Versatile Aerosol and Cloud Obstruction Mask (ACOM) for Diverse Remote Sensing Applications

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Clouds and aerosols can obstruct the solar radiation propagating through the atmosphere before it reaches the Earth's surface due to the scattering and absorption processes. The impact of this obstruction on Earth observation is related to the degree of obstruction along the optical path, and to the remote sensing application in question. Usually, such obstruction is accounted for by applying cloud and shadow masking for the observed pixels or by performing simultaneous atmosphere/surface retrieval. Estimation of the atmospheric signal (clouds and aerosol obstructions) from the top of atmosphere measurements can be used to identify clouds, cloud shadows or presence of aerosol in the atmosphere. In ACOM this is done by extracting surface signal from atmospheric one and then separating clouds and aerosol features from each other using multi-dimensional spectral thresholds and spatial variability tests.

The concept applied in ACOM allows a quantitative estimation of the atmospheric obstruction which results in the distinction of different clouds and aerosols classes varying from low to high levels of aerosol and clouds loading in addition to cloud vicinity, cloud shadow and aerosol plumes shadow classes. ACOM shows robust results with ENVISAT/MERIS and Sentinel-3/OLCI and the algorithm can be easily extended to any other optical instruments with spectral channels in the blue and infrared ranges.