

## LEVEL 2 ECOSYSTEM PRODUCTS DESCRIPTION

### The Level2 production

The ETC produces Level2 products using different type of raw for the Class1 and Class2 stations:

- 10 or 20 Hz EC files from the eddy covariance system
- 1 second ST file with storage measurements
- 10 to 60 seconds measurements from meteorological sensors
- Metadata about sensors, station, team and other information
- Digital Hemispherical Photos and Ceptometer measurements for the GAI calculation
- Field Map files for the trees inventory
- Other ancillary data such species, biomass, litter-fall and others
- Soil and Vegetation samples for the chemical analysis of the content

In case of Associated stations instead the data are calculated and aggregated by the Station Team and the ETC applies the post-processing, quality check and format transformation.

The Level2 products are released with two main different file types:

- Timeseries, where values are reported continuously at a resolution typically of 30 minutes. These are ASCII files comma separated with dot as decimal indicator and one line of header with the variable names. The first two columns are the timestamp of start and end of the averaging period, in local solar time. Missing data reported as -9999
- Sporadic values, including all the metadata, are reported using the BIF (BADM Interchangeable Format, a standard in the international community) where information are provided together with a timestamp and a number of parameters. The BIF format is described here: <https://hdl.handle.net/11676/GbvksWIH5zCFUkZhJiKqmeRB>

### Specific Level2 files produced

In order to simplify the use of the large number of variables produced, the Level2 data are distributed using different data types (Table 1) that includes variables/information that are coherent and designed for specific type of users. The files have one of the two formats described above (Timeseries or BIF). All the files are included in the product named ARCHIVE, that is described there:

<https://hdl.handle.net/11676/kxHPYpZF-I-VRFHaWpLrBlba>.

Table 1. Files produced and distributed with the Level2 product (all in the Archive L2 product)

File	Type	Content	Notes
FLUXES	TSerie	Eddy covariance fluxes, all the quality tests results, storage fluxes and footprint information calculated starting from the raw data. Description available here: <a href="https://hdl.handle.net/11676/Vb_c34v0nfTA_fg0kilAmXM">https://hdl.handle.net/11676/Vb_c34v0nfTA_fg0kilAmXM</a>	Halfhourly, produced also as NRT. Available also as specific product in the CP.
METEO	TSerie	Meteorological variables with values aggregated spatially (e.g. one single soil temperature value per layer). Description available here: <a href="https://hdl.handle.net/11676/AOceWQsLL6wjS2fKUyISKsrY">https://hdl.handle.net/11676/AOceWQsLL6wjS2fKUyISKsrY</a>	Halfhourly, produced also as NRT. Available also as specific product in the CP.
METEOSENS	TSerie	Meteorological variables for each single sensor, aggregated from raw data. Description available here: <a href="https://hdl.handle.net/11676/H51Y34JoWmUffYKoNlpDVg2l">https://hdl.handle.net/11676/H51Y34JoWmUffYKoNlpDVg2l</a>	Halfhourly, produced also as NRT. Available also as specific product in the CP.
AUXDATA	TSerie	Specific diagnostic and derived variables needed to evaluate the correct functioning of the sensors, in particular the EC system. Description available here: <a href="https://hdl.handle.net/11676/4TYcTMhpRFy7SE9irv8zP1QV">https://hdl.handle.net/11676/4TYcTMhpRFy7SE9irv8zP1QV</a>	Halfhourly, produced also as NRT. Available also as specific product in the CP.
FLUXNET	TSerie	Fluxes and meteo data processed with the standard FLUXNET2015 procedure (ONEFlux). Includes also 2 parameter files linked to the processing (see Pastorello et al. 2020, <a href="https://doi.org/10.1038/s41597-020-0534-3">https://doi.org/10.1038/s41597-020-0534-3</a> ). Description of the HH version available here: <a href="https://hdl.handle.net/11676/OQYly6J8mvXCklu3M7uqOX7E">https://hdl.handle.net/11676/OQYly6J8mvXCklu3M7uqOX7E</a>	Five different temporal resolutions (HH, DD, WW, MM, YY). Available also as specific product in the CP at HH resolution.
VARINFO	BIF	Basic metadata for each variable, including units, height/depth, sensor type and how the single sensor measurements are combined	One file for each continuous data file produced.
INST	BIF	Information about all the sensors used at the station (model, maintenance, variable generated, position, maintenance etc.)	It is linked to the VARINFO BIF file, see scheme at the end.
SITEINFO	BIF	General information about the station, including location, UTC offset, team, references, acknowledgement.	
ANCILLARY	BIF	Ancillary data and related metadata (methods description) including all the biological measurements such species composition, trees number, LAI, biomass, litter, soil and vegetation chemistry etc.	

Scheme to summarize the link of metadata info. The variables reported in the same colors are the one linking the different groups. The VAR\_INFO and VAR\_AGG Groups are in the VARINFO file, the INST, INSTOM and INSTPAIR Groups are in the INST file. All is in the BIF format.

