

Multi-Angular Cloud Screening methods over ocean for Polarimeters using HARP2 in PACE.

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New generation multi-angular polarimeters (MAPs) require independent cloud masks per view angle and per wavelength to minimize the discarded observations due to partial cloud contaminations, for aerosol and cloud retrievals. We present a global multangular cloud screening algorithm for Hyper Angular Rainbow Polarimeter 2 (HARP2) that combines the traditional spatial variance test with a new test that leverages both radiometric and polarization observations, the DoLP/I ratio, applied independently to each view angle. The characteristic behavior of the two complimentary tests in log space used to define the Theta Index parameter which is used by the algorithm to classifies pixels into ‘cloudy’, ‘clear’, or ‘undetermined’ at each view angle. The algorithm was validated using co-located Level 2 Ocean Color Instrument (OCI) cloud mask at two matched HARP2 view angles globally. Accurate performance was observed for heavy dust aerosol loading and glint affected areas. Challenges remained for cloud adjacent pixels, high altitude sub-visible clouds, and regions with sea ice. Overall, this method enables improved angular specific cloud screening for MAP instruments including HARP2, increasing usable observations for aerosol retrievals in operational algorithms.

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