Geophysical Research Abstracts
Vol. 20, EGU2018-9111, 2018
EGU General Assembly 2018

Recent advances in the retrieval of solar surface irradiance from EUMETSAT satellite data in the LSA-SAF project

Xavier Ceamanos, Dominique Carrer, and Suman Moparthy
CNRM, UMR3589, Météo-France/CNRS, Toulouse, France (xavier.ceamanos@meteo.fr)

The quantity of solar irradiance reaching the surface of the Earth is a key parameter to understand the radiative processes happening at the interface between the surface and the atmosphere. The estimation of this radiative quantity, hereby referred to as DSSF (downwelling surface shortwave flux), at a continental scale and for long time series is therefore carried out by satellite to satisfy the needs of the scientific communities working on climate and weather forecast, but also solar energy. The operational dissemination of DSSF products is done by the Satellite Application Facility on Land Surface Analysis (LSA-SAF) from EUMETSAT since 2005. The estimation of DSSF is performed using observations from the Meteosat Second Generation (MSG) geostationary satellite and atmospheric analyses from the European Center for Medium-Range Weather Forecasts (ECMWF). Due to the strong dependence of DSSF on atmospheric conditions, the process of its retrieval is carried out using two separate approaches that are adapted either to a clear sky situation or a cloudy sky situation. Recent advances in the estimation of DSSF in the LSA-SAF project include the retrieval of the direct and diffuse components that constitute the global solar irradiance reaching the surface. In a clear sky situation, this is achieved thanks to an accurate modeling of the scattering and absorption of solar irradiance due to the aerosol particles in the atmosphere. Information on the time-evolving properties of aerosol is obtained from the Copernicus Atmosphere Monitoring Service (CAMS). In the presence of a cloudy sky, the splitting of global DSSF into direct and diffuse fluxes is done using a clearness index that decays with cloudiness. The dissemination of global and diffuse DSSF in the LSA-SAF project is foreseen for late 2018 and the validation phase based on irradiance measurements taken by ground stations has already started. After several years of development and operational activities involving the DSSF products of the LSA-SAF, a summary of the retrieval algorithm, the recent improvements on the retrieval of direct and diffuse fluxes and the corresponding validation results are presented here.