**Spectrophotometric Particulate Absorption Method**

**Plumes and Blooms**

**Sampling**

Water samples are collected at surface with Niskin bottles. Typically 630 ml are drawn from the Niskin and filtered onboard onto 25 mm Whatman GF/F glass fiber filters. After filtration, filters are folded in half without applying pressure on the crease, wrapped in aluminum foil and stored in liquid nitrogen until analysis. Samples are run within a week after collection.

**Analysis procedure**

Optical densities of particulate matter are measured with a Shimadzu UV-2401PC dual-beam spectrophotometer equipped with a 60mm diameter ISR-2200 integrating sphere. The transmittance-reflectance mode is used for the absorbance measurements. Measurements are performed between 300 nm and 850 nm, with a slit width of 2 nm, a data interval of 1 nm and a scan speed of 530 nm/min. This is an approximate scan speed as Shimadzu Technical Support can’t provide scan speed for our model. The scan speed reported here corresponds to a more recent model configurated as well with a data interval of 1 nm.

Two wetted blank filters are used for baseline correction. Three replicates are performed in different parts of the blank filter. Each frozen sample filter is allowed to thaw and placed in Petri dish on ultrapure water to ensure proper hydration. The sample filter is then externally mounted on the integrating sphere and run against the blank reference. Three replicates are performed on each sample filter avoiding the crease area.

After determination of the particle optical density, samples are de-pigmented in 100% methanol for 48 hours. De-pigmented filters are then rinsed with ultrapure water on a filtration apparatus and re-scanned following the same procedure as described above.

**Data processing**

The three measurements performed on blank and samples are averaged. The averaged blank filter measurement is subtracted from the averaged absorbance of sample filter and spectra are zeroed at 850 nm. Beta correction is then applied to the data. The beta-correction coefficients used are derived from local phytoplankton populations (Guillocheau 2003):

ODs corr = 0.251 ODf + 0.283 (ODf)2

The final absorption coefficients are calculated as:

ap final = 

The same equation is used to calculate the final de-pigmented absorption coefficients, ad final.

The spectral absorption for phytoplankton pigments is computed as the difference between particulate and de-pigmented absorption coefficients.

**Reference:**

Guillocheau, N. 2003. -correction experiment report. University of California, Santa Barbara.