

August 16, 2011

Arctic Inventory Summary:

Samples from the Prime Hill, Fossil Forest Hill, and Buchanan Lake Formation on Axel Heiberg Island are Middle Eocene in age. Samples from Stenkul Fjord on Ellesmere Island are Late Paleocene/Early Eocene in age. Isotope data are listed where available.

**Coal:** We collected a single bulk sample from every coal layer present at the Axel Heiberg fossil forest site (2000) and Stenkul Fjord site (2001). Additionally, we performed fine scale sampling (every 2 cm through depth of coal) on coals along a lateral transect on Axel Heiberg Island. At Stenkul Fjord, we performed fine scale sampling on coals, which correspond with Kalkreuth's section. Generally, there are 10s of grams of material per sub-sample. In the amber column, X = a minimal amount, XX = a mild amount, XXX = a large amount.

Bulk coals were also collected from Bay Fiord and Strathcona Fiord on Banks Island in 2010. A few of these coals were indicated as being amber-rich.

**Litter:** 80 of the 87 samples are from Axel Heiberg (Fossil Forest), 7 are from Ellesmere (Stenkul Fjord). These samples include *Metasequoia*, *Glyptostrobus*, and *Betula* leaves, assorted cones, possible fascicles rhizomes, fern rhizomes, and some bulk samples. Sample sizes range from grams to hundreds of grams. Most samples were collected in 2000.

**Wood:** We have many pieces of whole wood (centimeter to decimeter scale) from every coal layer at the Axel Heiberg Site, varying in degree of preservation, from poor to excellent...(most of which have yielded at least some cellulose). Cellulose has been extracted for each ring for samples AXLR 2, AXLR-3, and AXLR-41.

We collected many pieces of whole wood from the Stenkul Fjord site that we have not yet attempted to extract cellulose, but believe they hold promise based on visual inspection and excellent bulk carbon isotope patterns (Schubert et al. in review). The wood fragments are from various layers spanning the sections of Kalkreuth.

We have rings that have been ground and acidified; not been ground or acidified; and ground. Some rings have been sub-divided.

Sample IDs beginning with "LOG" are fine-scale intraring samples from a sample named, "LEP99-020/AXLR-FULL." These samples have been analyzed for  $\delta^{13}\text{C}$ .

Sample IDs beginning with "BW" are from Basinger Wood, but have very little material remaining as they were analyzed for a  $\delta^{13}\text{C}$  ring variation study.

Sample IDs beginning with “AH” are from the first wood sample sent to us by Ben LePage. The samples have been acidified and analyzed for  $\delta^{13}\text{C}$ . Approximately 100 mg remains of each sample.

*Bay Fiord:* Most of the wood was very compressed and carbonized. Will probably be difficult to differentiate rings from most of the samples. There appeared to be rings in some of the nicer specimens, but will need to take a closer look in the lab. I collected 2 to 3 wood samples from each coal layer with the hopes of extracting cellulose from the bulk material. I also collected permineralized wood that still contained organic carbon.

*Strathcona Fiord:* Similar to Bay Fiord, but less coal layers. There were a few specimens that contained clear growth rings.

*Musk-Ox River:* Most of the plant material was mummified at this site. Very nicely preserved wood. Rings were present in majority of wood samples, from very fine, sub-millimeter rings to 1 cm thick. Not all of the samples that have distinct rings are noted in inventory. A full assessment in the lab is needed.

Two pieces of wood [CMNPB4720 (MRWD81) and CMNPB4723 (MRWD84)] collected in 2010 by Hagopian from the Cyclic Member of the Eureka Sound Formation on northern Banks Island was sampled for high-resolution, intra-ring bulk  $\delta^{13}\text{C}$  analyses (Schubert et al. in review). Preliminary intra-ring bulk  $\delta^{13}\text{C}$  data are available for MRWD57 and MRWD80.

Modern Arctic Willow was collected from Strathcona Fiord.

**Cellulose:** We have 86 alpha-cellulose samples (~5-200 mg) of tree rings from Prime Hill. In addition, there are 82 white, yellow, orange, gray, and brown samples of finely powdered, fibrous, or clumped cellulose specimens (varying degrees of purity) remaining from samples analyzed previously. About a dozen of these have cellulose  $\delta^{18}\text{O}$ ,  $\delta\text{D}$ ,  $\delta^{13}\text{C}$ , and  $\%C$  data associated with them, some of which are published in Jahren and Sternberg (2002, GSA Today)

**Plant imprints:** Four rocks (cm-scale) with fossil stem and leaf imprints (cm-scale).

**Leaves:** 73 *Betula* leaf samples, 46 *Metasequoia* leaf samples, 1 *metasequoia* cone sample, 1 *platanus* leaf sample, and 8 unidentified leaf samples from Axel Heiberg “Leaf Locality” collected in 2000. Generally there is tens of mg (or less) of material remaining for each sample.

**Carbonate Permineralized Wood:** 20 samples sent to us by Ben LePage from the Buchanan Lake Formation on Axel Heiberg. The samples have been analyzed for  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  with and without carbonate (White Mountain Fossil A, Jahren et al. (2004)).

**Carbonate Shale:** 10 samples (4-12 cm) collected in 2001 from Stenkul Fjord on Ellesmere Island.

**Paleosols:** 4 sections sampled in 2000 with ~10 cm resolution (24 samples total) from Axel Heiberg. 3 of 4 sections (18 samples) have  $\delta^{13}\text{C}$  and %C data.

Approximately a dozen paleosol samples were collected from each of Strathcona River and Muskox River.

**Holocene Peat:** One sample taken 6 m from the top of the highest peak, south facing side (79.93097N, 88.87689W), Axel Heiberg, 2000.

**Plant Isolates:** 39 samples collected in 1999 from Axel Heiberg (Ben's Hill, Larix Locality, and Prime Hill). Samples weigh <1 to 45 grams. Samples include Betula; Metasequoia stems, cones, leaves; pine cones, larix leaves, fern rhizomes, Tsuga cones, glyptostrobus, and walnut; an additional sample of spruce cones sent to us by Ben LePage.