Atmospheric correction procedure description

Technical Note

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Atmospheric correction of OLCI pixels is performed in different ways for clean and polluted underlying snow surfaces. In the case of clean pixels, we assume that the satellite reflectance at OLCI channels located at 865 and 1020nm is not influenced by atmospheric effects. Also we assume that the reflectance can be presented by the simple analytical equation (Kokhanovsky et al., 2018). Two parameters in the reflectance are determined from measurements at 865 and 1020nm. This enables the calculation of the snow spectral reflectance in the whole spectral range 300-2400nm using ice spectral absorption coefficient. The calculated spectrum represent true bottom of atmosphere spectral reflectance, which is used to find the spectral albedo and also other snow parameters. In the case of polluted snow such an assumption can not be used because measurements in near infrared do not define spectral reflectance of snow in the visible, which can vary depending of a mixture of various pollutants in snow including algae. In the case of polluted snow we assume the atmospheric aerosol type and also the value of aerosol optical thickness given in the configuration file (currently: 0.1 at the wavelength 500nm), use ECMWF ozone concentration provided in the OLCI files (and also underlying surface height). This makes us possible to derive the snow spectral spherical albedo from the solution of transcendent equation, which gives a theoretical model for OLCI spectral reflectance over snow with all parameters fixed except spectral AOT (see ATBD). The theory described by Kokhanovsky et al. (2018) makes it possible to calculate bottom of atmosphere snow reflectance, snow plane albedo and also other snow parameters from the function The described procedure is coded/validated and can be used independently on SNAP.