Geophysical Research Abstracts
Vol. 17, EGU2015-11667-1, 2015
EGU General Assembly 2015

An open-access software platform for the pre-processing of Earth Observation data from the MSG SEVIRI radiometer

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The Spinning Enhanced Visible and Infrared Imager (SEVIRI) is multispectral sensor that is one of the main instruments on-board the MSG series of platforms. The radiometer is obtaining from a geostationary orbit coverage of Europe every 15 minutes, but it can also acquire data every 5' in the Rapid Scanning Service mode at the expense of coverage. SEVIRI has 12 spectral bands, five of which are operative in the infrared wavelengths. For the purpose of the present document, it should be mentioned that the instrument has a geometrical resolution of 1 km at Nadir for the high-resolution visible channel and 3 km for the other spectral bands. Detailed information on the SEVIRI specification and operation can be found in the EUMETSAT website. A series of data from SEVIRI instrument are currently provided by EUMETSAT at an operational mode, making a significant contribution to weather forecasting and global climate monitoring.

Herein, a software tool developed in Python programming language which allows performing basic pre-processing to the raw acquired SEVIRI data from EUMETSAT is presented. Implementation of this tool allows performing key image processing steps on the SEVIRI data, including but not limited data registration, country subsetting, masking and reprojecting to any national or global coordinate systems. SEVIRI data validation with reference data (e.g. from in-situ measurements if available) and generation of new datasets with ordinary linear regressions, are other capabilities. The tool makes use of the present day multicore processors, being able to process fast very large datasets. The practical usefulness of the software tool is also demonstrated using a variety of examples.

Our work is significant to the users' community of the model and very timely, given that to our knowledge there is no similar tool available at present to the SEVIRI users' community, particularly so in the light of the wide range of operationally distributed EO products from EUMETSAT based on SEVIRI data. Development of this software tool was supported by the European Commission Marie Curie Re-Integration Grant "TRANSFORM-EO, which aims to explore various aspects related to the retrievals of energy fluxes and soil moisture from EO data.

KEYWORDS: SEVIRI, EUMETSAT, pre-processing, registration, masking, geostationary satellite