

# Ecosystem Stations Labelling

## Step 2

### *What, why and how*

The Step 2 of the labelling process starts after the approval of the site proposal in Step 1 and continues until the site is ready to be considered ICOS site. Although this step is named “Evaluation” in the general labelling document, its aim is to establish the link between the site (staff/PI) and ETC, build the site specific data and information transfer and contact, test that all is working properly and finally declare that the site is ready to be labelled as ICOS for the Class proposed.

Similarly to Step 1, the complexity and heterogeneity of the ecosystem sites and measurements collected, in addition to the fact that a “true reference” doesn’t exist for most of the variables (first of all the fluxes), make it impossible to perform an evaluation based on the data validation. What can be checked and what should be fully established before a site is labelled as ICOS is the correct implementation of the protocols and a robust data collection and transfer that allow the data processing.

#### **Evaluation criteria**

During the Step 2 a strong link is established between site staff and ETC with the aim to collect and transfer all the information that is needed to build or setup the site in the best possible way to be ICOS compliant. During step 2, after a first phase of familiarization with the protocols, formats and guidelines, and data transfer start is evaluated in order to ensure that all is working smoothly.

For this reason the goal of Step 2 is not evaluating the data themselves (e.g. there is no comparison or evaluation of fluxes) but only ensuring that the site is properly established and well connected with ETC, both in terms of data submission and communication/exchange. For this reason, the evaluation is based on the effective transmission of the correct data, i.e. without issues occurring during the acquisition and transmission process. The ETC will apply some of the processing schemes to some or all the data collected in Step 2 but this is only to evaluate the general data structure (formats, units, metadata etc.) and solve potential large issues before the site become operative.

The data/information/tasks that are needed before the ETC can prepare the report to the DG are:

- Complete metadata about all the instruments, sensors, plots for variables considered to be mandatory to start the site (key variables - see below)
- Site staff identification and connection with the ETC
- Data submission (both automatic/NRT and manual) established, submission of the key variables. The aim is to get a minimum of two months of continuous data for all the continuous variables, with a maximum number of gaps summing to 8 days, and without consecutive gaps longer than 24 working days hours or maximum 24 hours to report major problems and actions taken to ETC.

- ICOS Protocol application for the key variables and, when needed, definition and agreement about site specific operating modes
- Plan for the implementation of the other variables not included in the key set

### The key variables

The list of variables to be considered as mandatory in order to be labelled as ICOS site are function of the site Class and site ecosystem. The list of mandatory variables is defined by the GA (already approved by ISIC) on the basis of proposals from MSA and ETC. Based on the current list of all the ICOS mandatory variables, the ETC proposes to consider as sub-set of variables needed to be implementer in order to pass the labelling Step 2: the eddy covariance measurements of CO<sub>2</sub>, H<sub>2</sub>O and energy; all the continuous meteorological variables; the biometric measurements; the site characterization (all based on the ICOS protocols, if not yet approved following an ETC proposal based on the last draft of the protocol available). See table 1 for details.

<b>Group</b>	<b>Variables</b>	<b>Protocols</b>
<b>Eddy covariance CO<sub>2</sub>/LE/H</b>	<ul style="list-style-type: none"> <li>- All raw variables from sonic and gas analyser</li> <li>- All raw data from storage system of CO<sub>2</sub> (also H<sub>2</sub>O for Class 1)</li> <li>- All metadata needed to calculate the fluxes</li> </ul>	<ul style="list-style-type: none"> <li>- IRGA</li> <li>- Sonic Anemometer</li> <li>- Set-up EC system</li> <li>- Storage</li> </ul>
<b>Meteorological variables above ground</b>	<ul style="list-style-type: none"> <li>- SW, LW and PPF radiations IN and OUT</li> <li>- Diffuse radiation (for Class 1)</li> <li>- TA, RH, air pressure, rain precipitation (also snow precipitation for Class 1)</li> <li>- Snow height</li> <li>- Backup meteo station</li> </ul>	<ul style="list-style-type: none"> <li>- Set-up</li> <li>- Radiation</li> <li>- Precipitation</li> </ul>
<b>Soil climate variables</b>	<ul style="list-style-type: none"> <li>- TS and SWC profiles</li> <li>- Soil heat flux</li> <li>- Groundwater level</li> </ul>	<ul style="list-style-type: none"> <li>- Soil climate variables</li> </ul>
<b>Biometric measurements</b>	<ul style="list-style-type: none"> <li>- LAI</li> <li>- Above ground biomass</li> <li>- Litterfall (Class 1)</li> </ul>	<ul style="list-style-type: none"> <li>- Ancillary data</li> </ul>
<b>Site characterization</b>	<ul style="list-style-type: none"> <li>- Species list</li> <li>- Site description</li> <li>- Instruments metadata</li> <li>- History of Disturbances and Management</li> </ul>	<ul style="list-style-type: none"> <li>- Lateral fluxes</li> </ul>

**Step 2 Ecosystem labelling process and timing**

After the Step 1 process is concluded and approved, the site can enter in the Step 2 phase as soon as the staff is ready to implement the protocols and build the site. The time between the end of Step 1 and the start of Step 2 is flexible and site dependent but with a maximum of one year, except if differently agreed between PI and ETC and ICOS ERIC. As soon as the site formally enters in the Step 2 of the labelling it gets the label of “Proposed ICOS site”.

The process of Step 2 evaluation can be summarized in the following steps:

- 1) As soon as the site staff is ready, the PI can ask to enter the Step 2 phase by contacting the ETC. The person to contact and/or system to use will be communicated at the end of the Step 1 phase and after the approval of the site proposal;
- 2) ETC staff will contact the PI and site staff in order to define and agree on a procedure and a timeline, defining priorities on the basis of what is already fully implemented at the site and what is under implementation. This step will help the speed up and optimize the site construction in order to arrive to the required criteria in the shorter possible time. In this phase motivated requests for specific deviations from protocols are discussed (see document on the deviations management);
- 3) PI, site staff and ETC are expected to closely collaborate and discuss, with frequent contacts, exchanges and discussions. The aim is to establish a strong link that will be the basis for a good communication between the ETC and PI to ensure that future issues are easily solved. During this phase the data transfer starts with the aim to arrive to the continuity, completeness and robustness requested to end the Step 2 positively.
- 4) As soon as the ETC will consider that the implementation of protocols, the data connection and the links with the site staff are correctly established and ensure the quality/robustness needed for an ICOS site, the Step 2 phase ends and the ETC writes a report to be sent to the DG proposing the final labelling of the site. DG and RI Com are then responsible for preparing the final recommendation to the GA.

The Step 2 procedure is expected to take between 4 and 12 months depending on the number of applications, readiness of the site and communication with the PI. Twelve months is the maximum timespan for the conclusion of Step 2 phase except if the PI asks to the ETC motivated extensions. In case of ending of the 12 months without an agreed extension, the ETC will report the situation to the DG. Here below it is reported a general scheme of the whole labelling process.

