Aerosol models for satellite atmospheric corrections.

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The land surface reflectance is a fundamental climate data record at the basis of the derivation of other climate data records (Albedo, LAI/Fpar, Vegetation indices) and has been recognized as a key parameter in the understanding of the land-surface-climate processes.

This work relies on a generic approach developed to derive surface reflectance over land from a variety of sensors. The approach is based on the inversion of the radiative transfer equation in the Lambertian case, with no adjacency effects, that account for a simplified coupling of the absorption by atmospheric gases and scattering by molecules and aerosols as implemented in the 6SV radiative transfer code. The processing code relies on look-up tables generated by 6SV, for which the accuracy (~1%) has been well documented in several papers. The LaSRC code uses ancillary data such as pressure and gas concentrations but relies on a per pixel inversion of the aerosol properties to assure the best possible accuracy for the surface reflectance, as aerosols can be highly variable both in space and time. This new aerosol inversion builds on the extensive dataset acquired by the Terra platform, combining MODIS and MISR to derive an explicit and dynamic map of band ratio’s between blue and red channels and is a refinement of the operational approach used for MODIS and LANDSAT over the past 15 years. The aerosol inversion is generic and applicable to a variety of sensors. We use this basic approach to derive Landsat 8 and Sentinel 2 surface reflectance products for medium, high and very high spatial resolution (MODIS, VIIRS, LANDSAT, SENTINEL-2, WORLD VIEW 3…). The validation scheme is based on using aerosol models developed for each AERONET sites. We will present here the methodology to get these models. We will also show comparison of surface reflectance products with field measurements done by an instrument developed by us.

Finally, we will presents performances of LaSRC inter-compared with other operational approaches in the framework of the CEOS-ACIX (Atmospheric Correction Intercomparison eXercise) Calibration Validation Task co-Lead by ESA and NASA.

Keywords: Aerosol, Surface reflectance, Validation, Atmospheric corrections

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