

Validation of the Operational Land Imager orange *contra*-band retrieval for inland water quality applications

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Motivation

A method is now available to extract additional spectral information from overlapping wavebands (Castagna *et al.*, 2018). When applied to OLI/Landsat 8, an orange *contra*-band (613 nm) can be retrieved from the Green, Red and Pan bands. This *contra*-band covers the phycocyanin absorption peak and can be used for cyanobacteria detection at high spatial resolution. Here we further evaluate its performance with comparison against OLCI/Sentinel-3 orange band (620 nm), taken as a calibrated reference. The goal is to validate the absolute magnitude of the orange *contra*-band.

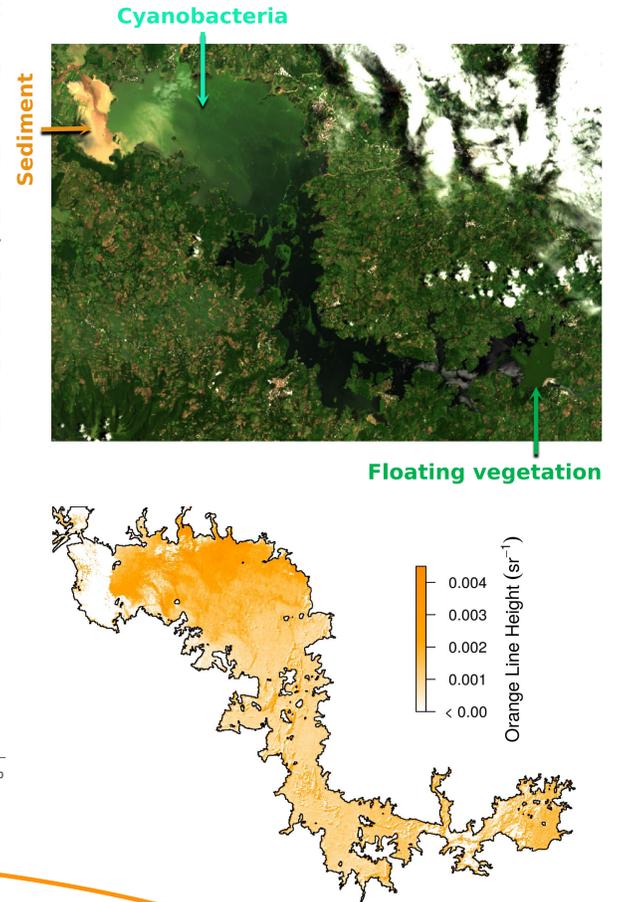
Castagna *et al.*, 2018, *Extending the Operational Land Imager/Landsat 8 for freshwater research: retrieval of an orange band from PAN and MS bands. Ocean Optics XXIV, Dubrovnik, Croatia.*

Validation approach

To compare the absolute reflectance magnitude between OLI and OLCI it is necessary that atmospheric effects are removed and any residual atmospheric bias be equal for both sensors. Compensation for atmospheric effects is challenging over turbid inland waters in the absence of SWIR bands, therefore OLI processed with ACOLITE was taken as reference in the multispectral bands other than the orange. OLCI imagery was first partially compensated for Rayleigh effects only with SeaDAS and then subtracted by the median difference to OLI multispectral bands. The OLCI orange band (620 nm) was corrected with the interpolated median difference between Green and Red bands. Spatial aggregation and bandshifting was performed before the correction.

Example application

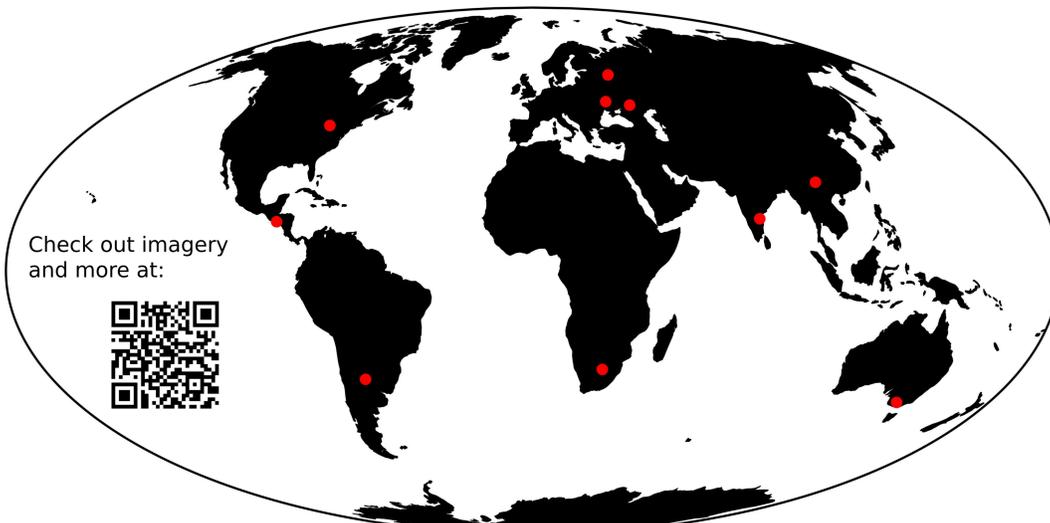
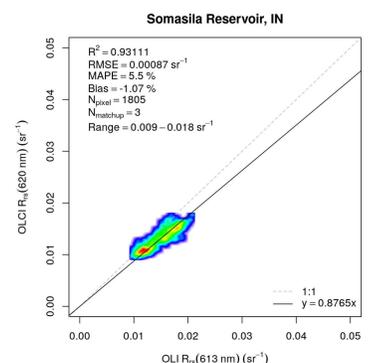
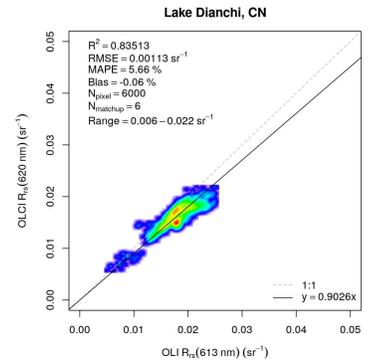
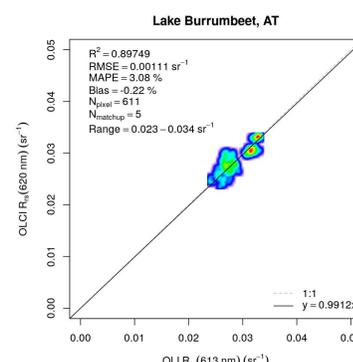
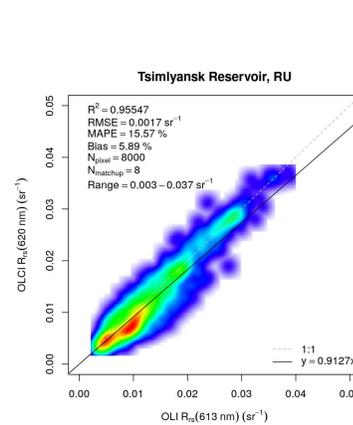
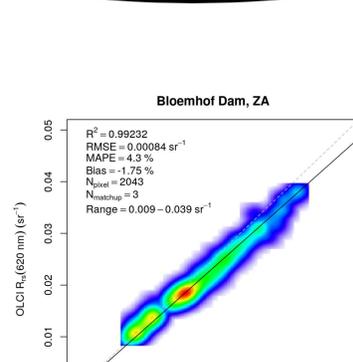
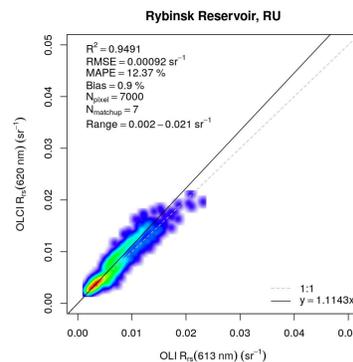
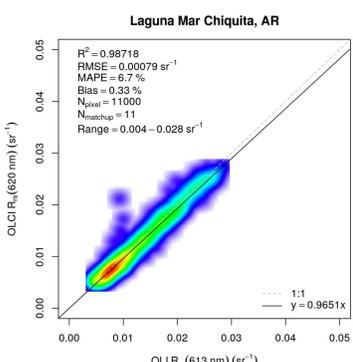
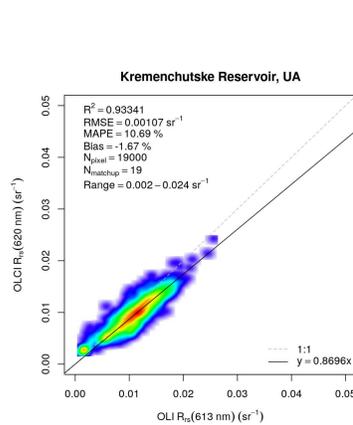
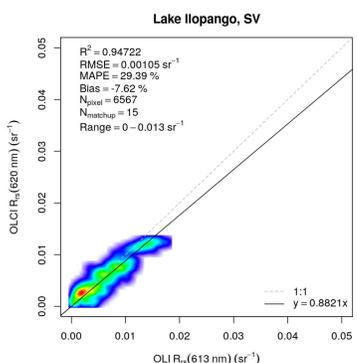
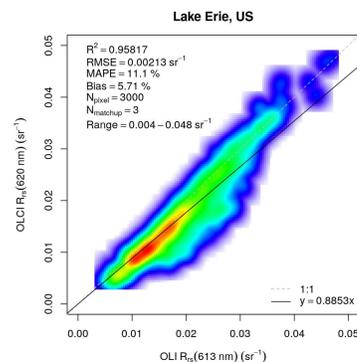
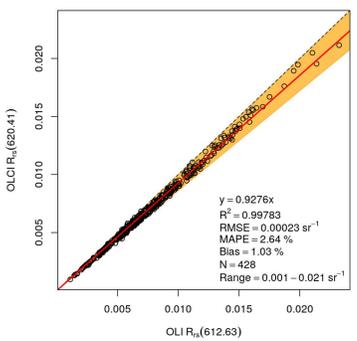
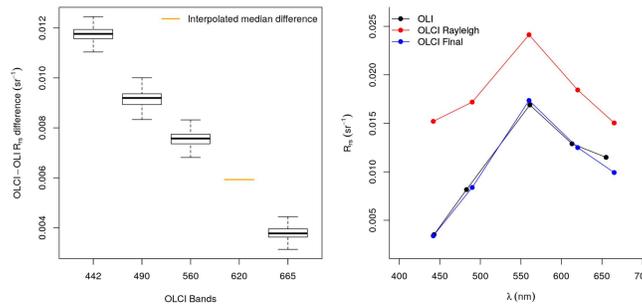
Embalse Cerron Grande, SV, 2018-09-06



Matchups with OLCI/Sentinel-3

80 matchups between OLI and OLCI were processed, covering 10 lakes between 2016 and 2019.

Expectation from *in situ* data: slope between 0.85 and 1, depending on the presence of phycocyanin.



Acknowledgments



Partners

