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The ESA GlobAlbedo Project for mapping the Earth's land surface albedo for 15 years from European sensors

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A land surface broadband albedo map of the entire Earth's land surface (snow and snow-free) is required for use in Global Climate Model initialisation and verification. A group of 6 users have been chosen to work with the GlobAlbedo* Implementation team to define requirements and drive the project towards practical applications of the product.

To generate such a map by temporal compositing at 1km and lower resolution on both equal area and latitude, longitude grid requires both sufficient directional looks and the very precise correction of top-of-atmosphere radiances to "at surface" directional reflectances (SDRs). In addition, such a map requires precise radiometric calibration of different sensors and the computation of radiative transfer coefficients to derive broadband SDRs from input narrowband SDRs and given sufficient angular sampling from the all the directional looks within a given temporal window, derive a suitable BRDF and DHR (Direct Hemispherical Reflectance known as "black-sky") and BHR (BiHemispherical Reflectance, known as "white-sky").The final albedo product has been integrated in three spectral broadband ranges, namely the solar spectrum (400-3000nm), the visible (400-700nm) and the near- and shortwave-infrared (700-3000nm). In addition, maps of normalized difference vegetation index (NDVI) and fraction of absorbed photoshyntetically active radiation (FAPAR) will be generated consistent with the albedo product to complement the Globalbedo data set for analysis of vegetation-related processes.

To achieve the aim of deriving independent estimates using European only assets, GlobAlbedo sets out to create a 15 year time series by employing ATSR2, SPOT4-VEGETATION and SPOT5-VEGETATION2 as well as AATSR with MERIS. Legacy algorithms for deriving SDRs using an optimal estimation approach will be outlined as well as a novel system for gap-filling using ten year mean estimates derived from US sensors.

Results from the processing of one year (2005) will be shown together with an assessment of the accuracy of this prototype dataset using contemporaneous satellite and tower-based albedometer measurements.

The final GlobAlbedo product will be available within OGC-compliant servers as well as with a simple graphical analysis tool for exploring the data.

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