

Temporal consistency evaluation of a long term surface albedo datasets generated with Meteosat archived images

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The Global Climate Observing System (GCOS) has recognized the importance and the key-role of the surface albedo in the study of the climate change. This and the other climate variables, called Essential Climate Variables (ECVs), must satisfy the following requirements: (i) a global coverage over long-term periods with adequate spatial and temporal resolution, (ii) reliability and accuracy as well as a (iii) quality control.

The Coordination Group for Meteorological Satellites (CGMS) assigned to EUMETSAT an action (T18 (TF7)) in order to prototype and test a new algorithm able to retrieve surface albedo using geostationary satellites as described in the “Implementation plan for the global observing system for climate in support of the UNFCCC” document (WMO/TD No. 1219).

In this frame EUMETSAT decided to develop a new specific algorithm, named Meteosat Surface Albedo (MSA), based on a method proposed by Pinty et al. The MSA algorithm is currently running in the operational reprocessing facility of EUMETSAT in order to generate reliable albedo data set starting from 1982. These data have been acquired by six different radiometers. As Meteosat first generation satellites have not been designed for climate monitoring, before proceeding with the interpretation of the complete archive (~ 25 years of data), a detailed temporal consistency analysis of the albedo data set generated with the MSA algorithm has been performed in order to check the compliance with points (ii) and (iii). Specific efforts have been put on the estimation of the measurement error accounting for the observation uncertainties and retrieval method assumptions.

This paper will present the method elaborated for the evaluation of the temporal consistency of the MSA data set and illustrate typical problems raising from the processing of old data and the differences between the various radiometers of Meteosat first generation. Finally, the paper will establish the minimum surface albedo change that can be significantly detected from the analysis of this data set.

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