Soil experiments- Technical report of group B

For the soil experiments, various measures were performed at two transects in the field. The figure below shows which measurements were performed by our group on Tuesday May 16th in the afternoon. During this day, it was dry, the temperature was around 15 degrees Celsius and there was a wind in the downstream direction. The transect with piezometers A and B is located upstream of the dam and the transect with piezometers D is located downstream of the dam.

Experiments (figure 1)

- The head was measured in a number of piezometers by writing down the depth at which a measuring tape reached the water table in the tube. We also installed two new piezometer tubes, B1 and B2, at which the group of the next day would be able to measure the head.
- Using a diver, we measured the water pressure in the piezometer tubes over time after pumping out the water, to get an idea of how fast the water exfiltrates. This can help to determine the transmissivity of the soil
- Using the same diver, we measured the water pressure in manually dug holes over time after filling them with water, hence measuring the infiltration over time. This test is called inverse Auger (in figure 1 referred to as 'Reverse Auger') and similarly informs about the soil transmissivity. Table 1 shows some details about these measurements, which were performed once at each transect.

Table 1: details of the inverse Auger tests

Inverse Auger Hole	time	depth (m)	diameter (m)
H1 (D6-D7)	13:00	0.39	0.08
H2(A1-A2)	15:00	0.36	0.08

- Using a soil moisture probe, the percentage of water (soil moisture) was measured around
 the piezometers that our group installed. This was done three times as indicated in the
 figure, and the mean value was used
- At these same piezometers, we also collected soil samples (one per tube). This was done by temporarily removing the top layer of the soil, pushing a cannister into the soil, taking it out and then sealing it without compressing it. We have tried to make sure that this sample properly represents the soil in situ.2
- Using a Theodolite, we measured the elevation at different piezometers. This can help to
 determine the head at each piezometer along the transects with reference to a datum. For
 the downstream transect, the base of the tripod on which the Theodolite rests was 0.93 m
 above the bridge. For the upstream transect, there was no clear reference point for the
 Theodolite so only the relative elevation between piezometers should be used.

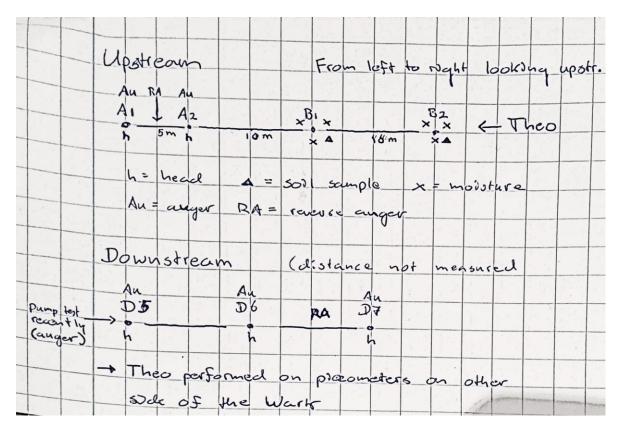
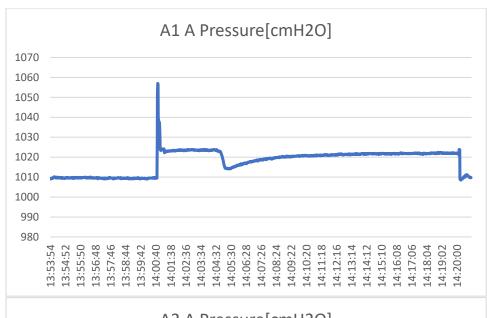
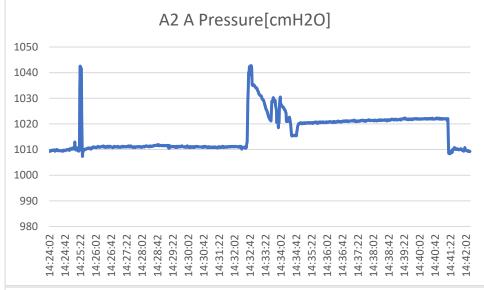


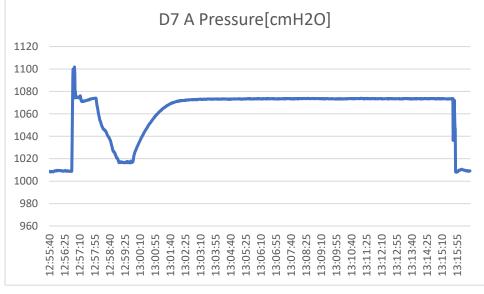
Figure 1: measurements that were performed by our group

Results

The results of all measurements as shown in the previous section can be found in table 2 and includes notes of relevant observations in the field. The locations can be referred back to by looking at figure 1. The group responsible for this experiment will be provided with an excel sheet containing all the data that was collected. The results of the diver tests are shown below in figure 2 to 6. Due to the logging starting before the actual infiltration/exfiltration process of interest had begun, only the final head change before the final sharp drop should be taken into account (at this time, the diver was removed hence the water pressure drops). The Auger tests show an asymptotic increase in head, though this is hard to notice at A2. At this location, the pump malfunctioned, which may have led to wrongful starting conditions of the test. The inverse auger tests show that only a slight amount of water infiltrates into the soil after inserting it into the dug holes.







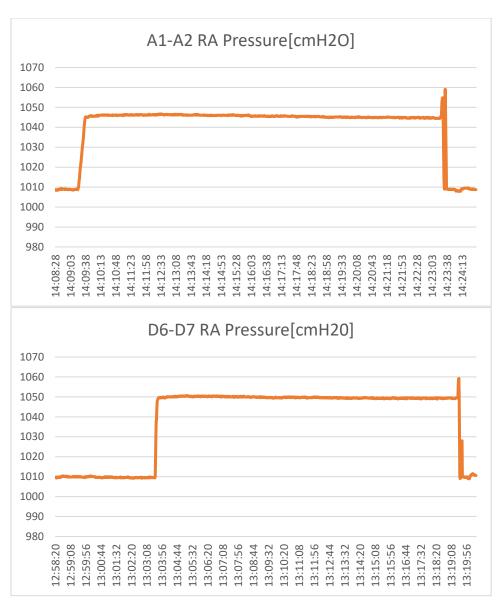


Figure 2-6 (from top to bottom): Auger and inverse auger tests. Data retrieved from divers using the appropriate software.

Table 2: Results of measurements as indicated in figure 1

Location	time	piezometer depth (m below surface)	soil moisture 1 (%)	soil moisture 2 (%)	soil moisture 3 (%)	soil moisture mean (%)	soil moisture variance (%)	Theodolite lower value	Theodolite middle value	Theodolite upper value	Theodolite mean (m)	Notes
A1	15:00	0.57						7.4	11.4	15.1	1.13	
A2	15:00	0.79						8.1	12.1	16.1	1.21	
B1	15:00		71.1	66.1	66.7	67.96667	7.453333	8.5	12.6	16.8	1.263333	
B2	15:00		62.8	72.7	76.7	70.73333	51.20333	8.7	13.1	17.5	1.31	More sandy at this end of the transect
D1	14:00							18.1	22.6	26.1	2.226667	
D2	14:00							18.9	23	26.6	2.283333	
D3	14:00							18.5	22.2	26.7	2.246667	
D4	14:00							20.4	24.9	28.7	2.466667	
D5	13:00	1.5										Recent auger test done (tube pumped)
D6	13:00	0.5										, , , , , , , , , , , , , , , , , , , ,
D7	14:00	0.28										