Tuesday, October 9
Poster Session 2
10:30–12:30

Poster 86

ATMOSPHERIC CORRECTION OF SENTINEL-2 AND LANDSAT 8 FOR SATELLITE DERIVED BATHYMETRY

Many coastal areas in remote locations have either never been charted or are still reliant on charts prepared in the 1700's. Boat-based surveys are prohibitively expensive, so the potential of mapping bathymetry using optical satellite imagery is of high interest to environmental agencies, private industry and hydrographic offices. Freely available global-scale data from Landsat 8, and especially Sentinel-2, further focus this interest. Methods using inversion of radiative transfer models offer the potential for large-scale robust bathymetric mapping without the need for known depths for calibration, but these methods are highly sensitive to accurate atmospheric correction. Small errors in estimating the primary unknowns (surface glint and aerosols) can introduce systematic errors in bathymetry estimates: a common issue for many standard atmospheric corrections. This paper presents a method of atmospheric correction specifically for model-inversion applications of high spatial resolution satellite data (pixels < 30 m). The method works by using the model to be inverted itself to constrain the possible water-leaving reflectances, and includes correction for variable and constant pixel-to-pixel glint. The method has been applied to over 70 Sentinel-2 and Landsat 8 images of coral reefs from three locations in Australia, Africa and Mexico. In an almost fully automated mode with no ancillary data, no calibration data or manual adjustments the method produces good results to 20 m depth in over two-thirds of the images, judged by comparison to in-situ echo-sound data. Interestingly results for Sentinel-2 show a slight bias compared to Landsat 8, possibly indicative of a relative calibration discrepancy.

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