# GLORIA-Europe resurvey 2008

## Guidelines for changing temperature loggers

*Version 1.4*

**2008-11-26**

**PLEASE NOTE: guidelines for newly installing data loggers for the first time, i.e., not changing them, is included into the content of this text!**

In the GLORIA-Europe resurvey campaign 2008 we used a new generation of temperature data loggers, GEOPRECISION M-Log5 wireless, which have a number of advantages compared to the Onset Tidbits used so far. See some specifications (for M-Log5, and for Tidbit in parentheses):

**Some technical data:**

- Temperature range: -40°C to +85°C; (Tidbit: -20°C to +50°C)
- Memory: 512k, good for about 8.5 years at hourly sampling rate without clearing the memory; (Tidbit 32k)
- Typical accuracy <+/- 0.2°C in the range -20°C to +40°C; (Tidbit: +/- 0.4°C at 21°C)
- Resolution: 0.01°C; (Tidbit: 0.3°C)
- Battery: can be replaced by the user!; should work for at least 8 years (and at least for 5 years under GLORIA conditions); (Tidbit: not replaceable; down after 3 years or less)
- Contact to logger via radio communication via a USB-dongle for the PC. This is a great advantage because you can readout the logger (e.g., year by year) without digging it out and, therefore, without disturbing the soil column. The battery voltage is sampled as well, so every time you read out the logger, the battery status can be checked.

For a full technical description see the document *08_5_MLog5w_description.pdf*.

**Maintenance of the M-Log5**

We will send you the loggers completely ready for field installation. **By no means unmount** the sensor cable from the logger! It will lose its waterproofness!

**Checking the loggers prior to your field trip**

We already programmed the loggers with proper parameters. However, **it is vital** that you check the loggers in the lab prior to your field trip. The counter and other parameters might have been reset by x-rays at the airport!

1) **VERY IMPORTANT**: Set the clock of your PC to UTC (*Universal Coordinated Time,* that is GMT without daylight saving time). Do this as exactly as possible. Check out www.gloria.ac.at/?a=12 or your personal GLORIA download materials page (www.gloria.ac.at/?a=50; you must be signed in there) to see a UTC-clock (javascript in your browser must be enabled); alternatively, search at www.worldtimeserver.com. Make sure that your WINDOWS system is set so that it does not automatically adjust the clock to daylight saving time

(Control Panel → Date and Time → Timezone, uncheck the checkbox "Automatically adjust clock for daylight saving changes"). Then set the PC's clock and check it's correct setting. **Refresh (F5) the abovementioned web page** (the web clock; it has changed when you adjusted your PC's clock) and compare the both times again. Make sure that your PC's clock is not re-adjusted automatically after some time (as some network computers do).

2) Read the file *08-4_GPShell_Helpfile.pdf* (NOTE: you have a wireless radio communication device).

3) Install the software by running the file *08-3_Setup_GP_Shell2W_1V02.exe*.

4) Plug the wireless converter USB-hardware (dongle) in an USB-port of your PC.

5) Start the software and follow the instructions in *08-4_GPShell_Help file.pdf* on how to connect to your loggers. In most cases, you get an error message first: the software does not find the respective COM-port where the dongle was connected to. Click "Setup" and change the COM-port setting until the correct port is found (Fig. 1).
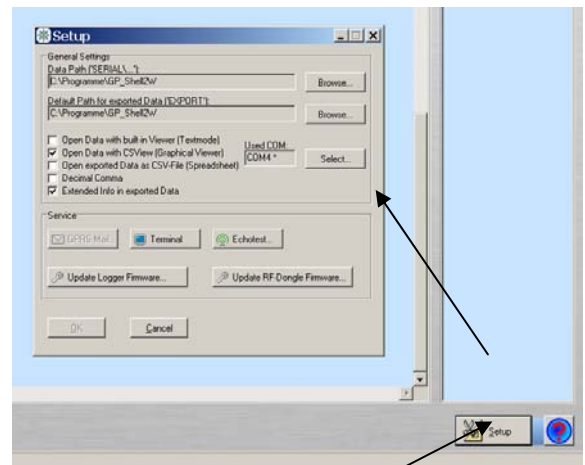
PLEASE NOTE: The loggers have **access codes** (to deny access of other persons who have the same software to your loggers). These codes are for groups of loggers.



Fig. 1

Access codes for Gloria: Devices A50000-A50399

No,Logger_Sno(#),Accesscode
1, A500xx(Group), A321
2, A501xx(Group), 3320
3, A502xx(Group), C320
4, A503xx(Group), 5321

Loggers will show up in the righthand window of the display (Fig. 2). Check the checkbox to the left of the logger serial. You are asked for the access code. Enter the relevant code for this serial number. All loggers within this group are accessible now. You have to do this only once for the current installation of the software on the respective PC.
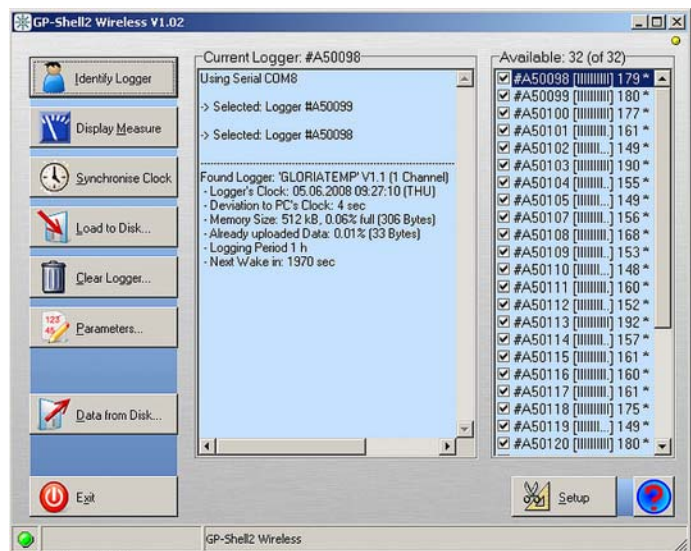
6) Select a logger and click the button "Identify Logger". Probably you get a warning message (in case the deviation of the logger'clock to your PC's clock is more than about +/- 120 secs.; see point 7 below). Next you get a status report in the main window, starting with "Found Logger:…" (Fig.2).



Fig. 2

7) The "- Deviation to PC's Clock" in the status report should be in the range of seconds. If the deviation to your PC's clock is remarkably (e.g., some minutes), you may click "Synchronize Clock" to synchronize the logger to your PC. **DON'T FORGET**: **your PC's clock must run in UTC, set as accurately as possible; see point 1).**

8) Click "Parameters". You should see the following settings (Fig. 3):

Period: **1 h**     Period Offset**: 0 sec**     Name**: GLORIATEMP**   Clock-adj: **0.0**
HK-Counter: **6**    Log HK: Supply: **checked**;          Temperature: **unchecked**
Parameter Set: *Logger Serialnumber_DateTime of last parameter transfer*
Channel parameters:     **#1**     Type: **Standard Linear**   Scale: Offset: **0**,  Unit: **oC**        Multi: **1**
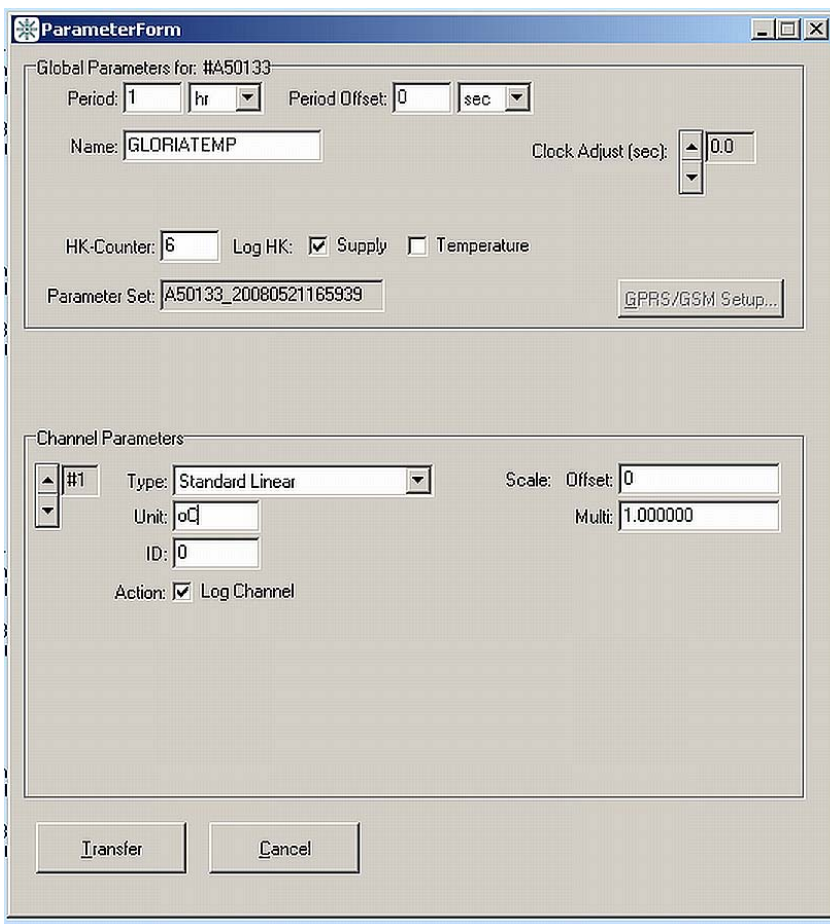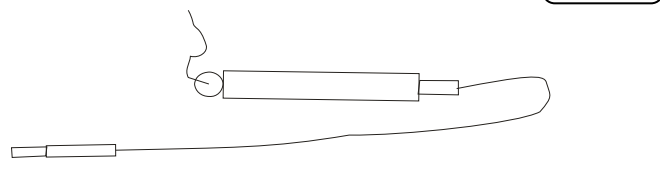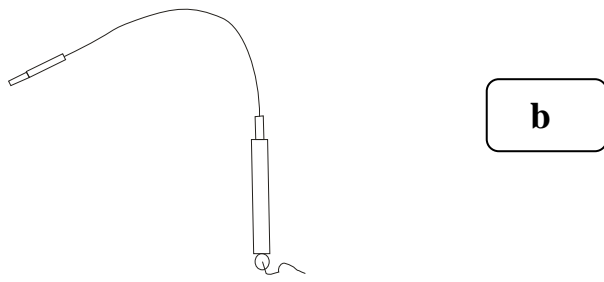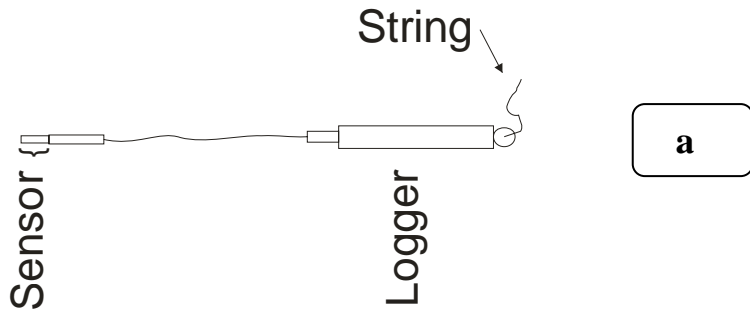ID: **0**     Action Log Channel: **checked**



Fig. 3

If these settings are correct, do not change anything. The "Transfer" button should be disabled. Click "Cancel". If you have to change anything, you have of course to "Transfer" the new parameters.

9) Repeat Step 6 to 8 for all loggers. Then "Exit" the software.

String

Sensor

Logger

a

b

c

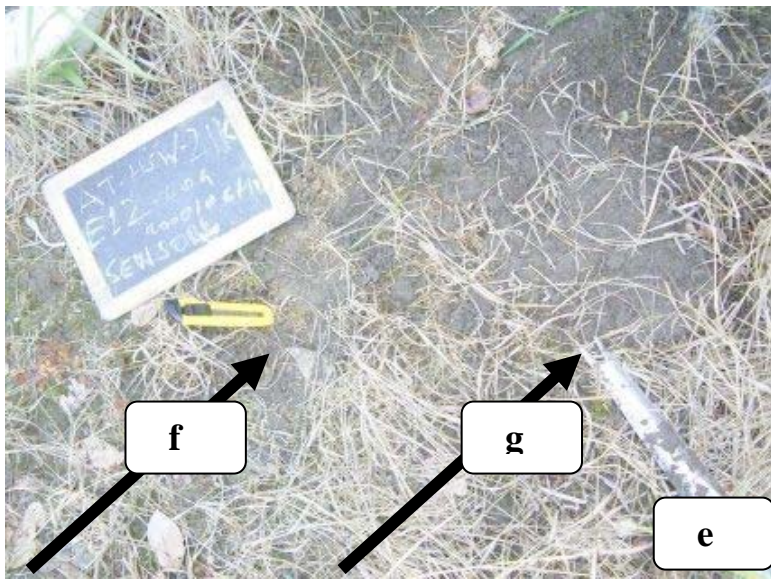Best solution in most cases.

d

f

g

e

h

Fig. 4

**Installation in the field (see Fig. 4 above)**

1) Identify the loggers position in the respective quadrat with your historic photos. Make a photo from the current surface situation (logger still covered with soil). Don't forget the blackboard.

2) Dig out the soil above the old Tidbit as carefully as possible, e.g., with a knife, disturbing the soil column as little as possible. Store the soil and stones beside the borehole.

3) Make a photo of the uncovered Tidbit logger in its borehole. Don't forget to include the blackboard with the relevant information into the photo.

4) Take the old Tidbit logger out. Write with a marker the quadrat code onto the logger.

5) Carefully note the quadrat number and the Tidbit serial number in the protocol (*08-1_AII2_Temperature_loggers.pdf*).


Fig. 5

6) Using a small spade (Fig. 5, left) together with a "Pflanzenstecher" (german; a metal tool for digging plants; Fig. 5, right), make a slot of 10cm depth into the soil, as narrow as possible; start with this slot at the borehole and go to any direction where the soil is smoothest. You may make the slot straight or curved or twist the cable having it aside the logger housing (Fig. 4a-c). Currently the cables are uncomfortabel long, they will be shorter in the next version.
**<u>Most important here:</u>** avoid in any case to dig into, or close to, the corner quadrats of the 3x3m grid where species are recorded. The *21, *12, *32, *23 quadrats, and of course *22 where usually the logger is located, are not critical. Inspect the intended position of the cable and logger and the surrounding soil properties before starting to dig the slot.

7) Put a short string onto the ring on the logger housing. It serves for finding the logger in the future.

8) **Carefully** note the **quadrat code** and the M-Log5 **serial number** in the protocol. **It is the only reference between data series and logger positions**!

9) Put the metal tip of the cable (this is the sensor; see Fig. 4) of the M-Log5 into the borehole, exactly at the old Tidbit's position, with the sensor parallel to the soil surface, at 10cm depth, as exactly as possible. Then put the cable and the logger housing into the slot.

> **NOTA BENE: if you bury a M-Log5 in a new position (i.e., there was no logger buried there earlier), of course try NOT to make a borehole for the sensor but only the slot in the soil; the less you disturbe the soil column, the better.**

10) Make a photo of the new situation (sensor, cable and logger uncovered). Don't forget the blackboard.

11) Close the borehole and the slot, making a typical soil column as before as good as possible. Position the string at the logger's ring so that it reaches to 3 centimetres below the soil surface (as we did with the Tidbits; the string must not be visible after burying). Avoid that the cable comes close to the surface, it may be picked up by an animal. Close the slot tightly to avoid unintended kryoturbation effects.

12) Make a photo of the new soil surface situation (sensor, cable and logger covered). **VERY IMPORTANT** (Fig. 4, e): Put the tip of a pencil or knife to the sensor's position (Fig. 4, f). Write "Sensor" together with an arrow onto the blackboard and position it close to the sensors position (e, and zoom in Fig. 4, h). Put an other pencil's tip etc. to the position where the string (mounted on the ring on the end of the logger housing) is below the surface (Fig. 4, g). Then make the photo.

As to the producers indication the loggers should send out of 10cm depth (and were tested for 30cm soil depth) without problems. If you can, you may take your notebook to the summit and test the loggers radio connections after they were buried, however. See the first chapters of this document and the *08-4_GPShell_Helpfile.pdf*: just start the software and look if the loggers appear in the window. A field intensity of around 120 (this is indicated in the right window, right of the loggers serial number; Fig. 2) should be sufficient to communicate with the logger. You may try out "Identify Logger" and "Display Measure", this does not disturb the loggers functioning.

**Related files**

08-1_AII2_Temperature_loggers.pdf

08-2_Changing_Temperature_loggers_GUIDELINES.pdf

08-3_Setup_GP_Shell2W_1V02.exe

08-4_GPShell_Helpfile.pdf

08-5_MLog5w_description.pdf

08-6_CE_declaration_mlog5w.pdf