

35-years of Land Surface Albedo and 15-years of Down-Welling Short-Wave Radiation Retrievals from Satellites through the EUMETSAT/LSA-SAF and ECMWF/C3S projects

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The space program of EUMETSAT (project CDOP3, LSA-SAF) and the Copernicus Climate Change program (managed by ECMWF) provide (or will provide) added-value satellite products for the meteorological and environmental science communities, especially in the fields of climate modelling, environmental management, natural hazards management, and climate change detection.

The EUMETSAT/LSA-SAF project started in 1999 with research and development activities. The delivered operational products include land surface albedos, temperature, short-wave and long-wave downwelling radiation fluxes, and many others. After twenty years (1999-2019) of research, development, and progressive operational activities, Meteo-France built on a strong expertise on satellite retrieval of the surface albedo and down-welling short-wave radiation variables. Based on that experience, we started in 2016 within the framework of the COPERNICUS/C3S_312 project to develop consistent surface albedo products from the 80' s until now using multiple sensors from the past to the current generation of instrument. This will complete the EUMETSAT/LSA-SAF albedo archive for the past period. This work will lead in 2019 to more than 35 years of products characterizing the albedo properties of the surface and 15 years of short-wave downwelling radiation fluxes from different satellite sensors. First C3S collection will be available in autumn 2019 whereas more than 10 different albedos and short-wave downwelling radiation fluxes are already operational in EUMETSAT/LSA-SAF (<http://lsa-saf.eumetsat.int/>). Product characteristics, and performances are presented here. The next scientific challenges related to the next generation of European satellites and the emergence of artificial intelligence are also discussed.

Finally, it is important to emphasize that these programs provide a great opportunity to monitor human-induced climate change since consistent production of data sets is ensured until at least 2022. In this perspective, our effort will be in the development of open source scientific code in order to share our expertise in the remote sensing of the Earth.

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