**An improved method for calibration and validation of MODIS Chlorophyll-a in the North Malacca Straits**

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**Abstract:** Local calibration and validation (CAL/VAL) exercise of the satellite derived Chl-a encountered problem in establishing good agreement with the in-situ Chl-a because of the coarser spatial resolution that leads to lower pixel-to-point correlation. The spatial variation between the pixel- and point-based observation introduces bias in the three-band MODIS standard Chl-a algorithm (OC3M). Bias induced by temporal difference between both acquisitions is taken into account in the total bias estimate of OC3M. This paper presents the application of spatio-temporal weight function on OC3M algorithm to reduce the total bias of Chl-a estimation. Integrated spatial and temporal weight function is applied on the remote sensing reflectance (Rrs) at different window size to estimate the total bias-free Rrs. The objective of this study is to assess the accuracy of newly estimated Chl-a in different kernel size and different acquisition lapse between the MODIS and in-situ observation. Continous in-situ Chl-a data were collected using fluorometer at one station located in the North of Malacca Straits area from October 2011 to August 2012. Series of MODIS-Aqua (MODISA) Level 2 data published in 2013 that have been undertaken by latest pre-processing to reduce global overestimation were used in the CAL/VAL exercise. Three kernel sizes, 3x3, 5x5 and 7x7 were applied on the integrated spatio-temporal weight function to estimate Rrs and later used in OC3M algorithm to produce locally tuned Chl-a estimate. An optimization tool is used in quantifying the OC3M model and statistical variants such as absolute percentage difference (APD), root mean square error (RMSE) and etc. are used to assses the accuracy of MODISA derived Chl-a. The spatio-temporal weight function gives better accuracy particularly in kernel size of 7x7 as the APD and RMSE is 0.3 and 0.3 respectively and this result is significantly better than the one without applying the total bias correction with APD and RMSE of 0.64 and 0.6 respectively. Impact of temporal difference is less than of spatial one. This method also is an alternative to produce many match-up samples with higher accuracy of Chl-a estimates and its weight function has proved as an effective method in reducing spatio-temporal induced bias of Chl-a estimation

**Keywords**: Chlorophyll-a, Malacca Straits, MODIS, ocean color, spatio-temporal bias.

**Suggested Topic:** 3. Remote Sensing Applications/ Coastal Zone or 5. Data Processing/ Data Processing

**Proposed Presenter (Oral) :** Nor Zafirah Ab Lah, Mohd Nadzri Md Reba