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Land surface reflection modelling and retrieval from satellite remote sensing: experience based on application of advanced GRASP retrieval to multiple instruments

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Accurate separation of surface and atmosphere contribution to the satellite signal is a crucial requirement of any algorithm for the retrieval of atmosphere/surface properties from remote sensing measurements. This problem is especially important for space-borne Earth remote sensing over land in visible, near-infrared and shortwave infrared regions where scattering features of aerosol, surface, and number of absorption lines of trace gases manifest themselves. Depending on land type and atmosphere optical thickness, the contribution of atmosphere and surface to the measured signal can be of the same order of magnitude or one of the signals can dominate over another one.

To separate reliably aerosol and surface signals from the remote sensing measurements accurate models for surface reflection description as well as advanced retrieval algorithm are required [1]-[4]. Here we will discuss the different possibilities of surface reflection modeling for satellite remote sensing in visible and infrared ranges. Applying advanced retrieval algorithm GRASP (Generalized Retrieval of Aerosol and Surface Properties [3], [4]) to multi-angle, multi-spectral photopolarimetric PARASOL measurements as well as to nadir viewing instruments (MERIS) and geostationary (GOCI) satellite, we investigate the effect of the surface reflection modeling and instrument spatial resolution on aerosol/surface properties retrieval from space-borne sensors.

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