
ADAPT Active Layer Sampling standard protocol for C/H/N determination

- 1. Sub-site selection.** Determine 2 sub-sites for soil sampling. Choose sub-sites according to significant differences (e.g. soil type, vegetation type/cover, soil moisture, topography, etc.). Criteria for sub-site selection may vary from site to site according to the research question (i.e. the subproject topic). Each sub-site is sampled at 3 different locations (i.e. 3 replicates/profiles by sub-site).
- 2. Sub-site general description.** Record the descriptive information in Table 1 (section General description of the active layer) for each sub-site. 6 copies of Table 1 are needed by site. **Before digging the soil pit (step 3), please carefully apply the ADAPT vegetation Standard Description Protocol (detailed below).*
- 3. Digging the soil pit.** Dig the active layer as deep as possible. The larger the soil pit is, the easier it is to sample the soil. Determine 2 of the 6 soil pits (one for each sub-site) which will be used for drilling and dig a larger hole to allow for drilling 2 borehole in the same pit (see ADAPT Permafrost Drilling Protocol).
- 4. Preparing soil pits for sampling.** Make a clean, vertical cut on one of the soil pit edges. Place a measurement tape on the cleaned edge and take a vertical photograph (clearly identify the photograph). Record stratigraphic information on Table 1, section 2 (i.e. Sampled active layer description).
- 5. Active layer soil sampling.** Using the ADAPT soil sampler (which allows for bulk density determination, Figure 1) and a trowel, take an undisturbed sample of soil at each depth (surface, -5 cm, -15 cm, -30 cm, -40 cm and at max. depth) starting from top to bottom (see Figure 2). In order to take an undisturbed soil sample, slowly sink the stainless tube completely into the soil and use the trowel to cut the soil at the buried tube's edge. Extract the tube while keeping the trowel stuck to the bottom edge and put a plastic cap at one end of the tube. Use a needle to make a small hole in the center of the second plastic cap and slowly close the tube with it. Wrap the soil sampler with duct tape and make sure it is airtight. Clearly identify the sample (ex: Site name_Soil pit no._Depth) and store it in a cooler to keep it away from heat. * Please do not write on the soil sampler (tube and caps) so they can be reusable.

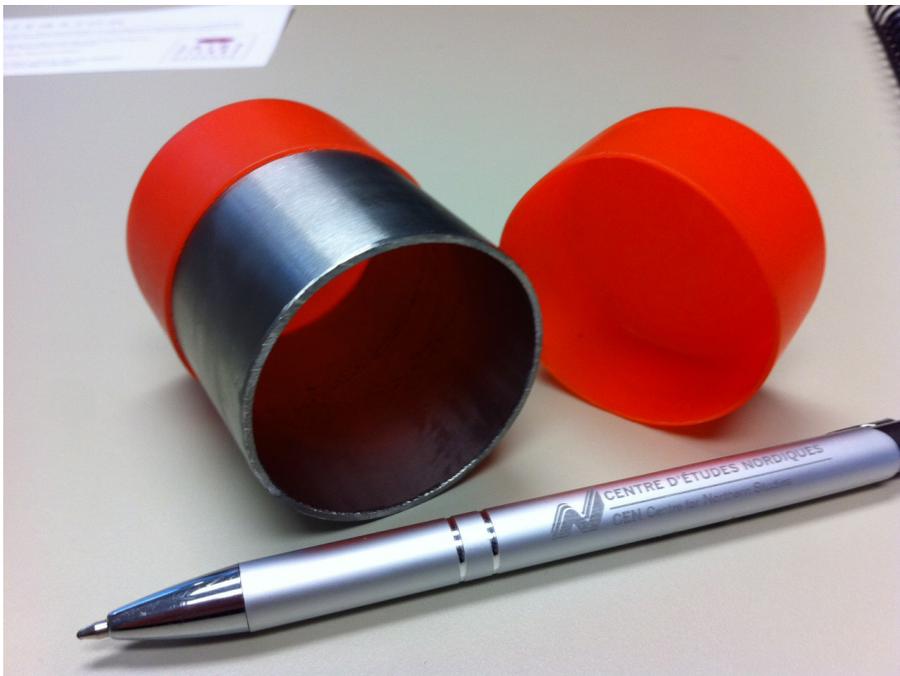


Figure 1. ADAPT soil sampler used for bulk density determination.

Dimension:
Diameter = 1.875 inches;
Length = 2.250 inches;
Volume = 101.76 cm³.

Carbon Sampling Protocol

2 soil types sampled by site
 3 replicates by soil type (profiles)
 6 samples by trench (6 x100 cm³)

A total of 36 samples by site

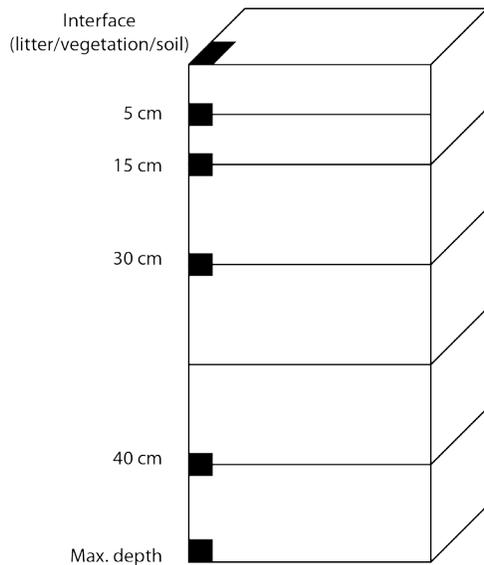


Figure 2. Sampling depths of the ADAPT active layer sampling protocol.



Figure 3. LECO CHN628 Elemental Determinator.

6. Repeat steps 3 to 5 for all replicates.
7. Send all samples (36) to CEN (Université Laval) for C/H/N analyses and bulk density determination at the following address:

Mickaël Lemay
 Centre d'études nordiques (CEN)
 2405, rue de la Terrasse (ABP-1212)
 Université Laval, Québec (Qc), Canada
 G1V 0A6

All soil samples will be analyzed at the Radio-carbon laboratory (www.cen.ulaval.ca/en/page.aspx?lien=labradio) of the CEN, where the total mass content of the carbon (C), nitrogen (N) and hydrogen (H) are calculated by combustion using a LECO CHN628 Elemental Determinator (Figure 3).

TABLE 1. General description of the active layer sampling site.**Name of researcher:****Date of sampling:**

Aerial photographs or/and satellite imagery (Quickbird, RadarSat, Modis, etc):

Site name	Coordinates		Photographs (sitename_no)
General description of the active layer (with sketch)			
Topography, valley, gentle/steep slope, depression, top of palsa/lithalsa, etc.			
Surficial Geology	i.e. Type of deposit (sandy, marine clay, clay, gravel, etc), fluvio-glacial, till, alluvion, colluvion, etc.		
Vegetation	Please provide a general description of the vegetation: type of vegetation (shrub tundra, forest tundra, lichen field, fen, bog, polar dessert), cover density, main species, morphology, etc. Please also fill the ADAPT Vegetation protocol		
Sampled active layer description (provide photographs, aerial and side views)			
Sample No	Depth	Colour	Grain size (organic, silty, sandy, etc.)
	Grd surface		
	-5		
	-15		
	-30		
	-40		
	(max)		