# Cloud products from the PACE Ocean Color Imager

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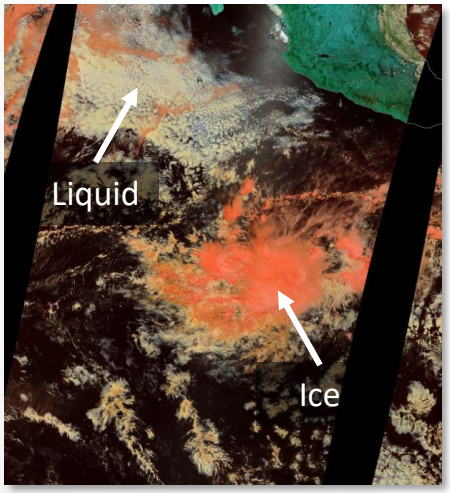
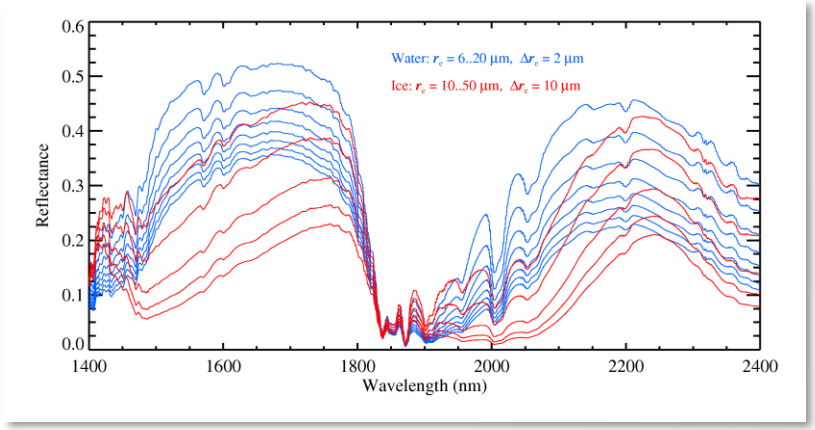
**Funded Activities*:**

- Using *Generalized Nonlinear Retrieval Analysis* (GENRA) [*Coddington et al.*, 2017] as a guide, investigate approaches for cloud thermodynamic phase classification using OCI
  - Thermodynamic phase (liquid, ice, mixed/unknown) is a critical first step in retrievals of cloud properties
    - Spectral scattering/absorption properties of liquid and ice differ substantially, with implications on retrievals relying on realistic forward radiative transfer calculations (optical properties, possibly cloud height)
  - PACE OCI uniquely offers three SWIR channels having sensitivity to cloud thermodynamic phase: 1613, 2130, 2260nm
- Explore phase algorithm methodologies (e.g., decision tree, voting scheme, machine-learning, etc.)
  - Requires extensive cloud forward RT modeling, as no A-Train sensor compliment is equipped with the three OCI SWIR channels




Terra MODIS
25 May 2020

R: 0.47µm
G: 1.64 µm
B: 2.13 µm




Spectral TOA reflectance for liquid (blue) and ice (red) clouds in the SWIR for clouds having the same optical thickness; differences indicate that reflectance observations in this spectral region have information content for cloud thermodynamic phase.

*Current understanding; definitive guidance not yet received. These activities were tightly integrated with unfunded retrieval work (cloud mask, $O_2$ A-band height, optical properties).