

Optical Observatory Sampling Frequency for the BB2F

July 16, 2004

Mei Sato

Objective

- How frequently should we sample the water in order to get the information about TSM?
i.e. Is one dock sampling per day enough to understand the change of TSM?

TSM

- Total suspended Material (TSM):
 - silt, decaying plant, animal matter, industrial wastes, sewage etc.
- When TSM increases,
 - the water becomes cloudier as more light is scattered by particles
 - decrease of light penetration affect photosynthesis
- TSM measurements are lots of work
 - => backscatter from dock observatory (700 nm) can be used as a proxy for TSM

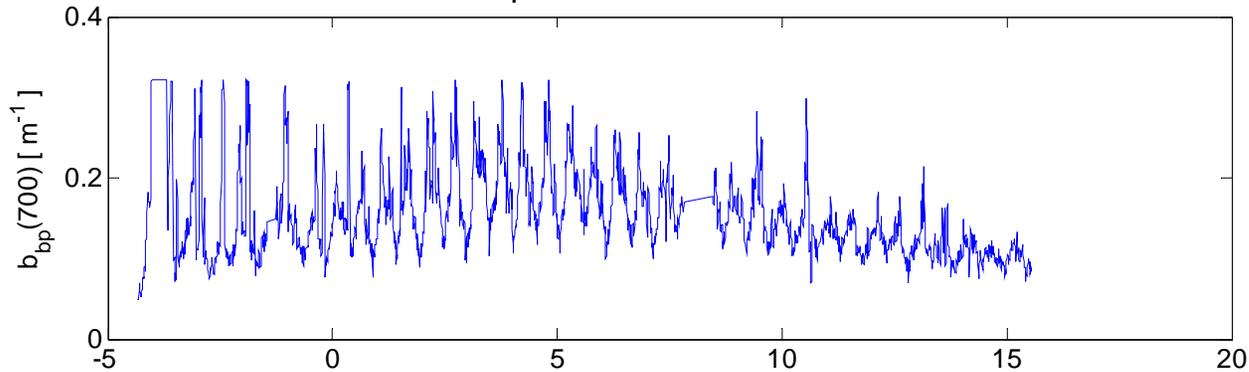
Instrument

- ECO-BB2F:
 - output from the sensor is counts
 - concurrent determination of chlorophyll fluorescence and optical backscattering
 - measuring backscattering at 117 degrees at 470 nm and 700 nm

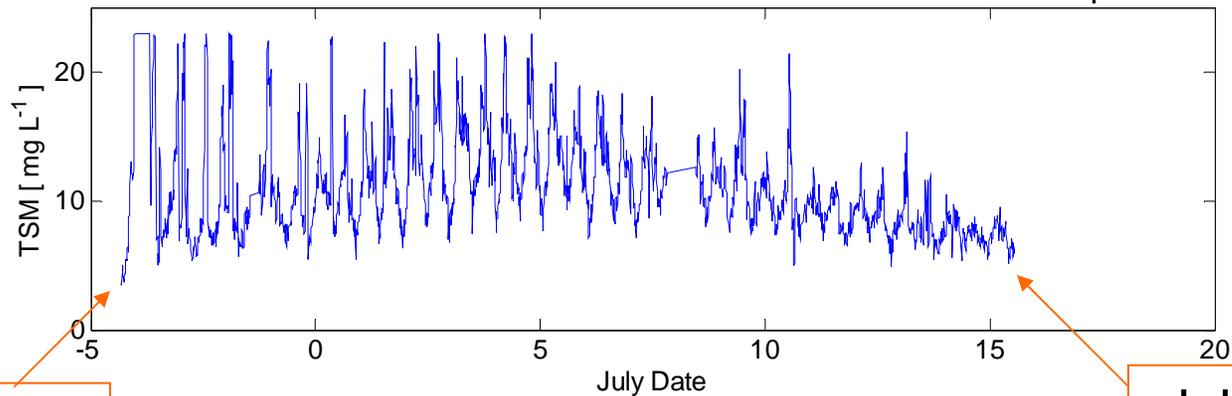


By using $b_{bp}(700)$ as a proxy for TSM...

Time series of $b_{bp}(700)$: Averaged over 10-min



Time series of TSM calculated based on $b_{bp}(700)$

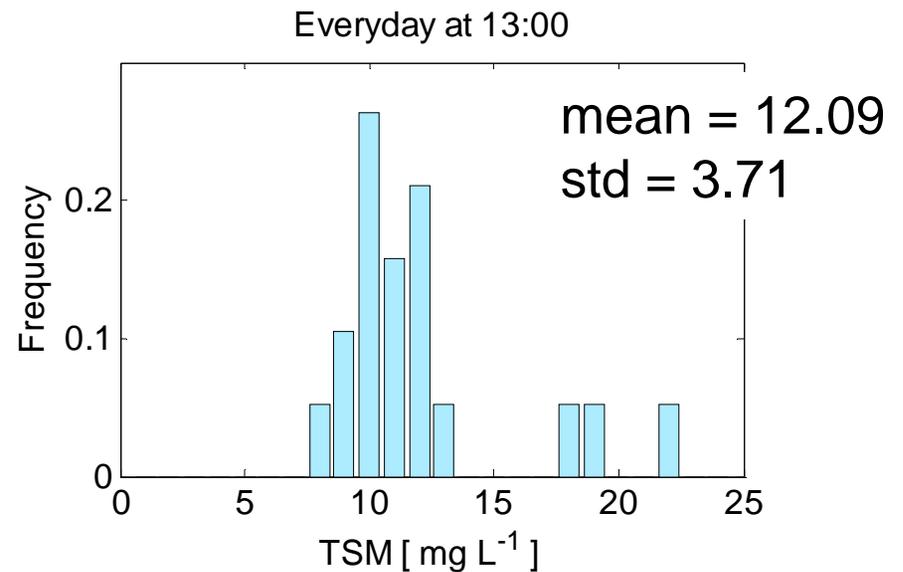
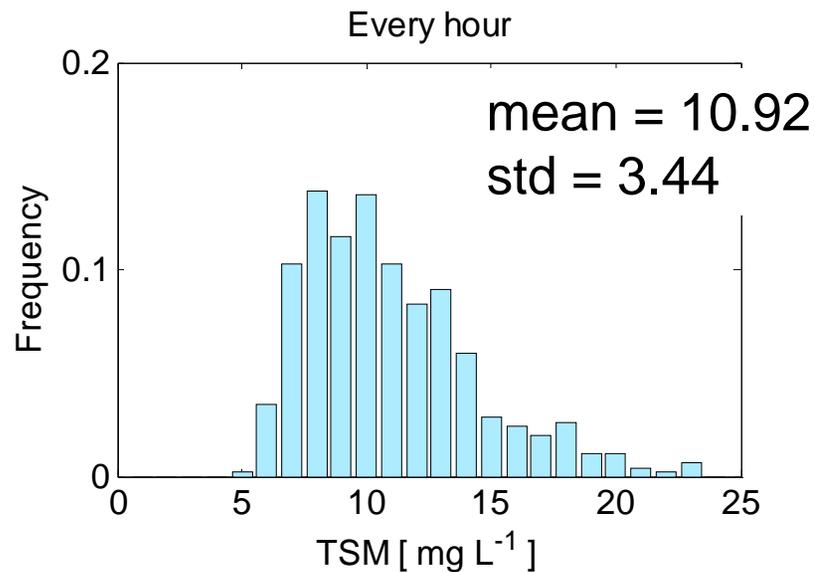
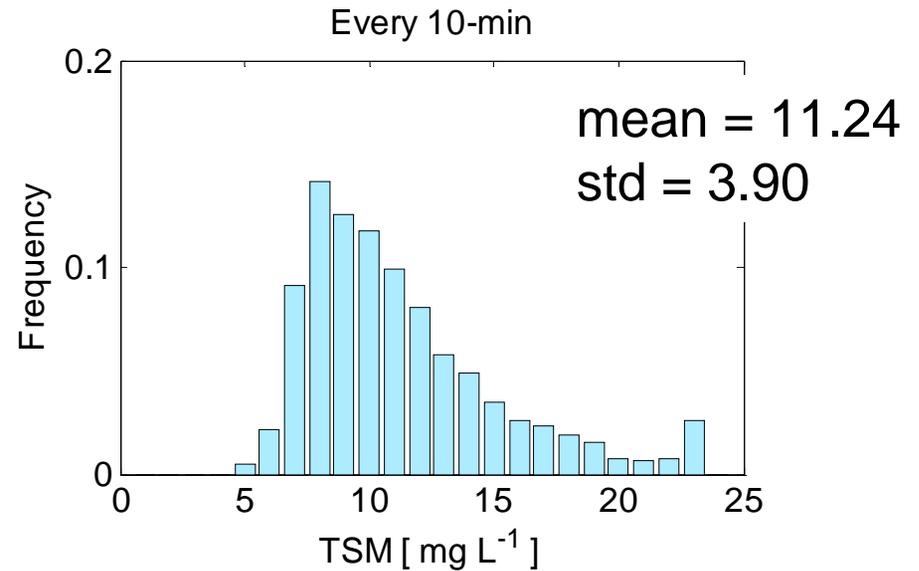
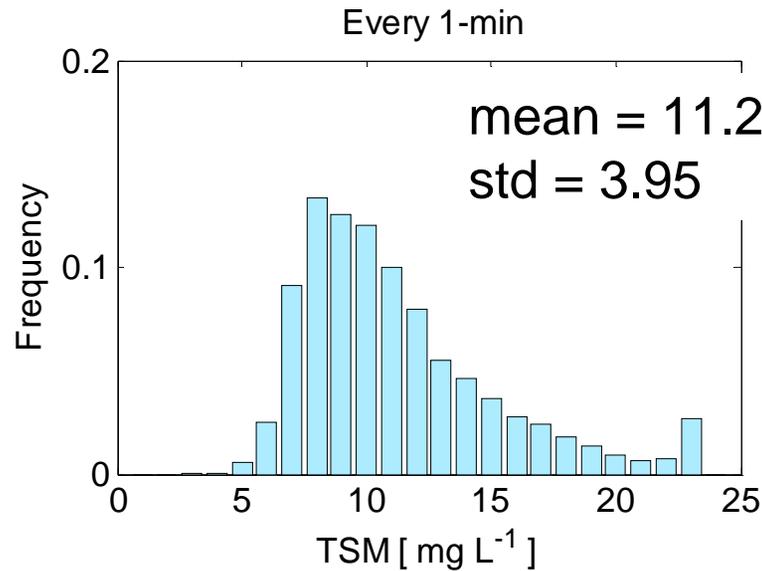


June 26

July 15

$$\text{TSM [mg L}^{-1}\text{]} = 71.4 * b_{bp}(700)$$

Sub-sampling: per 1-min, per 10-min, per hour, per day



Conclusions

-By using $b_{bp}(700)$ as an optical proxy for TSM, we could estimate temporal change of TSM

-In the time limited situation, one sampling for TSM measurement per day gives us a good estimate of the mean of TSM

Sampling frequency	Mean	Std.
per 1 min	11.26	3.95
per 10 min	11.24	3.90
per 1 hour	10.92	3.44
per 1 day	12.09	3.71

Sources of error

$$\text{TSM [mg L}^{-1}\text{]} = 71.4 * b_{bp}(700)$$

- TSM measurements had high std
 - Lack of lab technique
 - ex: forget rinsing filter => weight of salt was included in measurement
- => Need more RELIABLE data of TSM measurement to get a regression equation.