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## Evaluation of the new TOA radiation fields in the CM SAF CLARA-A3 Climate Data Record.

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The Climate Monitoring SAF (CM SAF) of EUMETSAT is finalizing the third version of the Cloud Albedo and Radiation based on AVHRR climate data record (CLARA-A3). This new version will cover the 1979-2020 time period and will provide the Top-of-Atmosphere (TOA) radiative fluxes as new products.

Although the Clouds and the Earth's Radiant Energy System (CERES) products are acknowledged to be the golden standard w.r.t. TOA radiative flux data records, two limitations can be identified: (1) the products are relatively recent, e.g. starting in year 2000 for the EBAF product, and (2) the products have a relatively coarse spatial resolution of  $1^{\circ} \times 1^{\circ}$  (lat-lon equal angle grid). The products developed within CM SAF aim to bridge these gaps, respectively by (1) a prolongation back in time to the late 1970s and (2) by increasing the spatial resolution to  $0.25^{\circ} \times 0.25^{\circ}$ . A third advantage of the new CDRs lies in their synergy and compatibility with the other CDRs from the CM SAF CLARA product family (cloud mask and other cloud parameters, surface radiation, surface albedo, etc.) sharing common algorithms and processing chains.

The CLARA-A3 data record has been completed but not yet released, and hence we can present a validation of daily and monthly Reflected Solar Flux (RSF) and Outgoing Longwave Radiation (OLR). CLARA-A3 performance is assessed in terms of bias, regional uncertainty (spatial RMSE), and stability. This is done primarily with the relatively recent CERES and GERB broadband-based reference products, and additionally also with long-term data records such as from HIRS, ERA-5, ISCCP, and ESA-CCI to assess the stability throughout the entire data record. Overall, the performance is within the expected target requirements. Regional uncertainty is however related to the number and of observations per day and their local time, which are both variable throughout the AVHRR and MetOp constellation history.