THE LAST GLACIAL-INTERGLACIAL TRANSITION AS RECORDED IN THE HARTLEY, MASTODON SITE, BOG IN NORTHEASTERN OHIO.

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INTRODUCTION

The last glacier to cover Ohio, The Laurentide Icesheet (figure 1), entered around 25,000 years BP and reached its maximum about 19,000 yr BP near Cincinnati (Lowell, 1995). The record of the environmental changes after the retreat is limited. During the KECK 2002 project ten bogs and lakes at the glacial boundary were cored. Most of these sediment cores were taken from southwestern Ohio (figure 2) with three being taken from northeastern Ohio (figure 3). This study focuses on two overlapping sediment cores taken from a basin in the northeastern part of Ohio, located in Columbiana county in the Hanoverton quadrangle. The GPS given location of the first core hole is latitude 40.85394ºN and longitude –080.94138ºW, the overlapping core hole was less than a meter away from the first one.

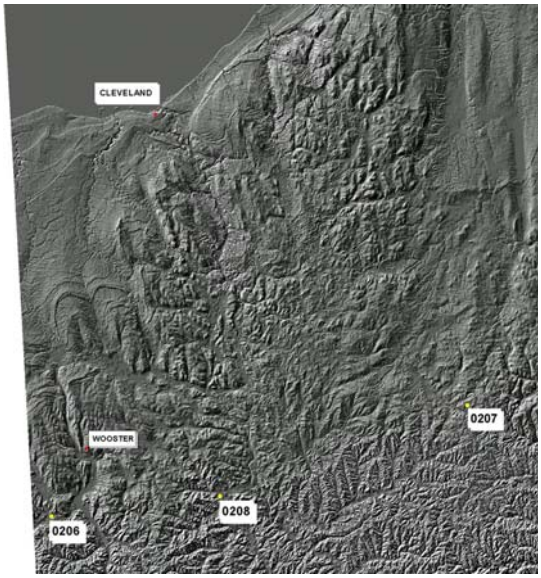

Figure 2. This topographic relief map is of the sites from northeastern Ohio core sites, 0206-0208. All are near the glacial extent limit for this part of Ohio.

This study uses magnetic susceptibility, isothermal remanent magnetization (IRM), loss on ignition (LOI) and C-14 dates to interpret the environmental record of the Hartley, Mastodon site, bog. This basin is within a few kilometers from the maximum northeastern extent of the Laurentide Icesheet. Therefore it is believed that the basin will provide a good estimate of timing of the retreat and to be a good recorder of the environmental record for the area since the retreat of the Laurentide Icesheet. Environmental conditions can be interpreted from the magnetic record of the basin, by giving information about grain size, the type of magnetic minerals present and inferred processes they represent (Oldfield, 1991).

Methods

The core site was mapped by using a hand held GPS and tile probing rods. The sediment cores were taken with a modified Livingston corer. They were given an initial description in the field to aid if the in depth description back in the lab.
The cores were tested for percent organics and carbonate using the Loss on Ignition method described by Dean, (1975). Magnetic susceptibility was measured with a "F" probe and susceptibility meter. The isothermal remanent magnetization (IRM) was done using a model IM10-30 Impulse Magnetizer then readings were took in the Spinner Magnetometer. There were fifty-nine samples run each 4cm apart along the core starting at a depth of about 380cm. The interpretations of this data will be aided by using radiocarbon dates to give a time constraint to the data.

Figure 3. The 0207 coring location. Man made pond in the background and green umbrella next to core hole.

SEDIMENT DESCRIPTION

At the base of the sediment core is glacial till labeled diamicton. This section of the core is around 30cm of the A-core and around 45cm of the B-core in thickness and ends at around a depth of 764cm on both cores. The grain size of this section of the cores is coarse sand, some gravel, and a few larger stones. (Section E in figure 4)

The next unit of the core is a layered and mottled silt. The layers vary in size from a few cm to around half a cm. Some are dark and others are light, but the mottling in both is lighter. This layer is about 120cm in thickness and ends at around a depth of 640cm. (Section D in figure 4)

The section above the layered mottling is one that consists of just mottled silts with no distinctive layers. The thickness of this section is around 130cm and ends at a depth of about 510cm. (Section C in figure 4)

The top silt layer is a massive layer of silt that is lighter in color over all compared to the previous layers. The layer is about 100cm in thickness and ends at a depth of about 400cm. (Section B in figure 4)

The final section is the peat layer. The peat is mostly organics slowly being decomposed. This layer is about 400cm thick and goes to the topsoil. This layer is waterlogged most of the time. (Section A in figure 4)

OBSERVATIONS & FINDINGS

The lithologic changes appear to coincide with the changes in magnetics and in LOI (figure 4). The basin appears to have had a cyclic sedimentation pattern after the glacial retreat. The evidence is the layered silts with mottling that does not cross the layers. This section also has relatively high magnetic susceptibility compared to the other silt layers. The next section in the sequence is a more continuous inflow of finer grained sediment with some kind of bioturbation as seen by the decrease in magnetic susceptibility and the mottling having no layer boundaries. The massive silt layer would not be bioturbated in the way that causes mottling but layers also did not build up that were any different. It drops in magnetic susceptibility to almost no signal and the increase in organics seen in the LOI data could be a signal for the transition to the Holocene.

REFERENCES CITED

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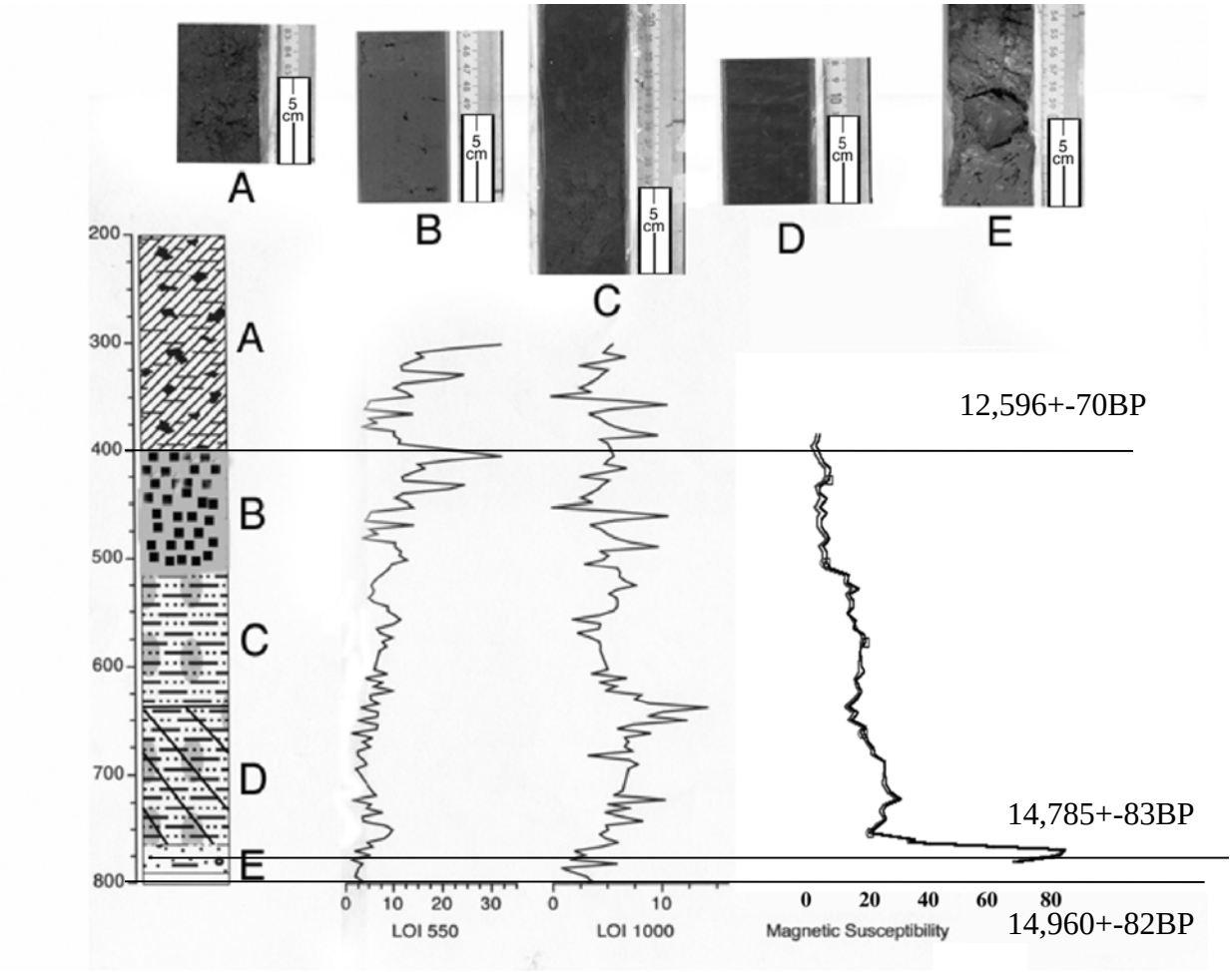

Figure 4. Stratigraphic column shows section A (peat), B (massive silt), C (mottled silt), D (layered mottled silt), and E (diamicton) with corresponding core images above. LOI 550 is the percent organics and the LOI 1000 is the percent carbonates. Magnetic susceptibility changes support the lithologic separations.