

BADM Frequently Asked Questions document

This document is updated continuously to report the general and frequently asked questions about the ICOS BADM. It does not substitute in the content the Instructions and the ICOS BADM Explanation so it is crucial to carefully read all the documentation.

The document is organized in different sections for the different groups and it also includes tables that list which variables can be submitted or must be submitted together and which variables can not be used in specific situations. Since it is a google Doc you can use the search options to find specific variables, keywords or groups.

[FAQs about Team members \(Groups: TEAM\)](#)

[FAQs about the sensors setup and maintenance \(Groups: EC, BM, STO, ECSYS, ECWEXCL, INST, FILE, LOGGER\)](#)

[FAQs about the ancillary information \(AGB, BULKH, ALLOM, DHP, CEPT, GAI, LITTERPNT, SPPS\)](#)

[FAQs about soil and vegetation sampling \(Groups: FLSM, SOSM\)](#)

FAQs about Team member (Groups: TEAM)

[QT1. I need to remove one person from the Station Team, how to proceed?](#)

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QT1. I need to remove one person from the Station Team, how to proceed?

AT1.

The removal of a station team member can be due to two different reasons that require different strategies:

- *the team member worked or collaborated at the station: in this case it is important to use the **TEAM_MEMBER_WORKEND** variable, reporting only **TEAM_MEMBER_FIRSTNAME**, **TEAM_MEMBER_LASTNAME** and **TEAM_MEMBER_EMAIL**. In this way from the date reported in the **WORKEND** variable the account of the person will be deactivated and the person removed from the mailing lists. At the same time it will ensure a proper recognition of the member role in the period he/she worked at the station.*
- *it was an error the submission of the person as member of the team: in this case it is needed to send an email at the ETC (info@icos-etc.eu)*

QT2. I need to change the PI of the station, how to proceed?

AT2.

Changing the PI is a formal step and can not be done online directly. The former PI or the Station Manager or the National Focal Point as last option must send an email to the Head Office (Elena Saltikoff elena.saltikoff@icos-ri.eu) and in CC to info@icos-etc.eu and to the current PI, asking for the change and indicating if the former PI should remain in the station team and the new role.

The changes will be done by the ETC in the system, reporting a WORKEND date to the former PI record and the following day the start of the new PI.

QT3. I need to change the Station Manager (or any other role), how to proceed?

AT3.

In order to change the Station Manager it is needed to proceed in two steps:

- 1) *submit a **TEAM_MEMBER_WORKEND** date for the current Station Manager (see question QT1)*
- 2) *submit the record reporting the new Station Manager with as date the following day (**TEAM_MEMBER_DATE**) of the **TEAM_MEMBER_WORKEND** of the previous Station Manager. You can not report the same date as **WORKEND** and new position because it would be a double role in the station for that day.*

*If the new Station Manager has already a role in the Station Team (e.g. as Scientist, Technician etc.) it is needed to report a **TEAM_MEMBER_WORKEND** also for the old role and then report him/her again with the new role (Station Manager).*

*In case of other roles, the change must follow the same procedure, i.e. report a **WORKEND** with the old role and submit the new role reporting only **TEAM_MEMBER_FIRSTNAME**, **TEAM_MEMBER_LASTNAME** and **TEAM_MEMBER_EMAIL** and as **TEAM_MEMBER_DATE** the following day respect to the **WORKEND**.*

FAQs about the sensors setup and maintenance (Groups: EC, BM, STO, ECSYS, ECWEXCL, INST, FILE, LOGGER)

Q1. I have to report the installation or management of eddy covariance (EC), meteorological (BM) or storage (STO) measurements, which is the general procedure?

Q2. Which BADM variables do I have to submit for the management of sensors in EC, STO and BM groups?

Q3. How do I communicate the update of a sensor firmware?

Q4. How do I report in the BADM the fact that one given sensor was sent to factory for calibration? And what if a spare sensor is installed in its place for the period?

Q5. How should I communicate a change of the sampling interval, file ID or logger ID?

Q6. How should I communicate a change of height or position of an instrument or storage profile level?

Q7. When something happens at my ICOS station, why am I supposed to send the corresponding BADM within midnight? What if it concerns an issue that is not fixed yet?

Q8: I calibrated the sensor in the lab. As I physically removed the sensor from the field, I did a Removal but then the “Field calibration” operation is not possible any more. Why is this happening and how to do it correctly?

Q9. What is the difference between Field calibration and Field calibration check?

Q10. How to report the update of the firmware of a datalogger?

Q11. How and when is it needed to change the File ID and Logger ID?

Q12. How do we report the use of a compact weather station for backup and the possible use of external additional/substitute sensors connected to it?

Q13. How to report the use of an external pump in place of the LICOR one for CO₂/H₂O EC measurement?

Q14. The ICOS Instructions on meteo measurements specify that the raw BM files must have both the instrument units and the physical units, if different. How to map the instrument units (IU) to the files in the BADM?

Q15. Do “Removal” and “Installation” as EC_TYPE, BM_TYPE and STO_TYPE variables have a physical meaning, or can they be used also to report changes that occurred without physically move the sensors (e.g. change variable names)?

Q16. How to report operations to parts of the station not included in the BADM, e.g. the update of a router?

Q17. In the Instructions on how to fill in the BADM it is reported that: “when for the same variable group it is needed to report more than one value, one “instance” for each entry must be done (i.e. one column in the Excel version or one online form filling and submission)”. How should the ECSYS group be reported relative to the EC group, present in the same Excel template?

Q18. Which BADM variables do I have to submit for the management of sensors in STO group?

Q19. How to report the required info for the ramified profile levels in the STO group?

Q20. How to report the replacement of a GA or a change in the design of the profile in the STO group?

Q21. How to report a change to the characteristic of a level in the STO group?

Q22. How to report the installation of a probe (e.g. for soil measurements) when there is only one Serial Number?

Q23. How to report the presence of a heating/shielding/aspiration system in a given BM sensor, and their addition/removal in a later stage after installation?

Q24. How will the ETC treat raw and processed data acquired in correspondence of a period of Disturbance correctly reported on the BADM?

Q25. After submitting some metadata about my station, I realised I made a mistake: how can I correct it?

Q26. At my station I have other meteorological sensors in addition to the ICOS ones: am I supposed to map the corresponding variables in the BADM group BM?

Answers to FAQs on sensors

Q1. I have to report the installation or management of eddy covariance (EC), meteorological (BM) or storage (STO) measurements, which is the general procedure?

A1.

When a new sensor is purchased, independently from the measurements type it will be used for, the first thing to do is to report the “availability of the sensor for the station” using the group **INST**, selecting “Purchase” as **INST_FACTORY**, and the date of purchase (doesn’t need to be precise, however before any possible use). Without this, the sensor Installation and any other operation cannot be communicated. Use **INST** also to report the calibration function used to convert the instrument units (e.g. mV) in physical units: this can be done at the beginning with the purchase or in a second moment. You will use **INST** also to communicate the factory calibration or other events that changed some sensor specific parameter (e.g. “Own repair”, “Own calibration”). If the sensor of interest was already in your lab please report the date of purchase with the maximum resolution possible (e.g. if you don’t remember the exact day of purchase, simply stop to the month).

After you reported the purchase of the sensor, you can report the installation in the field and the information about where the data are recorded. This is done using two different groups of BADM variable: **LOGGER** and **FILE** for the information about the data collection and **EC**, **ECSYS**, **ECWEXCL**, **STO** and **BM** for the sensor installation and maintenance.

The **LOGGER** and the **FILE** groups are used to link the ID of the logger (**LOGGER_ID**) used to collect the variable(s) to the logger model (which has to be present in **INST** with its **Purchase** date), and also to link the ID of the file produced (**FILE_ID**) to the file characteristics (such as file type, number of headerlines, extension, etc.) and to report in which logger the file is saved (with the **FILE_LOGGER_ID** variable). This set of information can be submitted before or after the installation in the field but in any cases before the submission of the files.

The installation of the sensor, the indication of the variable(s) produced and the link to the logger and file(s) are communicated using the **EC**, **STO** or **BM** groups, depending on the sensor type. While substantially following the same rationale, the detailed steps vary slightly between the groups.

- **BM** and **EC**: as a first thing in these groups you have to describe the “**Installation**”. The installation has to report the physical 3D location of the instrument in the field (vertical and horizontal distances from a reference point). Depending on the group, other info can optionally be reported together with the “**Installation**”: for example, in the **BM** group you can also map one variable produced by the instrument to the logger and to the file IDs. Also in the **EC** group you can report in addition to the position information about the logger and file IDs and other characteristics.
- **STO**: in this group the installation of the sensors is separated from the installation of the sampling levels for gas concentration measurements: before reporting the installation of the gas analyser(s), you have to describe the installation of the levels sampled by it (them) by using “**Level installation**”, where an ID to the profile is assigned, and the single levels are described in terms of height from ground, eastward and northward distances, buffer volumes, characteristics of the sampling lines in the profile (length, diameter, material, etc. Only after that the “**GA**

Installation can be reported, where in addition to the model and serial number, one variable (gas) measured has to be reported, the sampling interval specified, and the link to the logger, file and profile IDs created, together with the characteristics of the sampling line from the GA to the profile, and other characteristics depending on the sensor type.

In case a meteorological or a storage sensor measures more than one variable, or in case the info on the variable collected was not reported during the installation (only for **BM**), this must be done using the **BM** or **STO** group and the *_TYPE set as "**Variable map**", where it is possible to link each variable to the sensor, the logger and the file, as well as to communicate the sampling interval. In the **EC** group, instead, the variables are known, then there is no need to map them. To communicate the file and logger IDs, and to report the sampling interval, the **EC_TYPE** set as "**Maintenance**" must be used (or can be done during the "**Installation**").

For the eddy covariance system it is also important to communicate the link between the gas analyser and the sonic and to report relative distances. This can be done using the **ECSYS** group.

For indicating possible wind sectors to be excluded due to the presence of obstacles or other constraints, the group **ECWEXCL** has to be used.

Once a sensor is installed and operational, maintenance operations need to be reported; the period interested by these activities can be reported using the "**Maintenance**" option in the *_TYPE variables, using the **DATE_START** and **DATE_END** options to indicate the period, if no optional variables are reported: maintenance indeed can also be used to update other variables (see table below). The **EC**, **STO** and **BM** groups have also to be used in case of disturbances, using in this case the "**Disturbance**" option. In case of **BM** it is also possible to report the variable affected in case it doesn't affect the whole sensor. *_TYPE variables also have a "**Firmware update**" option to communicate the period during which you were updating the firmware of a given sensor; when this is done the new firmware number or version must be reported in **INST** using "**Own repair**" as **INST_FACTORY**. Also the calibration periods are reported using the *_TYPE with the option "**Field calibration**".

Finally, in case a sensor is removed, the option "**Removal**" in *_TYPE must be used to communicate the operation, and then the sensor becomes again available for a new installation. Again, in the **STO** group the Removal is separated between "**GA removal**" for the sensor and "**Level removal**" for a single level or the whole profile.

The following scheme summarises the concepts above:

<u>Action</u>	<u>BADM groups</u>	<u>Explanations and details</u>
Sensors in the lab ↓	GA SA Storage Meteo Logger } INST	<i>All the sensors, including the loggers must be first recorded in the system using the INST group with INST_FACTORY = Purchase.</i>
Define data acquisition ↓	LOGGER FILE	<i>An ID must be attributed to each of the loggers used and files created because it is reported in the file name.</i>
Install sensors in the field ↓	GA EC SA EC GA, SA ECSYS Storage STO Meteo BM	<i>The installation of the sensors in the field is reported using the EC (for sonic and analyser), BM (for the meteo sensors) and STO (for the storage system).</i>
Sensor field calibration ↓	EC, BM, STO	<i>Field calibrations are reported in the EC, STO or BM groups, only for sensors that are installed at the station.</i>
Problem to sensors ↓	EC, BM, STO	<i>Also other management and disturbances to the sensors are reported using the EC, BM or STO groups.</i>
Factory calibration ↓	EC, BM, STO INST	<i>Factory calibrations are linked to the sensor independently of where it is used and for this reason reported in the INST group. If the sensor is installed in the field must be first "Removed".</i>
Add new sensors with new logger ↓	INST (LOGGER) (FILE) EC, BM,STO	<i>If new sensors are installed it is needed to first report them as available at the station using the INST group. Then the details of the installation can be reported using the EC, BM or STO groups. In case a new logger is used or a new file is created, the FILE and LOGGER groups must be used.</i>

Q2. Which BADM variables do I have to submit for the management of sensors in EC, STO and BM groups?

A2.

EC, STO and BM groups have strict rules for the submission of the BADM variables: some variables are required at each submission, some other are mandatory only for specific *_TYPE options. In addition some variables can be submitted only for specific *_TYPE values.

There are also variables that are linked together (submitting one of them, you have to submit also the other ones). The tables below and the Explanation in the BADM template gives these information. The dates are also required at each submission, but in some cases they can be submitted as **DATE_START** and **DATE_END** to report the duration of an operation, while in other cases they can be submitted only as a single **DATE** value. [Go to the EC group table.](#) [Go to the STO group table.](#) [Go to the BM group table.](#)

Table Q2.a: EC Group

EC GROUP: VARIABLES ALWAYS MANDATORY FOR ALL THE ENTRIES	
SITE_ID EC_MODEL EC_SN EC_TYPE EC_DATE or [EC_DATE_START and EC_DATE_END]	NOTE: EC_DATE_START and EC_DATE_END must be reported only together and as alternative to EC_DATE. When the EC_TYPE Installation, Removal or Maintenance together with another optional variable are used, only EC_DATE is accepted (reporting the exact time of installation or removal respectively)

EC GROUP: VARIABLES ALWAYS POSSIBLE FOR ALL THE ENTRIES
EC_DATE_UNC EC_COMMENT

EC GROUP: ADDITIONAL VARIABLES FUNCTION OF THE EC_TYPE USED			
EC_TYPE	MANDATORY	POSSIBLE	NOTES
Installation	EC_HEIGHT EC_EASTWARD_DIST EC_NORTHWARD_DIST EC_SA_HEAT* EC_SA_OFFSET_N EC_NORTHREF	<u>EC_SAMPLING_INT</u> <u>EC_LOGGER</u> <u>EC_FILE</u> EC_SA_WIND_FORMAT EC_SA_GILL_ALIGN EC_SA_GILL_PCI EC_GA_FLOW_RATE EC_GA_LICOR_FM_SN EC_GA_LICOR_TP_SN EC_GA_LICOR_AIU_SN	The three underlined facultative variables are linked and can not be submitted individually. If one is submitted all the other must be also submitted. NOTE: in case an external pump is reported (INST_MODEL=GA_PUMP-other) refer to the specific FAQ. With this EC_TYPE the variables EC_DATE_START and EC_DATE_END can not be used. The variables EC_SA_* are mandatory/possible only when the

			<p>EC_MODEL is a sonic anemometer. EC_SA_HEAT is mandatory only if the sonic is heated (potentially). The variables EC_GA_* are mandatory/possible only when the EC_MODEL is a gas analyser EC_GA_FLOW_RATE is possible also in case EC_MODEL is an external pump</p>
Maintenance	<i>none</i>	<u>EC_SAMPLING_INT</u> <u>EC_LOGGER</u> <u>EC_FILE</u> EC_SA_WIND_FORMAT EC_SA_GILL_ALIGN EC_SA_GILL_PCI EC_GA_FLOW_RATE EC_GA_LICOR_FM_SN EC_GA_LICOR_TP_SN EC_GA_LICOR_AIU_SN	<p>The three underlined facultative variables are linked and can not be submitted individually. If one is submitted all the other must be also submitted.</p> <p>The variables EC_SA_* are mandatory/possible only when the EC_MODEL is a sonic anemometer. The variables EC_GA_* are mandatory/possible only when the EC_MODEL is a gas analyser. EC_GA_FLOW_RATE is possible also in case EC_MODEL is an external pump</p> <p>The variables EC_DATE_START and EC_DATE_END can not be used in case it is reported one or more facultative variables. In this case EC_DATE must be used to report the exact start of validity of the new value. EC_DATE_START and EC_DATE_END can be used to report a period of maintenance operation (in field)</p>
Field Calibration	<i>none</i>	EC_GA_CAL_CO2_ZERO <u>EC_GA_CAL_CO2_OFFSET</u> <u>EC_GA_CAL_CO2_REF</u> EC_GA_CAL_H2O_ZERO EC_GA_CAL_TA	<p>This variable can be used only if the EC_MODEL is a gas analyser.</p> <p>The underlined variables EC_GA_CAL_CO2_OFFSET and EC_GA_CO2_REF can be submitted only together.</p>
Field Calibration Check	<i>none</i>	EC_GA_CAL_CO2_ZERO <u>EC_GA_CAL_CO2_OFFSET</u> <u>EC_GA_CAL_CO2_REF</u> EC_GA_CAL_H2O_ZERO EC_GA_CAL_TA	<p>This variable can be used only if the EC_MODEL is a gas analyser.</p> <p>The underlined variables EC_GA_CAL_CO2_OFFSET and EC_GA_CO2_REF can be submitted only together.</p>
Disturbance	<i>none</i>	<i>none</i>	

Connection failure	<i>none</i>	<i>none</i>	With this EC_TYPE the variable EC_DATE can not be used (use EC_DATE_START and EC_DATE_END)
Field Cleaning	<i>none</i>	<i>none</i>	
Filter change	<i>none</i>	<i>none</i>	
Firmware Update	<i>none</i>	<i>none</i>	
Parts Substitution	<i>none</i>	<i>none</i>	
Removal	<i>none</i>	<i>none</i>	With this EC_TYPE the variables EC_DATE_START and EC_DATE_END can not be used
General comment	<i>none</i>	<i>none</i>	

Table Q2.b: STO Group.

STO GROUP: VARIABLES ALWAYS MANDATORY FOR ALL THE ENTRIES	
SITE_ID STO_TYPE STO_PROF_ID STO_GA_MODEL STO_GA_SN STO_DATE or [STO_DATE_START and STO_DATE_END]	<p>NOTE: STO_DATE_START and STO_DATE_END must be reported only together and as alternative to STO_DATE.</p> <p>When the STO_TYPE Installation, Level installation, Removal, Level removal or Variable Map are used, only STO_DATE is accepted (reporting the exact time of installation, removal or start of the variable mapping respectively)</p> <p>STO_PROF_ID is always mandatory when one or more other STO_PROF_* variables are submitted</p> <p>STO_GA_MODEL and STO_GA_SN are mandatory when one or more other STO_GA_* variables are reported, and can be reported only together</p>

STO GROUP: VARIABLES ALWAYS POSSIBLE FOR ALL THE ENTRIES
STO_DATE_UNC STO_COMMENT

STO GROUP: ADDITIONAL VARIABLES FUNCTION OF THE STO_TYPE USED			
STO_TYPE	MANDATORY	POSSIBLE	NOTES
GA Installation	STO_GA_MODEL STO_GA_SN	STO_GA_FLOW_RATE	With this STO_TYPE the variables STO_DATE_START

	<p>STO_GA_VARIABLE STO_LOGGER STO_FILE STO_GA_PROF_ID STO_GA_SAMPLING_INT STO_GA_AZIM_MOUNT STO_GA_VERT_MOUNT STO_GA_TUBE_LENGTH STO_GA_TUBE_DIAM STO_GA_TUBE_MAT STO_GA_TUBE_THERM</p>		<p>and STO_DATE_END can not be used</p> <p>STO_GA_AZIM_MOUNT and STO_GA_VERT_MOUNT mandatory only if STO_CONFIG=separate and the IRGA is an open path</p> <p>STO_GA_FLOW_RATE and STO_GA_TUBE_* vars possible only for closed path IRGAs</p> <p>STO_GA_SAMPLING_INT mandatory only if different from one</p> <p>The same STO_GA_PROF_ID can be used for different GA in case of STO_CONFIG == 'sequential', but it must be unique in case of STO_CONFIG == 'separate'</p>
Level installation	<p>STO_CONFIG STO_PROF_ID STO_PROF_LEVEL STO_PROF_HEIGHT STO_PROF_EASTWARD_DIST STO_PROF_NORTHWARD_DIST STO_PROF_BUFFER_VOL STO_PROF_TUBE_LENGTH STO_PROF_TUBE_DIAM STO_PROF_TUBE_THERM STO_PROF_TUBE_MAT</p>	<p>STO_PROF_HORIZ_S_POINTS STO_PROF_BUFFER_FLOWRATE STO_PROF_SAMPLING_TIME</p>	<p>STO_PROF_SAMPLING_TIME possible only if STO_CONFIG=sequential</p> <p>With this STO_TYPE the variables STO_DATE_START and STO_DATE_END can not be used</p> <p>STO_PROF_HORIZ_S_POINTS if not communicated it is assumed to be 1</p>
GA removal	<p>STO_GA_MODEL STO_GA_SN</p>	<i>none</i>	<p>With this STO_TYPE the variables STO_DATE_START and STO_DATE_END can not be used</p>
Level removal	<p>STO_PROF_ID</p>	<p>STO_PROF_LEVEL</p>	<p>With this STO_TYPE the variables STO_DATE_START and STO_DATE_END can not be used</p>
Maintenance	<i>none</i>	<p>STO_GA_FLOW_RATE STO_GA_TUBE_THERM STO_PROF_BUFFER_FLOWRATE STO_PROF_TUBE_THERM STO_PROF_SAMPLING_TIME</p>	<p>Either STO_PROF_ID in case if operations on the profile system, or STO_GA_MODEL (and STO_GA_SN) in case of operations on a GA must be reported</p> <p>STO_PROF_SAMPLING_TIME possible only if</p>

		<p>STO_PROF_LEVEL STO_PROF_ID <u>STO_GA_MODEL</u> <u>STO_GA_SN</u></p>	<p>STO_CONFIG=sequential</p> <p>STO_PROF_ID is mandatory only if one or more other STO_PROF_* variables are submitted</p> <p>STO_GA_MODEL and STO_GA_SN are mandatory only if one or more other STO_GA_* variables are reported, and can be reported only together</p> <p>STO_PROF_LEVEL mandatory if STO_PROF_BUFFER_FLOWRATE is reported (must be 0 for STO_CONFIG=simultaneous) and if STO_PROF_TUBE_THREAT is reported STO_GA_FLOW_RATE and STO_GA_TUBE_THERM possible only for closed path IRGAs</p>
Variable map	<p>STO_GA_VARIABLE STO_LOGGER STO_FILE STO_GA_MODEL STO_GA_SN STO_GA_SAMPLING_INT</p>	<i>none</i>	<p>STO_GA_SAMPLING_INT mandatory only if different from one</p> <p>With this STO_TYPE the variables STO_DATE_START and STO_DATE_END can not be used</p>
Field Calibration	<p>STO_GA_MODEL STO_GA_SN</p>	<p><u>STO_GA_CAL_VARIABLE</u> <u>LE</u> <u>STO_GA_CAL_VALUE</u> <u>STO_GA_CAL_REF</u> STO_GA_CAL_TA</p>	The three underlined variables can be submitted only together.
Field Calibration Check	<p>STO_GA_MODEL STO_GA_SN</p>	<p><u>STO_GA_CAL_VARIABLE</u> <u>LE</u> <u>STO_GA_CAL_VALUE</u> <u>STO_GA_CAL_REF</u> STO_GA_CAL_TA</p>	The three underlined variables can be submitted only together.
Connection failure	<i>none</i>	<p><u>STO_GA_MODEL</u> <u>STO_GA_SN</u></p>	With this STO_TYPE the variables STO_DATE can not be used (use STO_DATE_START and STO_DATE_END)

Disturbance	<i>none</i>	<p>STO_PROF_LEVEL STO_PROF_ID <u>STO_GA_MODEL</u> <u>STO_GA_SN</u></p>	<p>Either STO_PROF_ID in case if operations on the profile system, or STO_GA_MODEL (and STO_GA_SN) in case of operations on a GA must be submitted</p> <p>STO_PROF_ID is mandatory only if one or more other STO_PROF_* variables are submitted</p> <p>STO_GA_MODEL and STO_GA_SN can be reported only together</p>
Field Cleaning	<i>none</i>	<p>STO_PROF_LEVEL STO_PROF_ID <u>STO_GA_MODEL</u> <u>STO_GA_SN</u></p>	<p>Either STO_PROF_ID in case if operations on the profile system, or STO_GA_MODEL (and STO_GA_SN) in case of operations on a GA must be submitted</p> <p>STO_PROF_ID is mandatory only if one or more other STO_PROF_* variables are submitted</p> <p>STO_GA_MODEL and STO_GA_SN can be reported only together</p>
Parts Substitution	<i>none</i>	<p>STO_PROF_LEVEL STO_PROF_ID <u>STO_GA_MODEL</u> <u>STO_GA_SN</u></p>	<p>Either STO_PROF_ID in case if operations on the profile system, or STO_GA_MODEL (and STO_GA_SN) in case of operations on a GA must be submitted</p> <p>STO_PROF_ID is mandatory only if one or more other STO_PROF_* variables are submitted</p> <p>STO_GA_MODEL and STO_GA_SN can be reported only together</p>
Filter change	<i>none</i>	<p>STO_PROF_LEVEL STO_PROF_ID <u>STO_GA_MODEL</u> <u>STO_GA_SN</u></p>	<p>Either STO_PROF_ID in case if operations on the profile system, or STO_GA_MODEL (and STO_GA_SN) in case of operations on a GA must be submitted</p> <p>STO_PROF_ID is mandatory only if one or more other</p>

			STO_PROF_* variables are submitted STO_GA_MODEL and STO_GA_SN can be reported only together
Tube change	<i>none</i>	STO_PROF_LEVEL STO_PROF_ID	STO_PROF_ID is mandatory only if one or more other STO_PROF_* variables are submitted
Firmware Update	STO_GA_MODEL STO_GA_SN	<i>none</i>	
General comment	<i>none</i>	<i>none</i>	

Table Q2.c: BM Group.

BM GROUP: VARIABLES ALWAYS MANDATORY FOR ALL THE ENTRIES	
SITE_ID BM_MODEL BM_SN BM_TYPE BM_DATE or [BM_DATE_START and BM_DATE_END]	NOTE: BM_DATE_START and BM_DATE_END must be reported only together and as alternative to BM_DATE. When the BM_TYPE Installation, Removal or Variable Map are used, only BM_DATE is accepted (reporting the exact time of installation, removal or start of the variable mapping respectively)

BM GROUP: VARIABLES ALWAYS POSSIBLE FOR ALL THE ENTRIES
BM_DATE_UNC BM_COMMENT

BM GROUP: ADDITIONAL VARIABLES FUNCTION OF THE BM_TYPE USED			
BM_TYPE	MANDATORY	POSSIBLE	NOTES
Installation	BM_HEIGHT BM_EASTWARD_DIST BM_NORTHWARD_DIST BM_NORTHREF	<u>BM_VARIABLE_H_V_R</u> <u>BM_SAMPLING_INT</u> <u>BM_LOGGER</u> <u>BM_FILE</u> BM_INST_HEAT BM_INST_SHIELDING BM_INST_ASPIRATION	The four underlined facultative variables are linked and can not be submitted individually. If one is submitted all the other must be also submitted. With this BM_TYPE the variables BM_DATE_START and BM_DATE_END can not be used
Maintenance	<i>none</i>	BM_VARIABLE_H_V_R BM_INST_HEAT BM_INST_SHIELDING	The BM_VARIABLE_H_V_R variable should be used only in case the sensor measures

		BM_INST_ASPARATION	multiple variables and the maintenance affects only one of them.
Variable Map	BM_VARIABLE_H_V_R BM_SAMPLING_INT BM_LOGGER BM_FILE	<i>none</i>	With this BM_TYPE the variables BM_DATE_START and BM_DATE_END can not be used
Field Calibration	<i>none</i>	BM_VARIABLE_H_V_R	The BM_VARIABLE_H_V_R variable should be used only in case the sensor measures multiple variables and the calibration concerns only one of them.
Field Calibration Check	<i>none</i>	BM_VARIABLE_H_V_R	The BM_VARIABLE_H_V_R variable should be used only in case the sensor measures multiple variables and the calibration concerns only one of them.
Connection failure	<i>none</i>	<i>none</i>	With this BM_TYPE the variables BM_DATE can not be used (use BM_DATE_START and BM_DATE_END)
Disturbance	<i>none</i>	BM_VARIABLE_H_V_R	The BM_VARIABLE_H_V_R variable should be used only in case the sensor measures multiple variables and the disturbance affects only one of them.
Field Cleaning	<i>none</i>	BM_VARIABLE_H_V_R	The BM_VARIABLE_H_V_R variable should be used only in case the sensor measures multiple variables and the cleaning concerns only one of them.
Firmware Update	<i>none</i>	BM_VARIABLE_H_V_R	The BM_VARIABLE_H_V_R variable should be used only in case the sensor is composed by multiple sensors and the the firmware is updated only for one of them.
Parts Substitution	<i>none</i>	BM_VARIABLE_H_V_R	The BM_VARIABLE_H_V_R variable should be used only in case the sensor measures multiple variables and the part substitution affects only one of them.
Removal	<i>none</i>	<i>none</i>	With this BM_TYPE the variables BM_DATE_START and

			BM_DATE_END can not be used
General comment	none	none	

Q3. How do I communicate the update of a sensor firmware?

A3.

*In case the sensor is used in the field (installed) this info is reported in the group **INST** and **EC**, **BM** or **STO** (depending on the sensor type). Use the ***_TYPE** to report “**Firmware update**” and then in the **INST_FACTORY** (in the **INST** group) using the option “**Own repair**” and **INST_FIRMWARE** to report the firmware version.*

*If the sensor is not installed use directly **INST_FACTORY** set as “**Own repair**” and report the firmware version in **INST_FIRMWARE**.*

*In case of a data logger in use (used in the field), use the same procedure as the not installed sensors with **INST_FACTORY** set as “**Own repair**” and firmware version reported in **INST_FIRMWARE** (not needed to report the operation in **EC**, **BM** or **STO**).*

Q4. How do I report in the BADM the fact that one given sensor was sent to factory for calibration? And what if a spare sensor is installed in its place for the period?

A4.

*This info needs two groups to be filled: **INST** and **EC** if your sensor is a gas analyser or a sonic anemometer, **INST** and **BM** if it is a meteo sensor, **INST** and **STO** if it is a sensor used in the storage measurements. In ***_TYPE** , you have to report the “**Removal**” of the sensor with the corresponding date (when you unmount it from the station) using the ***_DATE** variable.*

*After the removal, in **INST** you have to report the factory calibration details: **INST_FACTORY** will be “**Factory calibration**”, with **INST_CALIB_FUNC** used to report the new calibration function and then the date of the calibration.*

*When the sensor will be back from the factory and put again in the field, it is needed to install it again, using the ***_TYPE** as “**Installation**” and providing all the info needed. In fact it is important to remember that with the “**Removal**” option all the information about the sensor (position, logger, file etc.) are closed and considered not any more valid after the removal date.*

*In the case the sensor shipped to factory is replaced by a spare one for the period of the calibration, after describing the **Removal** of the first one it is possible to report the installation of the spare sensor in the same location, and to map the variables to the same file, provided that they don't change name and number (the file structure must remain the same). However, it is also possible to change variable names, if preferred: in that case, a new file needs to be created, by changing the **FILE_ID**. See also Q11 on how to handle changes in files.*

Q5. How should I communicate a change of the sampling interval, file ID or logger ID?

A5.

*The sampling interval and the file and logger IDs are strictly bounded to each other in the BADM system. If a change to one or more of them is needed, this info has to be reported in the **BM**, **EC** or **STO** groups, with slight differences:*

- **EC:** any change in **EC_SAMPLING_INT**, **EC_LOGGER** and **EC_FILE** variables has to be reported using **“Maintenance”** as **EC_TYPE**. If only one or two of them change, you still have to report all the three.
- **BM:** the **BM_TYPE** to be used in this case is **Variable Map**. In addition to **BM_SAMPLING_INT**, **BM_LOGGER** and **BM_FILE**, that have to be reported together, independently from which one(s) of them is subject to modifications, also the variable(s) of interest have to be specified, i.e. **BM_VARIABLE_H_V_R**: then, if a set of variables is moved to a different file and/or its sampling interval is modified, the info has to be reported in the BADM for each single variable separately.
- **STO:** for storage measurements, the sampling interval of the GA (**STO_GA_SAMPLING_INT**, i.e. the one defining the interval between two consecutive records in the data file, independently from the level) has to be 1 second. Deviations from this value are possible only in case of real impediment and after agreement with the ETC. Changes in **STO_GA_SAMPLING_INT** (agreed), **STO_LOGGER** and **STO_FILE** have to be reported in the BADM selecting **Variable map** as **STO_TYPE**. **STO_LOGGER**, **STO_FILE** and **STO_VARIABLE** have to be reported together, while **STO_GA_SAMPLING_INT** only if different from 1, or if it is modified to 1 from a different value. Please note that, in the case of **Sequential** configuration, the time it takes to sample each single level has to be reported using **STO_PROF_SAMPLING_TIME**. Changes to it are reported using **Maintenance**, with no need to report any other variable.

Q6. How should I communicate a change of height or position of an instrument or storage profile level?

A6.

*If you change the location (height or horizontal distances) of an instrument or of a level on a storage profile, you need to report a **“Removal”** and then a new **“Installation”** of the instrument/level*

(specifying the new position) as *_**TYPE**. It is important to remember that with the “**Removal**” option all the information on the instrument/level (position, logger, file etc.) are closed and considered not any more valid after the removal date.

Please note that when communicating a new “**Installation**”, all the three variables reporting height (*_**HEIGHT**), northward (*_**NORTHWARD_DIST**) and eastward (*_**EASTWARD_DIST**) distances must be reported (and in case of a sonic anemometer also **EC_SA_HEAT** and **EC_SA_OFFSET_N**).

Q7. When something happens at my ICOS station, why am I supposed to send the corresponding BADM within midnight? What if it concerns an issue that is not fixed yet?

A7.

The BADM info are automatically retrieved and used for both the L2 and the NRT data products preparation. NRT data calculation is performed every morning using the data of the day before. For this reason it is important that before the processing all the relevant information about changes or issues affecting the measurements the day before are available in the BADM system.

If the info concerns an issue that is not resolved when the BADM is sent, for example a “**Disturbance**” the station team is trying to fix, it should be reported using an expected date in the future as *_**DATE_END**. This date will be then updated when the problem will be actually fixed by communicating it to the ETC.

Q8: I calibrated the sensor in the lab. As I physically removed the sensor from the field, I did a Removal but then the “Field calibration” operation is not possible anymore. Why is this happening and how to do it correctly?

A8.

The “**Field calibration**” is not possible because with the “**Removal**” option in the *_**TYPE** the sensor is considered no more installed in the field and for this reason you cannot report anything in **EC**, **STO** or **BM** group relative to it.

In this case the communication of your own calibration to the sensor must be through the **INST** group, selecting “**Own calibration**” as **INST_FACTORY** or “**Own repair**” in case you also did some other operation. When the sensor is then put back in the field it needs to be installed again using the “**Installation**” option in the *_**TYPE** and providing all the connected information.

A faster and easier alternative, particularly valid in case the sensor is calibrated locally (e.g. in the lab or an hut at the station) and for this reason removed and mounted back in few hours, is to use directly

“Field Calibration” in the *_TYPE and use **DATE_START** and **DATE_END** to indicate the period when the sensor was “disturbed” by the calibration.

Q9. What is the difference between Field calibration and Field calibration check?

A9.

*This difference is particularly relevant for the gas analyser used in the **EC** and **STO** measurements. The field calibration of the gas analyser is the operation of setting the zero and the span of the LI-7200 following the procedure described in the Instruction document (<https://doi.org/10.18160/qwv4-639g>): basically using CO2-free, H2O-free and known CO2 concentration tanks the parameters of the gas analyser are changed in order to reduce the differences between expected and measured concentrations. This is communicated using the “**Field calibration**” option in the **EC_TYPE** variable and the associated variables.*

*The field calibration check is practically similar to the calibration but has the only purpose of checking the differences in the concentrations (expected and measured) without adjusting the parameters of the sensor. This is communicated using the “**Field calibration check**” option in the **EC_TYPE** variable and the associated variables.*

The concept is valid for other sensors.

Q10. How to report the update of the firmware of a datalogger?

A10.

*Firmware update of a datalogger, as for all of the other sensors, has to be reported on the **INST** group selecting the corresponding logger and using “**Own repair**” as **INST_FACTORY**. The new firmware has to be reported in the **INST_FIRMWARE** variable. Differently from the other sensors, it is not needed to use any variable in the **EC**, **BM** or **STO** groups to communicate the event of firmware update.*

Q11. How and when is it needed to change the File ID and Logger ID?

A11.

*Both the File ID and the Logger ID can be set to any number between 1 and 99 (please note that 0 is not allowed) using the variables in the groups **FILE** and **LOGGER**. They have to uniquely identify a*

data-logger or a file produced by the logger (not the single file but the file type produced every day or half-hourly).

The File ID must be changed anytime one or more of the following situations occur:

- a. the structure of the file (number or order of columns, variable names, missing data indicator, header lines etc.) changes*
- b. any BADM variable in the group **FILE** changes*
- c. the sampling interval of the file changes*

The Logger ID must be changed when the data-logger is changed with a different model (and the file created in the new logger). If the new logger installed in the place of an old one is exactly the same model (with a different SN) and the old logger is not used anymore, the logger ID can remain the same. Also, the logger ID can be changed in case all the integers from 1 to 99 have been used for the File ID on the same logger, and a new file ID is needed.

*When a new file is created, it must be described in the BADM group **FILE**. The link of the **FILE_ID** and **LOGGER_ID** to the instruments (for **EC** and **STO**) and variables (for **BM**) will be used to understand if a file is expected or not: for that reason when a file is replaced by a new one, it will not be deleted from the BADM.*

*After the new file is described using the group **FILE** it is needed to map the instruments (**EC**, **STO**) and variables (**BM**) from the old file to the new and to submit a new header for the new file. More details are reported in Q5.*

Q12. How do we report the use of a compact weather station for backup and the possible use of external additional/substitute sensors connected to it?

A12.

The use of a compact weather station for backup measurements is in general possible but should be discussed first with the ETC for a general evaluation. Each measuring device in the weather station has to be treated as a separate sensor following the BADM Instruments [LIST](#); it is possible to group the sensors only when it is in the BADM LIST (e.g. RHTEMP sensors that measure both relative humidity and air temperature). If you are using an external sensor connected to the weather station (e.g. a tipping bucket connected to station), you must report it like all the other sensors using the correct LIST option. In case the weather station is already equipped with a sensor measuring the same variable (e.g. another rain gauge, maybe with different resolution or method), you can report both in case both provide a record of data or only the one you are using.

Q13. How to report the use of an external pump in place of the LICOR one for CO2/H2O EC measurements?

A13.

*In this very special case an additional **EC** data file is needed, where the pump variables are submitted (see the Instruction on **EC** raw data format **EC** for more details). In the BADM, this file has to be mapped using **EC_MODEL=GA-PUMP_other**. The variables to be submitted in the external pump installation are: **EC_MODEL (GA-PUMP_other)**, **EC_SN**, **EC_TYPE (Installation)**, **EC_HEIGHT** (the same as the GA), **EC_EASTWARD_DIST** (the same as the GA), **EC_NORTHWARD_DIST** (the same as the GA), **EC_SAMPLING_INT**, **EC_LOGGER**, **EC_FILE**, **EC_GA_FLOW_RATE**, and **EC_DATE**. In addition, the pump model must also be reported in the group **ECSYS** in both **SA_MODEL** and **GA_MODEL**, with the corresponding serial numbers and setting the separations to 0.*

Q14. The ICOS Instructions on meteo measurements specify that the raw BM files must have both the instrument units and the physical units, if different. How to map the instrument units (IU) to the files in the BADM?

A14.

*The instrument units (IU) variables of **BM** files are automatically linked to the corresponding physical units variables. For that reason it is not needed (and not possible) to map the instrument units variables: mapping the physical units ones is enough to map both. The same applies to other “special” variables: **G_SF**, **G_ISCAL** (mapped with **G**), **LW_T_BODY** (mapped with **LW_IN** or **LW_OUT**) and **SW_T_BODY** (mapped with **SW_IN** or **SW_OUT**)*

Q15. Do “Removal” and “Installation” as EC_TYPE, BM_TYPE and STO_TYPE variables have a physical meaning, or can they be used also to report changes that occurred without physically move the sensors (e.g. change variable names)?

A15.

*“Removal” and “Installation” must correspond to a physical removal and placement of the corresponding sensor, respectively. This is related to how the metadata are used: to build the story of measurements during the processing. With such info it is possible to automatically dispose the link between files and variables in the different periods discriminated by the *_**DATE** fields. Wrong info on **Installation** and **Removal** will result in discarding good data or in bad calculations.*

Q16. How to report operations to parts of the station not included in the BADM, e.g. the update of a router?

A16.

*Pieces of the monitoring system that are not sensors nor are parts of them don't have dedicated variables in the BADM system. However, if something happens to them which impacts the normal functioning of the station (correct measurements, data collection and submission, etc.), they have to be reported in the BADM as any other generic operation not specifically contemplated in *_TYPE: using "Disturbance", the period (*_DATE_START + *_DATE_END), and possible details in the *_COMMENT. In that way for that period the files will be not expected, or expected to be wrong.*

Q17. In the Instructions on how to fill in the BADM it is reported that: "when for the same variable group it is needed to report more than one value, one "instance" for each entry must be done (i.e. one column in the Excel version or one online form filling and submission)". How should the ECSYS and ECWEXCL groups be filled in relative to the EC group, present in the same Excel template?

A17.

The ECSYS and ECWEXCL groups can be filled in independently from the EC group, and following the same rules. In particular, the ECSYS and ECWEXCL groups must be submitted only if any of the variables of those groups changed. For example, if one template is submitted with ten columns to report ten different operations on the EC sensors, the ECSYS and ECWEXCL groups must be left empty if no update occurred there, or only those columns where some changes to the ECSYS and ECWEXCL variables occurred must be filled in. They must NOT be filled in with zeros or other characters: this will result in errors or ingestion of bad metadata.

The ECSYS group in order to be ingested, the two EC sensors linked together must be already installed: in the case the installations of the two EC sensors are reported in two columns of the same template, it is recommended to fill in the ECSYS group in the column reporting the installation of the second sensor, or in a column after that, or in a separate file, or in the online tool AFTER the Installation has been ingested. The same applies to the ECWEXCL group, where the wind sectors to be excluded (center + width) can be added and removed (see the corresponding Excel template for further reference)

Q18. I reported the installation of a GA in the STO group with one gas, as requested. How to report that this GA is used also to measure also the concentration of other gases? (e.g. H2O, CH4, N2O)

A18.

*In case multiple gases are measured with the same gas analyser, one of them must be reported with the **GA Installation** as explained in A1 and A2. The remaining ones must be mapped using **STO_TYPE = "Variable map"***

Q19. How to report the required info for the ramified profile levels in the STO group?

A19.

*In case multiple air inlets are used in a specific level (e.g. in the lower levels ramifications) the reference point for the height (**STO_PROF_HEIGHT**) and distances (**STO_PROF_EASTWARD_DIST** and **STO_PROF_NORTHWARD_DIST**) calculation is their geometric centre. Then with **STO_PROF_HORIZ_S_POINTS** simply report the number of sampling points (inlets) at that level.*

Q20. How to report the replacement of a GA or a change in the design of the profile in the STO group?

A20.

*The storage BADM is based on two groups of variables, namely "**STO_PROF_**" and "**STO_GA_**", which are both a) independent; and b) linked by an arbitrary and univocal ID assigned to the profile system. This ID (**STO_PROF_ID**) is used to connect the profile system to the GA in occasion of the GA installation, where **STO_GA_PROF_ID** has to be reported. In that way, for example, if the current GA is linked to the profile with ID=1 and has to be replaced by a different GA, one can use **STO_TYPE = "GA removal"** without reporting any of the profile variables, and then use **STO_TYPE = "GA Installation"** for the new model and simply link it to the existing profile ID=1 by setting **STO_GA_PROF_ID** to 1.*

Q21. How to report a change to the characteristic of a level in the STO group?

A21.

*As a general rule, it is possible to do that by using **STO_TYPE = Level removal** and then **Level installation** by reporting the specific **STO_PROF_LEVEL** involved in the change. However, the way to report the modification depends on the modification itself. If the modification implies:*

- *a physical change of the system, e.g. change of the tube length (**STO_PROF_TUBE_LENGTH**): you have to report the removal (**STO_TYPE = "Level removal"** with **STO_GA_PROF_ID = "#"** and*

STO_PROF_LEVEL = “#”) and then the installation of the modified feature (STO_TYPE = “Level installation” with STO_GA_PROF_ID == “#” and STO_PROF_LEVEL == “#”)

- *a non-physical change of the system, e.g. the length of the sampling time (STO_PROF_SAMPLING_TIME): you just have to report the modification using STO_TYPE = “Maintenance” together with the ID of the profile and the level actually affected by the operation (STO_GA_PROF_ID and STO_PROF_LEVEL respectively).*
- *Please note that in both cases, if the STO_PROF_LEVEL is not reported, the operation is considered valid for the whole profile*

Q22. How to report the installation of a probe (e.g. for soil measurements) when there is only one Serial Number?

A22.

A probe instrument deploys a set of sensors in different position (e.g. vertically in the soil) and it is generally characterized by a single Serial Number (SM).

For this reason, when a probe is registered as sensor in the INST group it is then impossible to install it using BM TYPE = Installation at the different depths because each sensor (defined by INST_TYPE and INST_SN) can only be installed once. In addition it is important to have the possibility to exactly identify each of the sensor in the probe, because in case of problems or a slightly different calibration this can be easily communicated.

For this reason, in case of probes the procedure is the following:

- *Each of the sensors in the probe (at the different depths) must be treated as an individual sensor. This means that each sensor must be registered in the INST group using as serial number the one of the probe with the addition of “_X” where X is an increasing number.*
- *Use then the BM Group to install each sensor separately as with the single sensors.*

It is not necessary to indicate that it is a probe because with the INST_TYPE that are now sensor specific this is already identified.

Q23. How to report the presence of a heating/shielding/aspiration system in a given BM sensor, and their addition/removal in a later stage after installation?

A23.

When reporting the Installation of a sensor, it is possible to report also if it is heated, shielded and/or aspirated by using the corresponding variables BM_INST_HEAT, BM_INST_SHIELDING and BM_INST_ASPARATION. If these variables are left empty at the Installation, this will be interpreted as “not present”, otherwise YES has to be indicated. If the heating/shielding/aspiration system is added or removed in a later moment, this has to be communicated using a Maintenance: in that case NO and

YES have to be used to communicate the removal of an existing system, or the installation of a missing one, respectively. If left blank, this will be interpreted as unchanged.

Q24. How will the ETC treat raw and processed data acquired in correspondence of a period of Disturbance correctly reported on the BADM?

A24.

Raw data are stored at the final CP repository as sent by the stations: the ETC will never edit them. The period reported as “**Disturbance**” on the BADM system, or any other operation involving a disruption of the correctness of the data, will not be processed. The period excluded from the processing is based on the corresponding dates indicated in the BADM: in case of *_**DATE_START** and *_**DATE_END**, the corresponding period +/- 5 minutes will be discarded. In case of *_**DATE**, the full corresponding half hour will be discarded. If *_**DATE** +/- 5 minutes is between two half hours, both the halfhours will be discarded. Please note that if the dates are reported at the daily resolution instead of half hourly, the whole day will be discarded, as it will be not possible to assign a shorter period to the disturbance event.

Q25. After submitting some metadata about my station, I realised I made a mistake: how can I correct it?

A25.

When an error is present in the groups **EC, BM, STO, ECSYS, ECWEXCL, FILE** or **LOGGER**, the user has to contact the ETC at icos-etc@unitus.it. The editing of the abovementioned groups is indeed prevented to the users: for that reason we recommend NOT to try correcting things by adding records that do not correspond to factual actions. The mistakes will be corrected internally by the ETC upon users’ request: also for that reason we recommend always performing an extra-check on the metadata before submitting it, to reduce the likelihood of mistakes.

An exception to this rule is valid for the **INST** group: in this case, by sending a record with the same **INST_MODEL, INST_SN** and **INST_DATE** of an existing one, all the other fields will be overwritten. This is especially useful when the **Purchase** of a sensor is reported without the **INST_CALIB_FUNC**, and this needs to be added in a second moment.

Q26. At my station I have other meteorological sensors in addition to the ICOS ones: am I supposed to map the corresponding variables in the BADM group BM?

A26.

ICOS requires a group of meteorological sensors with minimum specifics required. As detailed in the relative Instruction documents, additional sensors are possible. For handling these additional variables, three options are available:

- *Option #1: the variables are not in the ICOS files and are not registered in the BADM. For ICOS they don't exist.*
- *Option #2: the variables are in the ICOS files, and are named in the external (+ internal if present) header(s) with non-ICOS labels (i.e. different from the list of labels present in the Instructions). In this case they don't have to be registered in the BADM. The variables are stored in the CP repository as raw measurements, but they are not processed by ICOS.*
- *Option #3: the variables are in the ICOS files, named with ICOS labels. They are processed by the ETC (half-hourly aggregations), but they are not used in the spatial aggregations.*

While options #1 and #2 can be used with both ICOS-compliant and not-compliant sensors, and also with variables not included in the ICOS list, option #3 is only possible for ICOS variables, even if measured with non-compliant sensors.

FAQs about the ancillary information (Groups: AGB, BULKH, ALLOM, DHP, CEPT, GAI, LITTERPNT, SPPS)

[QA1. Which BADM variables do I have to / can report for the Ancillary data groups?](#)

[QA2. How do we report the litter mass of which we report the leaves area?](#)

Answers to FAQs on Ancillary data

QA1. Which BADM variables do I have to / can report for the Ancillary data groups?

AA1.

It is important to clarify that this is not related to the variables that must be measured and submitted in ICOS stations that is discussed in the Instructions and not part of these FAQs. Here it is related to variables that can or must be reported when a BADM is submitted.

For each group there are variables always mandatory (in each submission of a BADM) and variables that can be submitted only in specific cases, function of the ecosystem, protocol applied and type of submission. For each group a table is reported with the mandatory and possible variables in the different conditions.

- [Go to GAI group table](#)
- [Go to AGB group table](#)
- [Go to LITTERPNT group table](#)
- [Go to DHP group table](#)
- [Go to BULKH group table](#)
- [Go to CEPT group table](#)
- [Go to SPPS group table](#)

Table QA1.a: GAI Group

GAI GROUP: VARIABLES ALWAYS MANDATORY FOR ALL THE ENTRIES	
SITE_ID GAI_PLOT GAI_METHOD GAI_DATE	NOTE:

GAI GROUP: VARIABLES ALWAYS POSSIBLE FOR ALL THE ENTRIES
GAI_COMMENT

GAI GROUP: ADDITIONAL VARIABLES FUNCTION OF THE GAI_METHOD (AND GAI_PLOT)			
GAI_METHOD	MANDATORY	POSSIBLE	NOTES
DHP (GAI_PLOT = CP)	<u>GAI_DHP_EASTWARD_DIST</u> <u>GAI_DHP_NORTHWARD_DIST</u> XOR <u>GAI_DHP_DISTANCE_POLAR</u> <u>GAI_DHP_ANGLE_POLAR</u> GAI_DHP_ID GAI_DHP_SLOPE	none	Can be used only in Forest. The couples of underlined facultative variables are linked and can not be submitted individually. If one is submitted the other must be also submitted. The options separated by XOR

	GAI_DHP_ASPECT		are one alternative to the other. The variables must be submitted only once with the starting date, or when changing the position
DHP (GAI_PLOT = SP)	GAI_DHP_SLOPE GAI_DHP_ASPECT GAI_DHP_ID	<u>GAI_DHP_EASTWARD_DIST</u> <u>GAI_DHP_NORTHWARD_DIST</u> XOR <u>GAI_DHP_DISTANCE_POLAR</u> <u>GAI_DHP_ANGLE_POLAR</u>	Can be used only in Forest. The couples of underlined facultative variables are linked and can not be submitted individually. If one is submitted the other must be also submitted. The options separated by XOR are one alternative to the other. The variables must be submitted only once with the starting date, or when changing the position.
Destructive (Cropland)	GAI_PTYPE GAI GAI_AREA GAI_LOCATION	GAI_SPP GAI_PHEN GAI_HEIGHTC	GAI_PTYPE must be used with the options Crop or Weed. Only in case of a crop species mixture, the GAI_SPP should be filled in to report GAI at species level
Destructive (Grassland)	GAI GAI_AREA GAI_PLOT_TYPE	GAI_SPP GAI_PHEN GAI_HEIGHTC GAI_PTYPE	
Visual estimation	GAI GAI_SPP	GAI_HEIGHTC GAI_LOCATION_HEIGHT GAI_AREA	Can be used only in Mires
Modified VGA	GAI GAI_SPP	GAI_HEIGHTC GAI_LOCATION_HEIGHT GAI_AREA	Can be used only in Mires
Spectral reflectance	GAI	GAI_HEIGHTC	Only when agreed with ETC
AccuPAR (Cropland)	<i>none</i>	GAI_HEIGHTC GAI_LOCATION	
AccuPAR (Grassland)	GAI_PLOT_TYPE	GAI_HEIGHTC	
SUNSCAN (Forest) (GAI_PLOT = CP)	<u>GAI_CEPT_EASTWARD_DIST</u> <u>GAI_CEPT_NORTHWARD_DIST</u> XOR <u>GAI_CEPT_DISTANCE_POLAR</u> <u>GAI_CEPT_ANGLE_POLAR</u> GAI_CEPT_ID	<i>none</i>	The groups of underlined facultative variables are linked and can not be submitted individually. If one is submitted the other must be also submitted. The options separated by XOR are one alternative to the other. The variables must be submitted only once with the starting date, or when changing the position
SUNSCAN (Forest)	<i>none</i>	<u>GAI_CEPT_EASTWARD_DIST</u> <u>GAI_CEPT_NORTHWARD_DIST</u>	The groups of underlined facultative variables are linked

(GAI_PLOT = SP)		<u>GAI_CEPT_ID</u> XOR <u>GAI_CEPT_DISTANCE_POLAR</u> <u>GAI_CEPT_ANGLE_POLAR</u> <u>GAI_CEPT_ID</u>	and can not be submitted individually. If one is submitted the other must be also submitted. The options separated by XOR are one alternative to the other. The variables must be submitted only once with the starting date, or when changing the position
SUNSCAN (Cropland)	<i>none</i>	GAI_HEIGHTC GAI_LOCATION	
SUNSCAN (Grassland)	GAI_PLOT_TYPE	GAI_HEIGHTC	

Table QA1.b: AGB Group

AGB GROUP: VARIABLES ALWAYS MANDATORY FOR ALL THE ENTRIES	
SITE_ID AGB_PLOT AGB_DATE	NOTE:

AGB GROUP: VARIABLES ALWAYS POSSIBLE FOR ALL THE ENTRIES
AGB_COMMENT

AGB GROUP: ADDITIONAL VARIABLES FUNCTION OF THE ECOSYSTEM TYPE AND AGB_PTYPE			
ECOSYSTEM	MANDATORY	POSSIBLE	NOTES
Mires	AGB_NPP_MOSS XOR AGB AGB_SPP	AGB_AREA AGB_PHEN AGB_LOCATION_HEIGHT AGB_HEIGHTC AGB_PTYPE AGB_ORGAN	The options separated by XOR are one alternative to the other. AGB_ORGAN possible in case of AGB_PTYPE is on woody species
Cropland	AGB AGB_LOCATION AGB_AREA AGB_PHEN AGB_PTYPE	AGB_HEIGHTC AGB_SPP AGB_ORGAN	
Forest	AGB AGB_LOCATION AGB_AREA AGB_PHEN** AGB_SPP* AGB_PTYPE	<i>none</i>	*AGB_SPP mandatory and allowed only if AGB_TYPE is Sapling and AGB is > 0. Not allowed in all the other cases. **AGB_PHEN mandatory and allowed only if AGB_TYPE is Herb, Ferns or Shrub. Not allowed in all the other cases. For Moss see the following.

Forest (AGB_PTYPE = Moss)	AGB_NPP_MOSS XOR AGB AGB_PHEN AGB_LOCATION AGB_PTYPE	<i>none</i>	The options separated by XOR are one alternative to the other. AGB_PHEN mandatory and allowed only if AGB is provided (not allowed if AGB_NPP_MOSS is submitted)
Grassland	AGB AGB_AREA AGB_PLOT_TYPE	AGB_HEIGHTC AGB_SPP AGB_PTYPE AGB_PHEN	

Table QA1.c: LITTERPNT Group

LITTER GROUP: VARIABLES ALWAYS MANDATORY FOR ALL THE ENTRIES	
SITE_ID LITTERPNT_PLOT LITTERPNT_TYPE LITTERPNT_DATE	NOTE: This group can not be submitted in Mires

LITTER GROUP: VARIABLES ALWAYS POSSIBLE FOR ALL THE ENTRIES
LITTERPNT_COMMENT

LITTER GROUP: ADDITIONAL VARIABLES FUNCTION OF THE ECOSYSTEM AND LITTER_TYPE			
ECOSYSTEM	MANDATORY	POSSIBLE	NOTES
Grassland	LITTERPNT LITTERPNT_AREA	LITTERPNT_SPP	
Cropland (LITTERPNT_TYPE = Natural)	LITTERPNT LITTERPNT_ID LITTERPNT_AREA LITTERPNT_FRACTION	LITTERPNT_SPP	
Cropland (LITTERPNT_TYPE = Residual)	LITTERPNT LITTERPNT_AREA LITTERPNT_FRACTION	LITTER_SPP	
Forest (LITTERPNT_TYPE = Coarse)	LITTERPNT_COARSE_DIAM LITTERPNT_COARSE_LENGTH LITTERPNT_COARSE_ANGLE LITTERPNT_COARSE_DECAY LITTER_ID	<i>none</i>	
Forest (LITTERPNT_TYPE = Fine-woody)	LITTERPNT LITTERPNT_AREA	<i>none</i>	

Forest (LITTERPNT_TYPE = Non-woody)	LITTERPNT LITTERPNT_ID LITTERPNT_AREA LITTERPNT_FRACTION	<u>LITTERPNT_EASTWARD_DIST</u> <u>LITTERPNT_NORTHWARD_DIST</u> XOR <u>LITTERPNT_DISTANCE_POLAR</u> <u>LITTERPNT_ANGLE_POLAR</u>	Information about the exact position and characteristics of the litter trap are submitted with the first sampling. The couples of underlined facultative variables are linked and can not be submitted individually. If one is submitted the other must be also submitted. The options separated by XOR are one alternative to the other.
Forest (LITTERPNT_TYPE = Non-woody & LITTERPNT_FRACTION = leaves)	LITTERPNT LITTERPNT_ID LITTERPNT_AREA LITTERPNT_FRACTION LITTERPNT_SPP	LITTERPNT_LEAVESAREA <u>LITTERPNT_EASTWARD_DIST</u> <u>LITTERPNT_NORTHWARD_DIST</u> XOR <u>LITTERPNT_DISTANCE_POLAR</u> <u>LITTERPNT_ANGLE_POLAR</u>	Information about the exact position and characteristics of the litter trap are submitted with the first sampling. LITTERPNT_LEAVESAREA only one value per year. LITTERPNT_SPP is mandatory when LITTERPNT_FRACTION=leaves and LITTERPNT>0. The couples of underlined facultative variables are linked and can not be submitted individually. If one is submitted the other must be also submitted. The options separated by XOR are one alternative to the other.

Table QA1.d: DHP Group

DHP GROUP: VARIABLES ALWAYS MANDATORY FOR ALL THE ENTRIES	
SITE_ID DHP_ID DHP_CAMERA DHP_CAMERA_SN DHP_LENS DHP_LENS_SN DHP_OC_ROW DHP_OC_COL DHP_RADIUS DHP_DATE	NOTE: Only for Forest

DHP GROUP: VARIABLES ALWAYS POSSIBLE FOR ALL THE ENTRIES

DHP_COMMENT

Table QA1.e: BULKH Group

BULKH GROUP: VARIABLES ALWAYS MANDATORY FOR ALL THE ENTRIES	
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SITE_ID BULKH_DATE BULKH_PLOT BULKH_PLOT_TYPE BULKH

NOTE: Only for Grassland

BULKH GROUP: VARIABLES ALWAYS POSSIBLE FOR ALL THE ENTRIES

BULKH_COMMENT

Table QA1.f: CEPT Group

CEPT GROUP: VARIABLES ALWAYS MANDATORY FOR ALL THE ENTRIES	
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SITE_ID CEPT_DATE

NOTE: CEPT_DATE is starting validity date; Not for Mires

CEPT GROUP: VARIABLES ALWAYS POSSIBLE FOR ALL THE ENTRIES
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CEPT_COMMENT

CEPT GROUP: ADDITIONAL VARIABLES FUNCTION OF THE ECOSYSTEM AND SENSOR			
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ECOSYSTEM/SENS	MANDATORY	POSSIBLE	NOTES
Grassland	<i>none</i>	<u>CEPT_FIRST</u> <u>CEPT_LAST</u>	The 2 underlined facultative variables are linked and can not be submitted individually.
SS1 Sunscan	<i>none</i>	CEPT_ELADP CEPT_ABSORP	

Table QA1.g: SPP Group

SPPS GROUP: VARIABLES ALWAYS MANDATORY FOR ALL THE ENTRIES

SITE_ID SPPS_PLOT SPPS_DATE	NOTE: this group can not be submitted in case of forest ecosystems
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SPP GROUP: VARIABLES ALWAYS POSSIBLE FOR ALL THE ENTRIES
SPPS SPPS_COMMENT

SPP GROUP: ADDITIONAL VARIABLES FUNCTION OF THE ECOSYSTEM			
ECOSYSTEM	MANDATORY	POSSIBLE	NOTES
Inaccessible Mires	<i>none</i>	<u>SPPS_LOCATION</u> <u>SPPS_LOCATION_LAT</u> <u>SPPS_LOCATION_LON</u> XOR <u>SPPS_LOCATION_DIST</u> <u>SPPS_LOCATION_ANG</u>	The set of underlined facultative variables are linked and can not be submitted individually. If one is submitted the others must be also submitted. The options separated by XOR are one alternative to the other.
Mires (SPPS_PLOT=CP)	<i>none</i>	SPPS_PTYPE	
Mires	<i>none</i>	SPPS_PERC_COVER SPPS_TWSP_PCT	

QA2. How do we report the litter mass of which we report the leaves area?

AA2.

For the leaves fraction in one trap (the one with ID=2) per CP per year, leaf area should be determined. The reported leaf area should be of the total area of all the leaves of that species in that trap (in cm²). However, the according litter values should be scaled to a trap area of 1m² all litter values are reported in g DM/m²).

For example: you have weighed and measured all the leaves of Betula pendula Roth in a trap of 0.5 m². The total weight was 2g and the total leaf area was 290 cm². In this case you report:

- LITTER_AREA: 0.5 (area of the trap from which you took the litter)*
- LITTER: 4 (litter value in g DM/m², since the trap was only 0.5m², the measured value was upscaled to 1 m²)*
- LITTER_LEAVESAREA: 290 (the measured total leaf area of all the leaves found in that trap in cm²)*

FAQs about soil and vegetation sampling (Groups: FLSM, SOSM)

QS1. Which BADM variables do I have to / can report for the foliar and soil data groups?

QS1. Which BADM variables do I have to / can report for the foliar and soil data groups?

AS1.

It is important to clarify that this is not related to the variables that must be measured and submitted in ICOS stations that is discussed in the Instructions and not part of these FAQs. Here it is related to variables that can or must be reported when a BADM is submitted.

For each group there are variables always mandatory (in each submission of a BADM) and variables that can be submitted only in specific cases, function of the ecosystem, protocol applied and type of submission. For each group a table is reported with the mandatory and possible variables in the different conditions.

- [Go to SOSM group table](#)
- [Go to FLSM group table](#)

Table QS1.a: SOSM Group

SOSM GROUP: VARIABLES ALWAYS MANDATORY FOR ALL THE ENTRIES	
SITE_ID SOSM_PLOT_ID SOSM_SAMPLE_ID SOSM_SAMPLE_MAT SOSM_DATE	NOTE: when SOSM_SAMPLE_MAT is one of the organic options (O, Oi, Oa, Oe), SOSM_PLOT_ID can be only SP_II (not SP_I, no information submitted for composite samples)

SOSM GROUP: VARIABLES ALWAYS POSSIBLE FOR ALL THE ENTRIES
SOSM_COMMENT

SOSM GROUP: ADDITIONAL VARIABLES FUNCTION OF SOSM_PLOT_ID AND SOSM_SAMPLE_MAT			
SOSM FUNCTIONS	MANDATORY	POSSIBLE	NOTES
SOSM_PLOT_ID = SP_I SOSM_SAMPLE_MAT = M	SOSM_UD SOSM_LD	SOSM_WX30_E SOSM_WX105_E	Composite samples of mineral material
SOSM_PLOT_ID = SP_I SOSM_SAMPLE_MAT = O; Oi, Oa, Oe	<i>none</i>	<i>none</i>	Only the mandatory common variables are needed in order to record the name of the composite sample sent to the lab for analysis
SOSM_PLOT_ID = SP_I SOSM_SAMPLE_MAT = H	SOSM_UD SOSM_LD	<i>none</i>	Variables needed in order to record the name of the composite sample sent to the lab for analysis. To be reported also in case that sample shipped to the lab is coming

			from a single SP-II point
SOSM_PLOT_ID = SP_II SOSM_SAMPLE_MAT = M	SOSM_UD SOSM_LD	<u>SOSM_AREA</u> <u>SOSM_VOLUME</u> SOSM_W0 SOSM_W30 SOSM_W30_E SOSM_W105_S SOSM_W70_R	Individual samples of mineral soil. The groups of underlined facultative variables are linked and can not be submitted individually. If one is submitted the other must be also submitted.
SOSM_PLOT_ID = SP_II SOSM_SAMPLE_MAT = O; Oi, Oa, Oe	<i>none</i>	<u>SOSM_THICKNESS</u> <u>SOSM_VOLUME</u> <u>SOSM_AREA</u> SOSM_W0 SOSM_W0_OH SOSM_W0_OS SOSM_W0_OR SOSM_W30 SOSM_W105_S SOSM_W70_R	Individual samples of organic soil. The groups of underlined facultative variables are linked and can not be submitted individually. If one is submitted the other must be also submitted.
SOSM_PLOT_ID = SP_II SOSM_SAMPLE_MAT = H	SOSM_UD SOSM_LD	<u>SOSM_AREA</u> <u>SOSM_VOLUME</u> SOSM_W0 SOSM_W0_OH SOSM_W0_OS SOSM_W0_OR SOSM_W30 SOSM_W105_S SOSM_W70_R	Individual samples of histic soil. The groups of underlined facultative variables are linked and can not be submitted individually. If one is submitted the other must be also submitted

Table QS1.b: FLSM Group

FLSM GROUP: VARIABLES ALWAYS MANDATORY FOR ALL THE ENTRIES	
SITE_ID FLSM_PLOT_ID FLSM_SAMPLE_TYPE FLSM_SAMPLE_ID FLSM_DATE FLSM_SPP XOR FLSM_PTYPE	NOTE: in general FLSM_SPP is required. If agreed with the ETC it is possible to submit instead of FLSM_SPP the variable FLSM_PTYPE.

FLSM GROUP: VARIABLES ALWAYS POSSIBLE FOR ALL THE ENTRIES	
FLSM_LMA_AREA FLSM_LMA_DW FLSM_COMMENT	NOTE: the LMA_AREA and LMA_DW must be submitted at least once per year..

FLSM GROUP: ADDITIONAL VARIABLES FUNCTION OF THE SAMPLED PLANT TYPE

<i>PLANT TYPE</i>	<i>MANDATORY</i>	<i>POSSIBLE</i>	<i>NOTES</i>
Tree	FLSM_TREE_ID		