



Global Observations of the Wave Field Direction: Revisiting an old idea

Stylianos Flampouris

United States (stylianos.flampouris@noaa.gov)

The direction of the wave field propagation is one of the most important wave field properties. But in global scale, the directional measurements are mainly satellite products from synthetic aperture radar and therefore have limited spatial and temporal resolution. In the last five years, there is a significant increase of commercial and public constellations of satellites which provide high resolution (up to 0.3m) panchromatic images and/or High Definition videos. This presents an opportunity to accumulate a high volume of wave directional information by revisiting the analysis of sea surface photography.

In this paper, data from panchromatic sensors are analyzed using a targeted multistep approach. These steps include, but are not limited to: filtering according to cloud coverage, linear detrending and smoothing in physical space, 2D spectral analysis and filtering to calculate the directional information of the wave field. Landsat-8 datasets from two different locations (mid-Atlantic and Hawaii) are analyzed and validated with in-situ and SAR wave spectra. Additionally, the method is demonstrated with high resolution data from WorldView-4 satellite.