Geophysical Research Abstracts
Vol. 18, EGU2016-3539, 2016
EGU General Assembly 2016
© Author(s) 2016. CC Attribution 3.0 License.

Joint retrieval of surface reflectance and aerosol properties from MSG/SEVIRI observations in the framework of aerosol_CCI2

Alix Damman (1), Violette Zunz (1), Yves Govaerts (1), Thomas Kaminski (2), and Michael Voßbeck (2)
(1) Rayference, Brussels, Belgium (alix.damman@rayference.eu), (2) The Inversion Lab, Hamburg, Germany

The Meteosat satellites play an important role for the generation of consistent long time series of aerosol properties. This importance relies on (i) the long duration of past (Meteosat First Generation, MFG), present (Meteosat Second Generation, MSG) and future (Meteosat Third Generation, MTG) missions and (ii) their frequent cycle of acquisition that can be used to document the anisotropy of the surface and therefore the lower boundary condition for aerosol retrieval over land surfaces.

The Package for the joint Inversion of Surface and Aerosol (PISA) is a new algorithm developed by Rayference and The Inversion Lab for the joint retrieval of surface reflectance and aerosol properties. It relies on the inversion of a physically-based radiative transfer model accounting for the surface reflectance anisotropy and its coupling with aerosol scattering. The inversion scheme accounts for prior knowledge on the surface properties and smoothness constraints on the temporal variation of aerosols. PISA also provides the posterior uncertainty covariance matrix for the retrieved variables in every processed pixel.

The package has been applied on Top Of Atmosphere (TOA) Bidirectional Reflectance Factor (BRF) acquired by SEVIRI onboard Meteosat Second Generation (MSG) in the VIS0.6, VIS0.8 and NIR1.6 spectral bands. Observations are accumulated during a certain period of time to sufficiently document the surface anisotropy and minimize the impact of clouds. The surface radiative properties are retrieved for this entire accumulation period during which they are supposed to be constant. Aerosol properties however are derived on an hourly basis.

Based on PISA, a processing chain has been developed and applied on 2008 MSG/SEVIRI observations for some specific sub-domains of the Earth disk. For these processed sub-domains, the information content of each MSG/SEVIRI band will be analysed based on the prior and posterior uncertainty covariance matrices. This constitutes a first step towards a multi-year retrieval over the whole SEVIRI disk. The retrieved aerosol properties will be used in the context of the aerosol_cci2 project. First results will be presented here both over land and sea surfaces and compared with AERONET data. They will demonstrate the capability of PISA to decouple the fraction of the TOA BRF signals coming from the surface reflectance from the one originating from the aerosol scattering.