Wednesday, October 10
Oral Session 7
11:10–12:30

11:10–11:30

EXPLORING GEOSTATIONARY HIMAWARI-8 OBSERVATIONS FOR COASTAL OCEAN COLOUR APPLICATIONS ON THE GREAT BARRIER REEF

Remote sensing of ocean colour has been fundamental to the synoptic-scale monitoring of marine water quality over the Great Barrier Reef (GBR). However, observations from current polar orbiting satellites, such as MODIS-Aqua and Sentinel-3 have been insufficient to quantify the diurnal variability of ocean colour in highly dynamic coastal environments such as the GBR. To overcome these limitations this work presents the development, validation and application of a physics-based coastal ocean colour algorithm for the geostationary Advanced Himawari Imager (AHI) on-board Himawari-8. Despite being designed for meteorological applications, AHI offers the opportunity to estimate ocean colour features every 10 minutes, in four broad visible and near-infrared spectral bands and at 1 km^2 spatial resolution. Observing ocean features from daily to less than hourly basis is a vast improvement, suggesting the potential to capture changes in dynamic coastal phenomena not previously possible, such as the migration of flood plumes. A coupled ocean-atmosphere radiative transfer model was used to simulate the AHI bands for a realistic range of in-water and atmospheric optical properties of the GBR and for a wide range of sun and observing geometries. The simulations were used to develop an inverse model based on Artificial Neural Network techniques to estimate the concentrations of chlorophyll-a, total suspended sediments and absorption of yellow substances directly from the AHI top-of atmosphere spectral radiance. The algorithm was validated with concurrent in situ data across the coastal GBR and an application of the Himawari-8 observations is presented during post-cyclone flood conditions in 2017.

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