Time and Space composite Level 3 products of OLCI's Terrestrial Chlorophyll Index and Global Vegetation Index (a.k.a. Instantaneous Green FAPAR)[1] are now routinely generated by the S3MPC (by Brockmann Consult and University of Southampton) and are available from the FTP S3 MPC public website hosted by ACRI-ST:

- ftp://ftp.acri-cwa.fr
- login: ftp_s3mpc-public
- password: KL25pm!!
- folder : /OLCI L3 LAND

The OLCI L3 vegetation products are separated into different directories, depending on the length of time period used to produce the products (8days/1month) and the platform (S3A/S3B). Inside these directories the products are split accordingly to the first day of observation data used to produce the product.

The data is stored in an integerized sinusoidal projection (ISIN), following the NASA definition for MODIS land data. Each global mosaic is available in separate tiles using a 10×10 degrees raster subset with a pixel ground resolution of 500m. The data format is a NetCDF-CF conforming NetCDF4 file.

the file naming convention is S3A/B_OL_3_VEG_<start-date>_<end-date>_<proc-date>_<tile-id>_<version>_MPC_O.nc where:

- <start-date>: start date of aggregation period. Period starts at 00:00 hours.
- <end-date>: end date of aggregation period. Period ends at 23:59 hours.
- <proc-date>: processing date.
- <tile-id>: a tile identifier for horizontal and vertical tile index (“hxxvxx”) following the MODIS land conventions.
- <version>: a data version identifier.

OLCI Terrestrial Chlorophyll Index (OTCI)

Vegetation canopy spectral response is characterised by two distinctive elements. First, low reflectance in the visible range of the spectrum (400-675 nm) as a result of chlorophyll absorption. Second, a relative high reflectance of NIR radiation (750-1350 nm) because of incident light scattering by leaf cell walls and intracellular air spaces. The narrow transitional region formed between these two features is known as the Red-Edge (RE). The RE position (REP) responds to increasing levels of chlorophyll by shifting towards longer wavelengths. Therefore, the REP can be successfully exploited for the remote sensing of canopy chlorophyll content (CCC).

[1] https://sentinel.esa.int/web/sentinel/user-guides/sentinel-3-olci/applications/land-monitoring

The optical configuration of MERIS facilitated the development of the MERIS Chlorophyll Index (MTCI), a ratio of the difference of bands centred at 753 and 708 nm and the difference between bands centred at 708 and 681 nm. This simple, yet efficient arithmetic combination of MERIS spectral bands is strongly correlated to a wide range of CCC. The simplicity and sensitivity to CCC made the MTCI suitable for automation and to be adopted as an ESA Level-2 land product. Operational availability of MERIS MTCI data enabled terrestrial applications including monitoring land surface phenology (He et al., 2015; Rodriguez-Galiano et al., 2015), estimating gross primary productivity (Chiwara et al., 2018; Harris and Dash, 2010), identify crop health and production (Dash and Curran, 2007; Zhang and Liu, 2014), thus making MTCI a key product in vegetation monitoring.

OLCI was designed to replicate the optical capabilities of MERIS. This facilitated the development of a homologous index to continue the legacy of MERIS, the OLCI chlorophyll index (OTCI) which is available near real time from Sentinel 3.

OLCI global vegetation index (OGVI or Green Instantaneous FAPAR)

The state and evolution of terrestrial vegetation is characterized by a large number of physical, biochemical and physiological variables. Few of these are directly observable from space, but they jointly determine the Fraction of Absorbed Photosynthetically Active Radiation (FAPAR) which acts as an integrated indicator of the status and health of the plant canopy, and can reasonably be retrieved by remote sensing techniques. FAPAR plays also a critical role in the biosphere path of the global carbon cycle and in the determination of the primary productivity of the phytosphere.

The properties of terrestrial surfaces thus concern a large number of users through such applications as agriculture, forestry, environmental monitoring, etc. Since plant canopies significantly affect the spectral and directional reflectance of solar radiation, it is expected that the analysis of repeated observations of these reflectance's may lead to a better understanding of the fundamental processes controlling the biosphere, which, in turn, will support the definition of sustainable policies of environmental exploitation, and the control of the effectiveness of any adopted rules and regulations.

According to international organisations including GCOS, FAPAR is an essential surface parameter for the provision of Earth climate system data.