Time series performance of Copernicus Sentinel-2 operational L2A-Products of year 2022

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Copernicus Sentinel-2 is the main European land surface observing mission. It serves for observation of land-cover change and deriving biophysical variables related to agriculture and forestry, monitors coastal and inland waters and is useful for risk and disaster mapping. Data quality of the provided data products is a critical point for all these applications.

The Sentinel-2 mission consists of a constellation of two polar orbiting satellite units. Both Sentinel-2A and Sentinel-2B are equipped with an identical optical imaging sensor MSI (Multi-Spectral Instrument) which samples 13 spectral bands: four bands at 10 m in the Visible Near Infrared (VNIR) region, six bands at 20 m and three bands at 60 m spatial resolution in the VNIR to Shortwave Infrared (SWIR) region.

Sentinel-2 Level-2A (L2A) data contain Bottom-of-Atmosphere (BOA) surface reflectance products together with Aerosol Optical Thickness (AOT), Integrated Water Vapour (WV) and Scene Classification (SCL) maps. They are generated with Sen2Cor which is the operational atmospheric correction processor that removes the effect of the atmosphere from Top-of-Atmosphere Level-1C data.

ESA started the complete reprocessing of the Sentinel-2 data archive named Collection-1 which is tagged with the processing baseline (PB) 5.00. The previous processing baseline PB 4.00 has equivalent evolutions and is very close to the PB 5.00 of Collection-1. Operational L2A products with PB 4.00 were generated from end of January 2022 to beginning of December 2022.

In this presentation we propose to study surface reflectance time series smoothness, for several test sites, using L2A products from year 2022. The smoothness of that time series is used as an indicator of data quality of the reprocessed products. Test sites are selected representing different climate

zones with different AOT retrieval performance $0.03 \leq RMSD_{AOT} \leq 0.20$ and different WV retrieval performance 0.12 g/cm^2 $\leq RMSD_{WV} \leq 0.40$ g/cm^2.