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Cloud screening and AOD retrieval from ENVISAT/MERIS data: validation with AERONET data and surface reflectance data over inland waters.

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The Medium Resolution Imaging Spectroradiometer (MERIS) on board the ENVISAT platform provides multi-spectral measurements with high radiometric accuracy covering the 400-900nm spectral window in 15 bands with typical bandwidths of 10nm, a swath of 1150 km and a ground sampling distance of either 300 or 1000m. MERIS was initially designed for ocean color applications, but a wide range of land and atmospheric applications has also been developed for MERIS data.

Apart from being an important geophysical product by itself, an accurate aerosol optical depth (AOD) retrieval is necessary for the inversion of top-of-atmosphere data to surface reflectance to be exploited in higher-level water and land application. In turn, cloud screening is crucial for the reliable retrieval of AOD and the accurate exploitation of surface reflectance. A precise cloud screening for MERIS data is specially challenging because of the absence of channels beyond 900nm which would enable the detection of thin cirrus clouds.

A method for aerosol optical depth retrieval and cloud screening for MERIS data over land and inland waters will be presented in this contribution. Cloud screening is based on a statistical approach which makes use of nonlinear regression algorithms to exploit the information provided in MERIS data, which include the shortest blue channels and water vapor and oxygen absorptions. The advantages of using co-registered AATSR data in a synergetic manner for improved cloud screening will also be discussed. On the other hand, the fundamental basis for AOD retrieval over land with focus on the characterization of surface reflectance will be briefly discussed.

The complete processing approach has been validated by visual inspection of the data in the case of cloud screening, and with AERONET and surface reflectance data for AOD retrieval. In the latter case, surface reflectance acquired over inland water bodies over Europe will be used for AOD validation under the assumption that AOD drives the accuracy of the retrieval of water-leaving reflectance, which is relatively homogeneous at the MERIS spatial resolution and therefore a proper validation parameter.