

Manual for sampling data of Task 3.10 Freshwater provisioning and water quality

(A) List of materials for field operation

- (1) Soil moisture data (Data logger Em50)**
- (2) Soil water (Permanent suction cup devices)**
- (3) Soil water (Mobile suction cup devices)**
- (4) Deposition sampler**
- (5) Rain gauge sampler**

To (A) List of materials for field operation

Before you start the implementation of the measuring campaign for my task 3.10, here you get a list of materials which you will need for the

- portable Laptop, installed Software "ECH20 Utility"
- USB cable (for connecting the data logger)
- Lab bottles
- Black permanent marker
- Auger (with black drawbar-stick)
- "Simplex" hammer
- Suction cups
- tube devices, filling bottles (aluminium foil), vacuum bottles (plastic foil)
- (black angular) rubber rings
- Vacuum pump
- Measuring beaker at least 1000 ml
- Beaker for the composite sample
- Deposition samplers
- Watch classes (in the small brown carton 5x2x5cm)
- Distilled water (3l)

To (1): **soil moisture data (Em50)**

- Open the white (measuring instrument) box
- First open the Data Logger and check, if the cables are correctly connected to the connection ports P1 and P2
- connect Laptop with USB to ComPort
- Open software "ECH20 Utility" on your Laptop, choose the communication port (in the drop down menu "connect via" at which you connected the USB -> click Button "connect".
- Check if "Device Identity" (and "Site Name" of Device Location) corresponds to the Plot ID, on which you are at this moment. (If not, please correct it)
- Click button "download" and save data in a folder
- After download click "disconnect" and close the logger.

To (2): **soil water (Permanent suction cup devices)**

- Open the white Box in the plot
- Check, if there is pressure remaining in the tube system (audible sound of pressure compensation when opening the valve OR BETTER (if I already gave you a vacuum pump) connect the pump to the tube device (to the valve), open the valve and read out the pressure gauge (and note it).
- Check the amount of soil water in the sample bottle. Precise amount not necessary. Classification of the amount of water 0, 25, 50, 100, 150,, 1000, >1000 ml. Take notes of the amount of soil water.
- Fill the soil solution into the small lab-bottle (if there is more soil solution in the filling bottle then it fits into the smaller lab-bottle, discard the surplus).
- Label the lab bottle (with a black permanent marker) as follows:

[Region_abbreviation]_[Plot-ID]_[60]

[Region_abbreviation] = FN(Finland); PL(Poland); RO(Romania); IT(Italy); SP (Spain); D(Germany)

[Plot-ID] = Plot ID

[60] = abbreviation for the 60 cm sampling depth of the permanent suction cup

Example: IT_01_60

- After collecting, close the bottles and connect the suction cup device and bottles together and (if I already gave you the pump) re-set up vacuum in the vacuum bottle to -0.6bar.
- Back in the lab put the small lab-bottles in a refrigerator.
- Send the small lab-bottles in the black cooling box (WITH COLD PACKS) to:

Forstliche Versuchs- und Forschungsanstalt
Baden-Württemberg
Labor (Projekt: FunDiv)
Wonnhaldestr.4
Germany - 79100 Freiburg

To (3): **soil water (Mobile suction cup devices)**

First installation:

- Install one mobile suction cup device at each HIP according to **figure 1** below. Start at point number 1 and go on step by step at every new time interval of your measuring period. (The blue double ring corner marks the origin edge of the plot).
- One time interval of the measuring period should at least last 2 weeks. During this time, the mobile suction cup is installed at this point.
- Uncover the topsoil and drill the auger (with a “simplex”-hammer) into the soil to a depth of 60 cm.
- Pull out the auger carefully by turning the auger on its own axis (Pay attention: the hole-shaft should not expand when pulling out the auger).
- Take the lower part of the soil (5cm) out of the auger into a beaker and mix it with distilled water (as much as the mixture comes into a solution).
- Fill the solution back into the hole-shaft
- Slide the suction cup through the (black angular) rubber ring and stick the suction cup very carefully into the soil (60cm).
- Slide the rubber ring onto the soil and cover it with the back shifted litter.
- Connect the filling bottle (wrapped with aluminium foil) and the vacuum bottle (wrapped with plastic foil) together with the plug/tube device according **figure 2** below.
- Connect the vacuum pump with the valve, create a vacuum (-0.6 bar) and close the valve.

After two weeks (or however how long the time interval of your measuring period is) collect the water out of the filling bottle according to instructions under point (2) “*soil water (Permanent suction cup devices)*” with one difference:

- Label the lab bottle (with a black permanent marker) as follows:

[Region_abbreviation]_[Plot-ID]_[**sampling point of MSC**]_[60]

For [**sampling point of MSC**] use the sampling point according *figure 2*

Example: FN_01_01_60

- After collecting, pull out the suction cup **very carefully** (please pay attention of the ceramic bottom of the suction cup, which is the most vulnerable part of the device)
- At the new time interval of your measuring period, go on with next point on the sampling scheme for mobile suction cup device, *figure 1*.

Important last step instruction: After completion of one sampling point, please mark this sampling point with a small wooden stick (or something similar). The reason for this, I would like to take further parallel measurement at the same point this year.

To (4): **deposition sampler**

In general important notes:

A: In every country, you find 3 deposition measuring points (à 3 wooden masts). Please, before sampling, give the 3 points the abbreviation 01, 02 and 03 and label the deposition sampler (the wooden masts in field with black marker) with the abbreviation 01, 02 and 03 as well. In this way, you will always have the overview of the exact location of the deposition samplers. (On occasion, please define the exact location with GPS).

B: Since our laboratory will analyze the element composition of the precipitation (and not of your perspiration) it should be very important to minimize (prevent) the impact of skin contact on the inner side of the funnel (and the watch class).

C: Collection once per month should be sufficient

Installation:

- Put the watch class into the funnel according **figure 3** (touch it with a piece of paper or something similar to prevent direct skin contact).
Final advice: If the watch class lies in the wrong direction (curvature down), try to turn it by shaking the sampler and not by touching.
- Place the deposition sampler bottles on the wooden masts

Collection (of 1 measuring point, repetition for measuring point 2 and 3):

Two options of collection

A: at your institute (replace all sample bottles, take the collected bottles to your institute and carry out the measuring in your institute)

B: directly in the field (go on directly with following instructions)

- Before taking out the samplers (of the metal ring fixation), check if the funnel is contaminated by bird excrements.
 - o If yes, take the sampler (out of the metal ring fixation) and put the sampler aside and don't use the collected rainwater for the composite sample.
 - o If not, take the sampler (out of the metal ring fixation), unscrew the bottle and measure the amount of rainwater with a measuring beaker. Make notes of the amount and fill the rainwater into an extra "composite sample"-bottle.
 - Repeat this with sampler 2 and 3, measure the amount and fill them (insofar they are not contaminated) into the "composite sample"-bottle as well.
 - Fill the collected rainwater from the "composite sample"-bottle into a small lab-bottle (if there is more rainwater in the "composite-sample"-bottle then it fits into the smaller lab-bottle, discard the surplus)

- Label the lab bottle (with a black permanent marker) as follows:

[Region_abbreviation]_[Point-ID]

[Point-ID] = one of the three deposition measuring points, at which you have collected rain water out of three samplers and have mixed it to one composite sample.

- If one sampler (funnel) is contaminated, measure the amount of its rainwater with the measuring beaker at the end of one measuring point (after filling the “composite sample”-bottle into the small lab bottle) and make notes of the amount.

-> At the end of measuring the deposition at one measuring point, make sure that you clean (swing out) the sample bottles, the funnels, the watch glasses, the measuring baker and the “composite sample”-bottle with distilled water!

In case of pollution/contamination of the funnels, please clean all contaminated parts a bit more thoroughly.

-> After cleaning, put them back into the metal ring fixation and go on with measuring point 2 and 3.

To (5): rain gauge sampler

→ Instructions will follow


Final information:

You are going to send the lab bottles to our laboratory? Copy the field protocol and put it additionally into the transport box

**And: Send soil moisture data after download, back in office to:
Simon.Kolb@forst.bwl.de**

Good Luck - Distracție plăcută - dużo szczęścia –
onneksi olkoon - buona fortuna - buena suerte

Sampling points for mobile suction cup devices



22 3 11	19 23 26 13	12 4 20
16 8 29 25	18 2 9 27	30 31 24 5
1 17 10	32 7 28 21	14 15 6

figure 1: Sampling points for mobile suction cup device

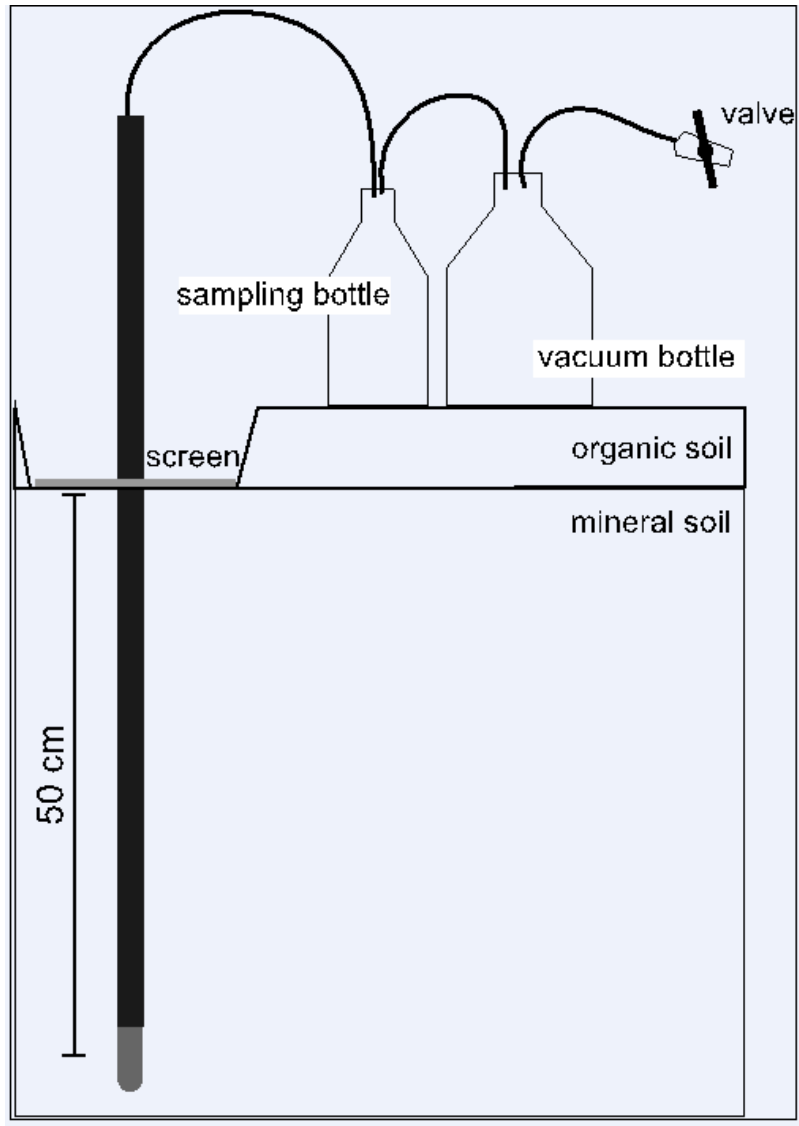


figure 2: scheme of the mobile suction cup device

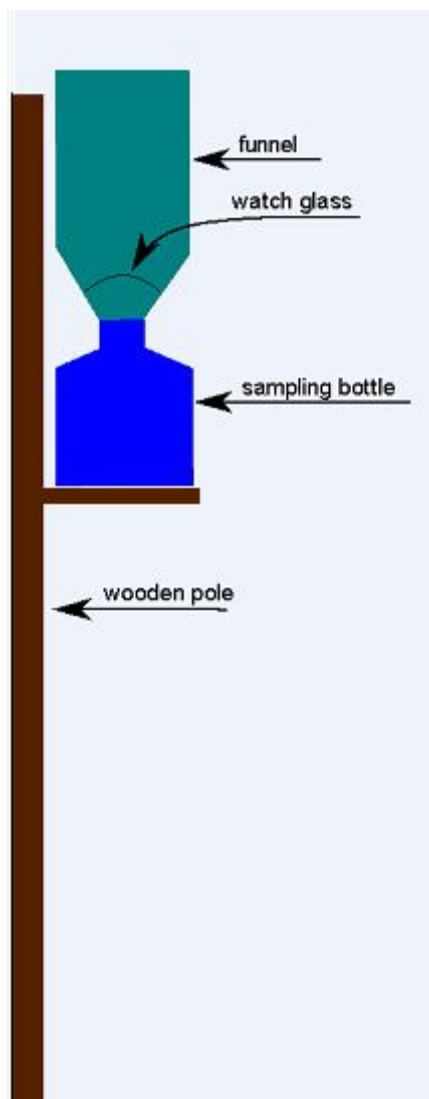


figure 3: deposition sampler