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Deriving surface albedo maps from archived geostationary observations

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Recently, the Global Climate Observing System (GCOS) committee recognised the need for establishing a benchmark for assessing land-surface albedo products and implementing a system for the retrieval of surface albedo from existing and archived geostationary satellites to form a global climatology of albedo for the entire period of available measurements. The effort currently undertaken at EUMETSAT to fulfil the second part of this recommendation will be presented. Geostationary satellite observations could play a significant role in monitoring long-term surface albedo changes thanks to the long duration of the missions and the corresponding archives, often covering more than two decades. Specifically, their frequent cycle of acquisition can be used to document the anisotropy of the surface and therefore surface albedo. Lately, Pinty et al. proposed a new method for the simultaneous characterisation of surface anisotropy and atmospheric scattering properties, explicitly accounting for the radiative coupling between these two systems. The approach relies on a daily accumulation of geostationary observations acquired at different illumination conditions to document these radiative effects. This method has already been successfully applied for the derivation of surface albedo from Meteosat-7 (0 degree), GOES-8 (75W), GOES-10 (135W), GMS-5 (140E) and finally Meteosat-5 (63E). This suite of satellites allows thus the generation of global surface albedo maps from the geostationary orbit during the entire period of available measurement as recommended by GCOS. In particular, data acquired over the 0-degree position by six different Meteosat spacecrafts, with slightly different radiometric performance, have been systematically archived since September 1981. Hence, the algorithm that derives surface albedo provides also an estimate of the retrieval error that explicitly accounts for the radiometric error. This retrieval error estimation allows the significance determination of observed sur-

face albedo changes. Over a 20-year period, important surface albedo changes are observed, among other over the South African continent.