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Sensitivity of clear-sky direct radiative effect of the aerosol to micro-physical properties by using 6SV radiative transfer model: preliminary results

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The aerosol micro-physical properties are crucial to analyze their radiative impact on the Earth's radiation budget [IPCC, 2007]. The 6SV model, last generation of the Second Simulation of a Satellite Signal in the Solar Spectrum (6S) radiative transfer code [Kotchenova et al., 2007; Vermote et al., 1997] has been used to perform physically-based atmospheric correction of hyperspectral airborne and aircraft remote sensing data [Vermote et al., 2009; Bassani et al. 2010; Tirelli et al., 2014]. The atmospheric correction of hyperspectral data has been shown to be sensitive to the aerosol micro-physical properties, as reported in Bassani et al., 2012.

The role of the aerosol micro-physical properties on the accuracy of the atmospheric correction of hyperspectral data acquired over water and land targets is investigated within the framework of CLAM-PHYM (Coasts and Lake Assessment and Monitoring by PRISMA HYperspectral Mission) and PRIMES (Synergistic use of PRISMA products with high resolution meteo-chemical simulations and their validation on ground and from satellite) projects, both funded by Italian Space Agency (ASI).

In this work, the results of the radiative field of the Earth/Atmosphere coupled system simulated by using 6SV during the atmospheric correction of hyperspectral data are presented.

The analysis of the clear-sky direct radiative effect is performed considering the aerosol micro-physical properties used to define the aerosol model during the atmospheric correction process. In particular, the AERONET [Holben et al., 1998] and FLEXAOD [Curci et al., 2014] micro-physical properties are used for each image to evaluate the contribution of the size distribution and refractive index of the aerosol type on the surface reflectance and on the direct radiative forcing.

The results highlight the potential of the hyperspectral remote sensing data for atmospheric studies as well as for environmental studies. Currently, the future hyperspectral missions, such as the PRISMA mission, are an opportunity to study the aerosol radiative effects.

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