

## Calibration Report: Tara Oceans Polar Circle C-OPS Radiometer

Name: Biospherical Instruments Inc. Compact-Optical Profiling System (C-OPS)

Model: C-OPS System 18

Ed0 SN 181

EdZ SN 182

LuZ SN 183

Purchased by Laboratoire d’Oceanographie de Villefranche

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### I) Introduction

The C-OPS instrument “is a radiometer system for determining apparent optical properties in aquatic systems. It consists of two 7 cm diameter radiometers: one measures in-water upwelling radiance, and the other either downward irradiance or upward irradiance, pressure/depth, and tilt. Both radiometers are equipped with up to 19 optical wavebands and are mounted on a unique free-fall backplane. In addition, avoiding any influence from the shadow of the boat, the frame can be optimized for either slow descent rates for work in very shallow (e.g., 3 m) and coastal waters, or faster descent rates for observations in the open ocean.” – Biospherical website:

[http://www.biospherical.com/index.php?option=com\\_content&view=article&id=66&Itemid=66](http://www.biospherical.com/index.php?option=com_content&view=article&id=66&Itemid=66)

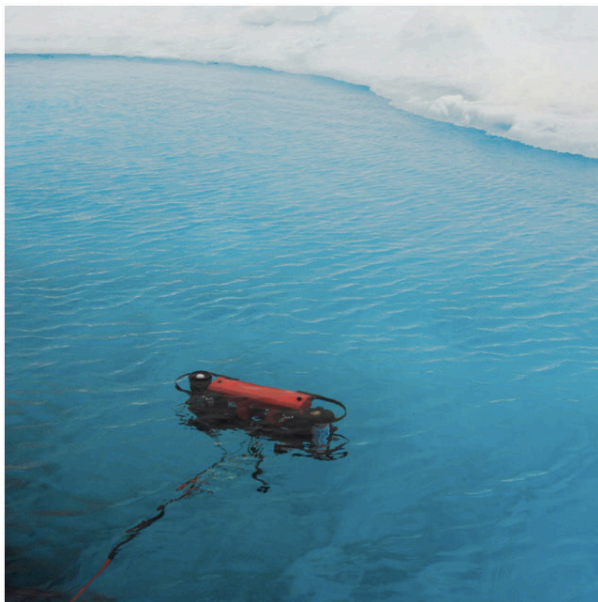


Figure 1. Image of the C-OPS during deployment, from the Biospherical website:

[http://www.biospherical.com/index.php?option=com\\_content&view=article&id=66&Itemid=66](http://www.biospherical.com/index.php?option=com_content&view=article&id=66&Itemid=66)

## II) Calibration/Maintenance

Dates of manufacturer calibration:

(a) October 2010

Deployment occurred throughout the Tara Oceans Polar Circle Expedition, during which the R/V Tara circumnavigated the Arctic Ice Cap counter-clockwise, beginning and ending in Lorient, France from May – November 2013.

(b) May 2015

During the 2015 calibration it was determined that the system needed repairs. The LuZ instrument needed replacement filters for wavelengths: 412, 465, 490, 510, 532, 555, and 670 nanometers (nm). The Ed0 and EdZ instruments needed replacement filters for the 670 nm channel. The resulting differences in the instrument calibrations vary with instrument and wavelength (Fig. 2).

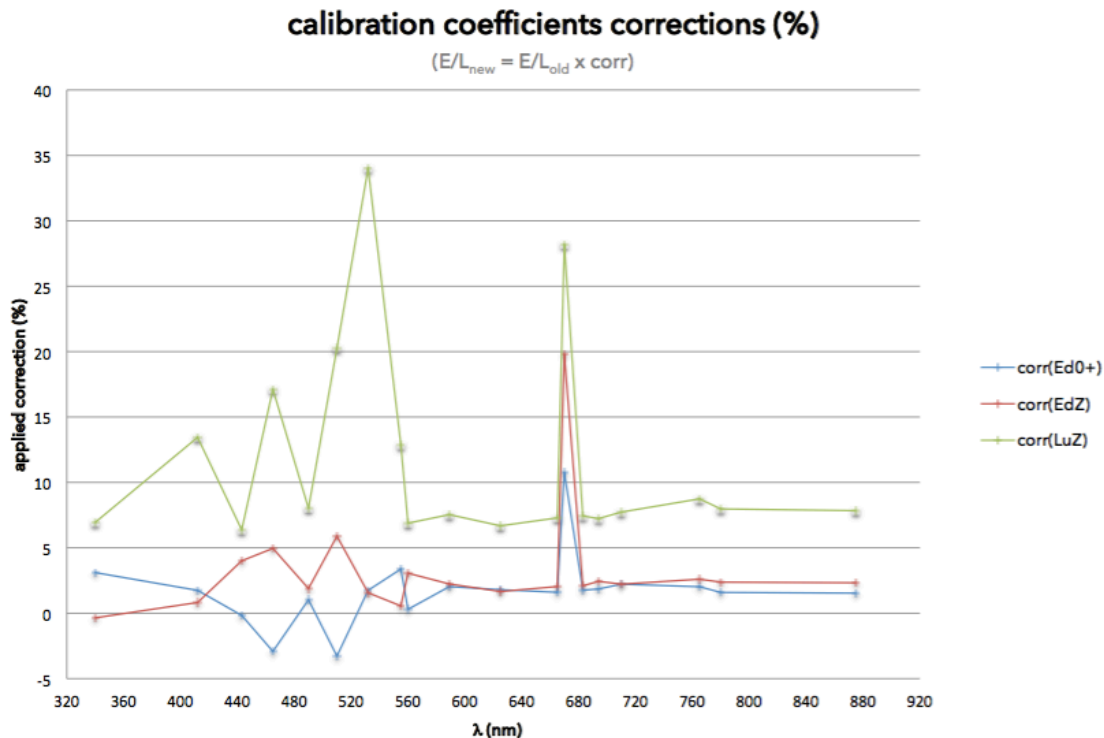


Figure 2. Difference between the 2010 ( $E/L_{\text{old}}$ ) and 2014 ( $E/L_{\text{new}}$ ) factory calibrations. The LuZ sensor at all channels and the 670 nm channel for all three sensors are affected the most.

Data provided to SeaBASS were calculated taking only the 2010 calibration into account.