Hawaii			GOES	20070312.2000.goes11.vis.x.hawaii.x.jpg	
2007-03-12T2014	21 14.168N	157 52.147	1014	STN_102	MAS	logging		HI031207.006	profiling to 80m
2007-03-12T2018			1018		PHO	sky/water photos			
2007-03-12T2019			1019		NRD	logging		SORTIED	
2007-03-12T2020			1020		SRF				sample bottle 3
2007-03-12T2022			1022		MAS	logging		HI031207.007	upcast to 10m
2007-03-12T2030			1030	Hawaii			GOES	20070312.2030.goes11.vis.x.hawaii.x.jpg	
2007-03-12T2035			1035		GGR	logging		SORTIE1_2007-03-12_GAC.RAW SORTIE1_2007-03-12_GBC.RAW	low cumulus, high cirrus 9/10 15:0 logs
2007-03-12T2035			1035		MAS	deployed			dark cast
2007-03-12T2100			1100		MAS	logging		HI031207.008	dark, dissolved cast to 90m
2007-03-12T2100			1100	Hawaii			GOES	20070312.2100.goes11.vis.x.hawaii.x.jpg	
2007-03-12T2104			1104		NRD	recovered			
2007-03-12T2117	21 14.599N	157 51.114W	1117	STN_103	MAS	recovered			end
2007-03-12T2130			1130	Hawaii			GOES	20070312.2130.goes11.vis.x.hawaii.x.jpg	

11 APPENDIX C – SORTIE-1 Data Processing Logs

SORTIE-1 Data Processing Logs:

SORTIE1_KOK_AOP_Processing_Log_2007-03-02
SORTIE1_KOK_AOP_Processing_Log_2007-03-03
SORTIE1_KOK_AOP_Processing_Log_2007-03-04
SORTIE1_KW_AOP_Processing_Log_2007-03-11
SORTIE1_KW_AOP_Processing_Log_2007-03-12

SORTIE-1-KOK AOP Processing Log **2007-03-02 (HST)** **Friday**

CTD	CTD/Rosette
HYP	HyperPro
HYT	HyperTSRB
GDF	HyperRef Global/Diffuse
GGR	HyperRef Global/Global
MAS	MASCOT
MOS	MOS ROV
DOL	DOLPHIN
ECO	ECO-VSF3 with pressure
SRF	Surface water sample
MOB	MOBY
SEA	SeaWiFS overpass
MOT	MODIS Terra overpass
MOA	MODIS Aqua overpass
GOES	GOES11 vis from www.nrlmry.navy.mil

Local = HST UTC-10

MOBY 20 49.170 157 11.160

ProSoft Processing: ProSoft V7.8.2-RC15 **Data processed: 2008-05-13**

MPR071 (CHORS) Calibration Files: (precruise)

HSE192ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPE191ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPL180ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration
MPR071D.CAL	pressure sensor post-calibration added

MPR012 (Dalhousie) Calibration Files: (precruise)

HSE266BS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPE235DS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPL191DS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration
MPR012G.CAL	pressure sensor post-calibration added

Conditions Summary:
Wind: 2m/sec
Waves: 1.0m
Cloud: <1/10

Processing/Data QA: Scott McLean (WETSAT)

Processing Corrections: stray light, thermal responsivity, shutter darks, output restricted to F409 NIST (1996) scale 350-700nm

Time/Date (UTC)	Lat	Lon	Time/Date (local)	STATION	OPERATION	ACTION	CODE	LOG FILE	Comments	Pressure Tare	ProSoft Instrument Config	ProSoft Processing Paramaters	ProSoft Processing Level	ASCII Files Created	SeaBASS Files Created	Header Records Verified	Data QA Check	Uploaded to ftp site	Submitted to SeaBASS	Data Quality	Processing Comments
2007-03-02T2223	20 57.358	157 23.556	2007-03-02T1223	In transit	Global/Diffuse		GDF	SORTIE1_2007-03-02_GAA.RAW	6:07 Global HSE266	0	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		GOOD	last 15sec has shadow contamination, logged file time UTC-4
2007-03-02T2223	20 57.358	157 23.556	2007-03-02T1223	In transit	Global/Diffuse		GDF	SORTIE1_2007-03-02_DBA.RAW	2:00 Diffuse HSE192	0	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		GOOD	last 15sec has shadow contamination, logged file time UTC-4
2007-03-02T2236	20 56.250	157 21.788	2007-03-02T1236	In transit	Global/Global		GGR	SORTIE1_2007-03-02_GAB.RAW	30:00 HSE266	0	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC-4
2007-03-02T2236	20 56.250	157 21.788	2007-03-02T1236	In transit	Global/Global		GGR	SORTIE1_2007-03-02_GBB.RAW	30:00 HSE192	0	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC-4
								SORTIE1_2007-03-02_PAA.RAW	4:25 MPR012 100m	10.824198	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	data looks excellent, but -ve Ked are generated up to 575nm will need updated processor to get good Keds
2007-03-03T0013			1413	MOBY	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-02_PBA.RAW	4:25 MPR071 100m	10.871194	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		POOR	low Lwn, possibly ship shadow, logged file time UTC-4
								SORTIE1_2007-03-02_PAB.RAW	4:18 MPR012 100m	10.824198	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	data looks excellent, but -ve Ked are generated up to 575nm will need updated processor to get good Keds
2007-03-03T0023			1423	MOBY	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-02_PBB.RAW	4:18 MPR071 100m	10.871194	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC-4
								SORTIE1_2007-03-02_PAC.RAW	aborted		N/A	N/A	none	N/A	N/A	N/A	No			INVALID	aborted cast
2007-03-03T0029			1429	MOBY	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-02_PBC.RAW	aborted	10.871194	N/A	N/A	none	N/A	N/A	N/A	No			INVALID	aborted cast
								SORTIE1_2007-03-02_SAA.RAW	5 casts to 10m	10.824198	MPR071_SORTIE1_WATERTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6), Level 4 MC	Level 2s (P1,P2,P3,P4, P5,P6), Level 4 MC	Level 2s (P1,P2,P3,P4, P5,P6), Level 4 MC	Yes	Yes	Yes		EXCELLENT	5 casts logged, logged file time UTC-4
2007-03-03T0030			1430	MOBY	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-02_SBA.RAW	5 casts to 10m	10.871194	MPR071_SORTIE1_WATERTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5), Level 4 MC	Level 2s (P1,P2,P3,P4, P5), Level 4 MC	Level 2s (P1,P2,P3,P4, P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	6 casts logged, logged file time UTC-4
								SORTIE1_2007-03-02_SAB.RAW	5 casts to 10m	10.824198	MPR071_SORTIE1_WATERTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4, P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4, P5,P6,P7), Level 4 MC	Yes	Yes	Yes		EXCELLENT	7 casts logged, logged file time UTC-4
2007-03-03T0035			1435	MOBY	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-02_SBB.RAW	5 casts to 10m	10.871194	MPR071_SORTIE1_WATERTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5), Level 4 MC	Level 2s (P1,P2,P3,P4, P5), Level 4 MC	Level 2s (P1,P2,P3,P4, P5), Level 4 MC	Yes	Yes	Yes		POOR	possible ship shadow in 3 casts, logged file time UTC-4
2007-03-03T0139			1539	MOBY	HyperTSRB	deployed	HYT	SORTIE1_2007-03-02_TBA.RAW	10:35 logged at surface stopped log for cloud	10.871194	MPR071_SORTIE1_Surface_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		POOR	good data 21:41 to 21:48, cloud/flit contamination at start and end of file, logged file time UTC-4
2007-03-03T0203	20 50.363	157 12.551	1603	MOBY	HyperTSRB	start log	HYT	SORTIE1_2007-03-02_TBB.RAW	moved out farther from ship	10.871194	MPR071_SORTIE1_Surface_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC-4
2007-03-03T0222			1622	MOBY	HyperTSRB	start log	HYT	SORTIE1_2007-03-02_TBC.RAW		10.871194	MPR071_SORTIE1_Surface_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC-4

SORTIE-1-KOK Cruise Log **2007-03-03 (HST)** **Saturday**

CTD	CTD/Rosette	Local = HST	UTC-10	
HYP	HyperPro			
HYT	HyperTSRB	MOBY	20 49.170	157 11.160
GDF	HyperRef Global/Diffuse			
GGR	HyperRef Global/Global			
MAS	MASCOT			
MOS	MOS ROV			
DOL	DOLPHIN			
ECO	ECO-VSF3 with pressure			
SRF	Surface water sample			
MOB	MOBY			
SEA	SeaWiFS overpass			
MOT	MODIS Terra overpass			
MOA	MODIS Aqua overpass			
GOES	GOES11 vis from www.nrlmry.navy.mil			

ProSoft Processing: ProSoft V7.8.2-RC15 **Data processed: 2008-05-13**

MPR071 (CHORS) Calibration Files: (precruise)

HSE192ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPE191ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPL180ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration
MPR071D.CAL	pressure sensor post-calibration added

MPR012 (Dalhousie) Calibration Files: (precruise)

HSE266BS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPE235DS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPL191DS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration
MPR012G.CAL	pressure sensor post-calibration added

Conditions Summary:
Wind: 4m/sec
Waves: 1.0m
Cloud: 3/10

Processing/Data QA: Scott McLean (WETSAT)

Processing Corrections: stray light, thermal responsivity, shutter darks, output restricted to F409 NIST (1996) scale 350-700nm

Time/Date (UTC)	Lat	Lon	Time/Date (local)	STATION	OPERATION	ACTION	CODE	LOG FILE	Comments	Pressure Tare	ProSoft Instrument Config*	ProSoft Processing Paramaters*	ProSoft Processing Level	ASCII Files Created	SeaBASS files Created	Header Records Verified	Data QA Check	Uploaded to ftp site	Submitted to SeaBASS	Data Quality	Processing Comments
2007-03-03T2201			1201	MOBY	HyperRef	measure global/diffuse	GDF	SORTIE1_2007-03-03_GAA.RAW	2:00 Diffuse HSE266	0	MPR012_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-03T2201			1201	MOBY	HyperRef	measure global/diffuse	GDF	SORTIE1_2007-03-03_DBA.RAW	2:00 Diffuse HSE192	0	MPR071_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
			1217	MOBY	HyperPro	abort -12 30m cable tangle	HYP	SORTIE1-2007-03-03_PAA.RAW		10.886693	N/A		N/A	N/A	N/A	N/A	Yes	N/A	N/A	INVALID	profile aborted, logged file time UTC
2007-03-03T2217	20 49.880	157 12.400	1217	MOBY	HyperPro	abort -12 30m cable tangle	HYP	SORTIE1-2007-03-03_PBA.RAW		10.160577	N/A		N/A	N/A	N/A	N/A	Yes	N/A	N/A	INVALID	profile aborted, logged file time UTC
	20 49.947	157 12.447	1223	MOBY	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-03_PAB.RAW	4:01 MPR012 50m	10.886693	MPR012_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	data looks excellent, but low Ked are generated up to 575nm
2007-03-03T2223	20 49.947	157 12.447	1223	MOBY	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-03_PBB.RAW	re-tared pressure 4:01 MPR071 50m	10.160577	MPR071_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		GOOD	tilts look high seems like too slow a cable pay out, Level3 3-58m, Lw looks ok, logged file time UTC
			1223	MOBY	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-03_PAC.RAW	4:20 MPR012 100m	10.886693	MPR012_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes	N/A	POOR	cast starts at 9m, bad points in Lu(0-),Lw,Lwn at 682 and 696
2007-03-03T2232			1232	MOBY	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-03_PBC.RAW	4:20 MPR071 100m	10.160577	MPR071_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
			1239	MOBY	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-03_SAA.RAW	5 casts to 10m	10.886693	MPR012_SORTIE1_DECKTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5), Level 4 (MC)	Level 2 (P1,P2,P3,P4,P5), Level 4 MC	Level 2 (P1,P2,P3,P 4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-03T2239			1239	MOBY	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-03_SBA.RAW	5 casts to 10m	10.160577	MPR071_SORTIE1_DECKTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5), Level 4 (MC)	Level 2 (P1,P2,P3,P4,P5), Level 4 MC	Level 2 (P1,P2,P3,P 4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC
	20 50.328	157 12.676	1248	MOBY	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-03_SAB.RAW	5 casts to 10m	10.886693	MPR012_SORTIE1_DECKTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5), Level 4 (MC)	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Level 2 (P1,P2,P3,P 4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-03T2248	20 50.328	157 12.676	1248	MOBY	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-03_SBB.RAW	5 casts to 10m	10.160577	MPR071_SORTIE1_DECKTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4), Level 4 (MC)	Level 2s (P1,P2,P3,P4), Level 4 MC	N/A	Yes	Yes	Yes	N/A	POOR	4 casts valid, Lu profiles seem significantly more affected by wave focusing than SBA, logged file time UTC
			1310	MOBY	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-03_PAE.RAW	4:01 MPR012 100m	10.886693	MPR012_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	data looks excellent, but -ve Ked are generated up to 575nm will need updated processor to get good Keds
2007-03-03T2310			1310	MOBY	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-03_PBE.RAW	4:01 MPR071 100m	10.160577	MPR071_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes	N/A	POOR	edited profile starts at 2.5m, Level 3 data starts at 4m, Lw looks low, logged file time UTC
			1316	MOBY	HyperPro			SORTIE1_2007-03-03_PAF.RAW		10.886693	N/A		N/A	N/A	N/A	N/A	Yes	N/A	N/A	INVALID	profile aborted, logged file time UTC
2007-03-03T2316			1316	MOBY	HyperPro	abort due to cloud	HYP	SORTIE1_2007-03-03_PBF.RAW	1:59 MPR071 40m	10.160577	N/A		N/A	N/A	N/A	N/A	Yes	N/A	N/A	INVALID	profile aborted, logged file time UTC

SORTIE-1-KOK Cruise Log **2007-03-04 (HST)** **Sunday**

CTD	CTD/Rosette
HYP	HyperPro
HYT	HyperTSRB
GDF	HyperRef Global/Diffuse
GGR	HyperRef Global/Global
MAS	MASCOT
MOS	MOS ROV
DOL	DOLPHIN
ECO	ECO-VSF3 with pressure
SRF	Surface water sample
MOB	MOBY
SEA	SeaWIFS overpass
MOT	MODIS Terra overpass
MOA	MODIS Aqua overpass
GOES	GOES11 vis from www.nrlmry.navy.mil

Local = HST UTC-10

MOBY 20 49.170 157 11.160

ProSoft Processing: ProSoft V7.8.2-RC15 **Data processed: 2008-05-13**

MPR071 (CHORS) Calibration Files: (precruise)

HSE192ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPE191ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPL180ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration
MPR071D.CAL	pressure sensor post-calibration added

MPR012 (Dalhousie) Calibration Files: (precruise)

HSE266BS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPE235DS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPL191DS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration
MPR012G.CAL	pressure sensor post-calibration added

Conditions Summary:
Wind: 5m/sec
Waves: 1.0m
Cloud: 0/10

Processing/Data QA: Scott McLean (WETSAT)

Processing Corrections: stray light, thermal responsivity, shutter darks, output restricted to F409 NIST (1996) scale 350-700nm

Time/Date (UTC)	Lat	Lon	Time/Date (local)	STATION	OPERATION	ACTION	CODE	LOG FILE	Comments	Pressure Tare	ProSoft Instrument Config	ProSoft Processing Paramaters	ProSoft Processing Level	ASCII Files Created	SeaBASS Files Created	Header Records Verified	Data QA Check	Uploaded to ftp site	Submitted to SeaBASS	Data Quality	Processing Comments
2007-03-04T1835	20 49.158	157 12.132	0828	MOBY	HyperRef	start logging	GGR	SORTIE1_2007-03-04_GAA.RAW		0	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
			0828	MOBY	HyperRef	start logging	GGR	SORTIE1_2007-03-04_GBA.RAW		0	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-04T1835	20 49.158	157 12.132	0835	MOBY	HyperRef	start logging	GGR	SORTIE1_2007-03-04_GAB.RAW	15:22 HSE266	0	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-04T1835	20 49.158	157 12.132	0835	MOBY	HyperRef	start logging	GGR	SORTIE1_2007-03-04_GBB.RAW	15:22 HSE192	0	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
			0916	MOBY	HyperRef	start logging	GGR	SORTIE1_2007-03-04_GAC.RAW	15:22 HSE266	0	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-04T1916			0916	MOBY	HyperRef	start logging	GGR	SORTIE1_2007-03-04_GBC.RAW	09:00 HSE192	0	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
			0927	MOBY	HyperRef	start logging	GGR	SORTIE1_2007-03-04_GAD.RAW	15:22 HSE266	0	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-04T1927			0927	MOBY	HyperRef	start logging	GGR	SORTIE1_2007-03-04_GBD.RAW	36:53 HSE192	0	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
			1008	MOBY	HyperDiff	start logging	GDF	SORTIE1_2007-03-04_GAE.RAW	15:22 HSE266	0	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-04T2008			1008	MOBY	HyperDiff	start logging	GDF	SORTIE1_2007-03-04_DBE.RAW	06:12 HSE192	0	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		GOOD	first 10-15sec in file diffuser not covered, logged file time UTC
	20 49.557	157 13.123	1037	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAA.RAW	4:20 MPR012 100m	10.924191	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		POOR	Lwn looks low, logged file time UTC,
2007-03-04T2037	20 49.557	157 13.123	1037	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PBA.RAW	4:20 MPR071 100m	10.933529	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		POOR	No Ed Lwn looks low, logged file time UTC
	20 49.608	157 13.207	1043	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAB.RAW	4:20 MPR012 100m	10.924191	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		GOOD	Lwn looks low, logged file time UTC, No Ed
2007-03-04T2043	20 49.608	157 13.207	1043	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PBB.RAW	4:13 MPR071 100m	10.933529	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	high tilts at 7-8m, logged file time UTC
	20 49.846	157 13.501	1050	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SAA.RAW		10.924191	MPR012_SORTIE1_WATERTARE	SORTIE1_MULTI_BEGIN	N/A	N/A	N/A	N/A	Yes	N/A		INVALID	file does not process
2007-03-04T2050	20 49.846	157 13.501	1050	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SBA.RAW	5:09 MPR071 10m	10.933529	MPR071_SORTIE1_WATERTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC
	20 50.014	157 13.664	1119	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAC.RAW		11.386656	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes			logged file time UTC
2007-03-04T2119	20 50.014	157 13.664	1119	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PBC.RAW	4:37 MPR071 100m	10.871194	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		POOR	logged file time UTC, high tilts near 9m
2007-03-04T2126	20 50.068	157 13.715	1126	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAD.RAW		11.386656	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	Kd's look high
2007-03-04T2126	20 50.068	157 13.715	1126	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PBD.RAW	4:36 MPR071 100m	10.871194	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-04T2134	**20 50.162**	**157 13.793**	**1134**	**MOBY**	**HyperPro**	**start logging, 5 profiles to 10m**	**HYP**	**SORTIE1_2007-03-04_SAB.RAW**		**11.386656**	**MPR012_SORTIE1_WATERTARE**	**SORTIE1_MULTI_MOBY**	**Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC**	**Level 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC**	Level 2s (P1,P2,P3,P4), Level 4 MC	Yes	Yes	Yes		EXCELLENT	**MOBY matchup 2125Z, Lw normalized to 2125Z**
2007-03-04T2134	**20 50.162**	**157 13.793**	**1134**	**MOBY**	**HyperPro**	**start logging, 5 profiles to 10m**	**HYP**	**SORTIE1_2007-03-04_SBB.RAW**	**4:20 MPR071 10m**	**10.871194**	**MPR071_SORTIE1_WATERTARE**	**SORTIE1_MULTI_MOBY**	**Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC**	**Level 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC**	Level 2s (P1,P2,P3,P4), Level 4 MC	Yes	Yes	Yes		EXCELLENT	**MOBY matchup 2125Z, Lw normalized to 2125Z**
2007-03-04T2139	20 50.219	157 13.844	1139	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SAC.RAW		11.386656	MPR012_SORTIE1_WATERTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4), Level 4 MC	Yes	Yes	Yes		POOR	Lwn seems low, logged file time UTC
2007-03-04T2139	20 50.219	157 13.844	1139	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SBC.RAW	4:19 MPR071 10m	10.871194	MPR071_SORTIE1_WATERTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4), Level 4 MC	Yes	Yes	Yes		POOR	Lwn seems low, logged file time UTC
	20 50.605	157 14.141	1210	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAE.RAW		11.386656	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-04T2210	20 50.605	157 14.141	1210	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PBE.RAW	4:24 MPR071 100m	10.871194	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
	20 50.688	157 14.204	1218	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAF.RAW		11.386656	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-04T2218	20 50.688	157 14.204	1218	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PBF.RAW	4:29 MPR071 100m	10.871194	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-04T2226	20 50.789	157 14.265	1226	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SAD.RAW		11.386656	MPR012_SORTIE1_WATERTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-04T2226	20 50.789	157 14.265	1226	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SBD.RAW	5:42 MPR071 10m	10.871194	MPR071_SORTIE1_WATERTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-04T2232	20 50.857	157 14.307	1232	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SAE.RAW		11.386656	MPR012_SORTIE1_WATERTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-04T2232	20 50.857	157 14.307	1232	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SBE.RAW	5:30 MPR071 10m	10.871194	MPR071_SORTIE1_WATERTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-05T0010	20 49.548	157 12.204	1410	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAG.RAW		10.824198	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	
2007-03-05T0010	20 49.548	157 12.204	1410	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PBG.RAW	4:29 MPR071 100m	10.914829	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-05T0017			1417	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PAH.RAW		10.824198	MPR012_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	Kd's low
2007-03-05T0017			1417	MOBY	HyperPro	start logging, profile to 100m	HYP	SORTIE1_2007-03-04_PBH.RAW	4:26 MPR071 100m	10.914829	MPR071_SORTIE1_WATERTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-05T0025	**20 49.695**	**157 12.267**	**1425**	**MOBY**	**HyperPro**	**start logging, 5 profiles to 10m**	**HYP**	**SORTIE1_2007-03-04_SAF.RAW**		**10.824198**	**MPR012_SORTIE1_WATERTARE**	**SORTIE1_MULTI_MOBY**	**Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC**	**Level 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC**	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	**MOBY matchup 0025Z, Lw normalized to 0025Z**
2007-03-05T0025	**20 49.695**	**157 12.267**	**1425**	**MOBY**	**HyperPro**	**start logging, 5 profiles to 10m**	**HYP**	**SORTIE1_2007-03-04_SBF.RAW**	**5:30 MPR071 10m**	**10.914829**	**MPR071_SORTIE1_WATERTARE**	**SORTIE1_MULTI_MOBY**	**Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC**	**Level 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC**	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	**MOBY matchup 0025Z, Lw normalized to 0025Z**
2007-03-05T0031	20 49.768	157 12.304	1431	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SAG.RAW	5:27 MPR071 10m	10.824198	MPR012_SORTIE1_WATERTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-05T0031	20 49.768	157 12.304	1431	MOBY	HyperPro	start logging, 5 profiles to 10m	HYP	SORTIE1_2007-03-04_SBG.RAW	5:27 MPR071 10m	10.914829	MPR071_SORTIE1_WATERTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2s (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2 (P1,P2,P3,P4,P5,P6,P7), Level 4 MC	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC

SORTIE-1-KW Cruise Log **2007-03-11 (HST)**

CTD	CTD/Rosette	Local = HST	UTC-10	
HYP	HyperPro			
HYT	HyperTSRB	MOBY	20 49.170	157 11.160
GDF	HyperRef Global/Diffuse			
GGR	HyperRef Global/Global			
MAS	MASCOT			
MOS	MOS ROV			
DOL	DOLPHIN			
ECO	ECO-VSF3 with pressure			
SRF	Surface water sample			
MOB	MOBY			
MCT	Microtops			
AC9	AC9 flow through			
NRD	NuRADS			
GOES	GOES11 vis from www.nrlmry.navy.mil			

ProSoft Processing: ProSoft V7.8.2-RC15 **Data processed: 2008-05-13**

MPR071 (CHORS) Calibration Files: (precruise)

HSE192ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPE191ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPL180ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration
MPR071D.CAL	pressure sensor post-calibration added

MPR012 (Dalhousie) Calibration Files: (precruise)

HSE266BS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPE235DS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPL191DS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration
MPR012G.CAL	pressure sensor post-calibration added

Conditions Summary:
Wind: 7.5m/sec
Waves: 0.5m
Cloud: 0/10

Processing/Data QA: Scott McLean (WETSAT)

Processing Corrections: stray light, thermal responsivity, shutter darks, output restricted to F409 NIST (1996) scale 350-700nm

Time/Date (UTC)	Lat	Lon	Time/Date (local)	STATION	OPERATION	ACTION	CODE	LOG FILE	Comments	Pressure Tare	ProSoft Instrument Config	ProSoft Processing Paramaters	ProSoft Processing Level	ASCII Files Created	SeaBASS Files Created	Header Records Verified	Data QA Check	Uploaded to ftp site	Submitted to SeaBASS	Data Quality	Processing Comments
2007-03-11T1857	21 16.454N	157 55.026W	0857	STN1	HyperRef	logging	GGR	SORTIE1_2007-03-11_GAA.RAW	24:34 log	0	MPR012_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a,4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-11T1857	21 16.454N	157 55.026W	0857	STN1	HyperRef	logging	GGR	SORTIE1_2007-03-11_GBA.RAW	24:35 log	0	MPR071_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a,4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
			0928	STN1	HyperRef		GGR	SORTIE1_2007-03-11_GAB.RAW		0	N/A	N/A	none	N/A	N/A	N/A	Yes	N/A	N/A	INVALID	aborted cast
			0928	STN1	HyperRef	logging	GGR	SORTIE1_2007-03-11_GAC.RAW	1:48 log	0	MPR012_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a,4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
			0928	STN1	HyperRef	logging	GDF	SORTIE1_2007-03-11_DBB.RAW	1:35 log	0	MPR071_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a,4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		GOOD	first 1:10 of file good, then Es not diffuse for last 0:30, logged file time UTC
			0935	STN1	HyperRef	logging	GGR	SORTIE1_2007-03-11_GAE.RAW	0:45 log	0	MPR012_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a,4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
			0935	STN1	HyperRef	logging	GDF	SORTIE1_2007-03-11_DBC.RAW	0:37 log	0	MPR071_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a,4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes	N/A	POOR	mixed global/diffuse, logged file time UTC
	21 16.455	157 55.232	0958	STN2	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-11_PAA.RAW	4:50 MPR012 100m 4:49 MPR071 100m	10.061755	MPR012_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a,4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	data looks excellent, but -ve Ked are generated up to 575nm will need updated processor to get good Keds
2007-03-11T1958	21 16.455	157 55.232	0958	STN2	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-11_PBA.RAW	4:50 MPR012 100m 4:49 MPR071 100m	10.12941	MPR071_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		GOOD	high tilts through cast, looks like too slow cable payout, edited data starts at 3m, profile data looks good, logged file time UTC
			1007	STN2	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-11_PAB.RAW	4:16 MPR012 100m 4:16 MPR071 100m	10.061755	MPR012_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a,4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	data looks excellent, but -ve Ked are generated up to 575nm will need updated processor to get good Keds
2007-03-11T2007			1007	STN2	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-11_PBB.RAW	4:16 MPR012 100m 4:16 MPR071 100m	10.12941	MPR071_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes	N/A	POOR	high tilts to 35m cast, looks like too slow cable payout, edited data starts at 2.5m, logged file time UTC
			1014	STN2	HyperPro		HYP	SORTIE1_2007-03-11_SAA.RAW	5 casts to 10m	10.061755	MPR012_SORTIE1_DECKTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2, 2s (P1,P2,P3,P4,P5), Level 4 MC	Level 2s (P1,P2,P3,P4,P5) , Level 4 MC	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-11T2014			1014	STN2	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-11_SBA.RAW	5 casts to 10m	10.12941	MPR071_SORTIE1_DECKTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2, 2s (P1,P2,P3,P4,P5), Level 4 MC	Level 2s (P1,P2,P3,P4,P5) , Level 4 MC	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC
			1017	STN2	HyperPro		HYP	SORTIE1_2007-03-11_SAB.RAW	5 casts to 10m	10.061755	MPR012_SORTIE1_DECKTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2, 2s (P1,P2,P3,P4,P5), Level 4 MC	Level 2s (P1,P2,P3,P4,P5) , Level 4 MC	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-11T2017			1017	STN2	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-11_SBB.RAW	5 casts to 10m	10.12941	MPR071_SORTIE1_DECKTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2, 2s (P1,P2,P3,P4,P5), Level 4 MC	Level 2s (P1,P2,P3,P4,P5) , Level 4 MC	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-11T2034			1034	STN2	HyperTSRB	logging	HYT	SORTIE1_2007-03-11_TBA.RAW	8:05 log	10.12941	MPR071_SORTIE1_Surface_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
2007-03-11T2043			1043	STN2	HyperTSRB	logging	HYT	SORTIE1_2007-03-11_TBB.RAW	8:39 log	10.12941	MPR071_SORTIE1_Surface_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	logged file time UTC
			1159	STN5	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-11_PAC.RAW	4:56 MPR012 100m 4:56 MPR071 100m HPE191 not working	10.061755	MPR012_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	data looks excellent, but -ve Ked are generated up to 575nm will need updated processor to get good Keds
2007-03-11T2159	21 16.616N	157 54.811W	1159	STN5	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-11_PBC.RAW	4:56 MPR012 100m 4:56 MPR071 100m HPE191 not working	10.12941	MPR071_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		GOOD	No HPE191 data, logged file time UTC
			1207	STN5	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-11_PAD.RAW	4:56 MPR012 90m 4:58 MPR071 90m reboot MPR071 HPE191 ok	10.061755	MPR012_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes		EXCELLENT	data looks excellent, but -ve Ked are generated up to 575nm will need updated processor to get good Keds
2007-03-11T2207			1207	STN5	HyperPro	profile to 100m MPR012, MPR071	HYP	SORTIE1_2007-03-11_PBD.RAW	4:56 MPR012 90m 4:58 MPR071 90m reboot MPR071 HPE191 ok	10.12941	MPR071_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes	N/A	POOR	edited profile starts at 2m, high tilts at 35.45m, logged file time UTC
				STN5	HyperPro		HYP	SORTIE1_2007-03-11_SAC.RAW	abort	10.061755	N/A	N/A	none	N/A	N/A	N/A	Yes	N/A	N/A	INVALID	aborted cast
				STN5	HyperPro		HYP	SORTIE1_2007-03-11_SBC.RAW	abort	10.12941	N/A	N/A	none	N/A	N/A	N/A	Yes	N/A	N/A	INVALID	aborted cast
			1219	STN5	HyperPro		HYP	SORTIE1_2007-03-11_SAD.RAW	5 casts to 10m	10.061755	MPR012_SORTIE1_DECKTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2, 2s (P1,P2,P3,P4,P5), Level 4 MC	Level 2s (P1,P2,P3,P4,P5) , Level 4 MC	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	
2007-03-11T2219	21 16.771N	157 54.804	1219	STN5	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-11_SBD.RAW	5 casts to 10m	10.12941	MPR071_SORTIE1_DECKTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2, 2s (P1,P2,P3,P4,P5), Level 4 MC	Level 2s (P1,P2,P3,P4,P5) , Level 4 MC	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC
			1225	STN5	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-11_SAE.RAW	5 casts to 10m	10.061755	MPR012_SORTIE1_DECKTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2, 2s (P1,P2,P3,P4,P5), Level 4 MC	Level 2s (P1,P2,P3,P4,P5) , Level 4 MC	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	
2007-03-11T2225			1225	STN5	HyperPro	profile to 10m MPR012, MPR071	HYP	SORTIE1_2007-03-11_SBE.RAW	5 casts to 10m	10.12941	MPR071_SORTIE1_DECKTARE	SORTIE1_MULTI_BEGIN	Level 1a, 1b, 2, 2s (P1,P2,P3,P4,P5), Level 4 MC	Level 2s (P1,P2,P3,P4,P5) , Level 4 MC	Level 2s (P1,P2,P3,P4,P5), Level 4 MC	Yes	Yes	Yes		EXCELLENT	logged file time UTC

SORTIE-1-KW Cruise Log **2007-03-12 (HST)**

CTD	CTD/Rosette	Local = HST	UTC-10	
HYP	HyperPro			
HYT	HyperTSRB	MOBY	20 49.170N	157 11.160W
GDF	HyperRef Global/Diffuse			
GGR	HyperRef Global/Global			
MAS	MASCOT			
MOS	MOS ROV			
DOL	DOLPHIN			
ECO	ECO-VSF3 with pressure			
SRF	Surface water sample			
MOB	MOBY			
MCT	Microtops			
AC9	AC9 flow through			
NRD	NuRADS			
GOES	GOES11 vis from www.nrlmry.navy.mil			

ProSoft Processing: ProSoft V7.8.2-RC15 **Data processed: 2008-05-13**

MPR071 (CHORS) Calibration Files: (precruise)

HSE192ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPE191ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPL180ES.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration
MPR071D.CAL	pressure sensor post-calibration added

MPR012 (Dalhousie) Calibration Files: (precruise)

HSE266BS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPE235DS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration, measured immersion coefficients
HPL191DS.CAL	NIST scale F409, stray light corrected, thermal responsivity coefficients, wavelength calibration
MPR012G.CAL	pressure sensor post-calibration added

Conditions Summary:
Wind: 7.5m/sec
Waves: 0.5m
Cloud: 8/10

Processing/Data QA: Scott McLean (WETSAT)

Processing Corrections: stray light, thermal responsivity, shutter darks, output restricted to F409 NIST (1996) scale 350-700nm

Time/Date (UTC)	Lat	Lon	Time/Date (local)	STATION	OPERATION	ACTION	CODE	LOG FILE	Comments	Pressure tare	ProSoft Instrument Config	ProSoft Processing Paramaters	ProSoft Processing Level	ASCII Files Created	SeaBASS Files Created	Header Records Verified	Data QA Check	Uploaded to FTP site	Submitted to SeaBASS	Data Quality	Processing Comments
2007-03-12T1910	21 13.920N	157 53.269W	0910		GGR	logging	GGR	SORTIE1_2007-03-12_GAA.RAW	600m winds 15kts S 30:00 logs	0	MPR012_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes	N/A	POOR	clouds, logged file time UTC
2007-03-12T1910	21 13.920N	157 53.269W	0910		GGR	logging	GGR	SORTIE1_2007-03-12_GBA.RAW	600m winds 15kts S 30:00 logs	0	MPR071_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes	N/A	POOR	clouds, logged file time UTC
2007-03-12T1942	21 14.056N	157 52.701W	0942		GGR	logging	GGR	SORTIE1_2007-03-12_GAB.RAW	low cumulus, high cirrus 8/10 32:30 logs	0	MPR012_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes	N/A	POOR	clouds, logged file time UTC
2007-03-12T1942	21 14.056N	157 52.701W	0942		GGR	logging	GGR	SORTIE1_2007-03-12_GBB.RAW	low cumulus, high cirrus 8/10 32:30 logs	0	MPR071_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes	N/A	POOR	clouds, logged file time UTC
2007-03-12T2035	21 14.168N	157 52.147	1035		GGR	logging	GGR	SORTIE1_2007-03-12_GAC.RAW	low cumulus, high cirrus 9/10 15:0 logs	0	MPR012_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes	N/A	POOR	clouds, logged file time UTC
2007-03-12T2035	21 14.168N	157 52.147	1035		GGR	logging	GGR	SORTIE1_2007-03-12_GBC.RAW	low cumulus, high cirrus 9/10 15:0 logs	0	MPR071_SORTIE1_DECKTARE	SORTIE1_SINGLE	Level 1a, 1b, 2, 2s, 3a, 4	Level 2s, 3a, 4	Level 2s, 3a	Yes	Yes	Yes	N/A	POOR	clouds, logged file time UTC