

Examining post-LGM landscape evolution: Comparing recent surficial mapping with a 12 meter bog core

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The San Juan Mountains of southern Colorado may contain an important terrestrial Holocene climate record in an alpine area where landscapes tend to be responsive to climate change at millennial scales. Here we have chosen to examine paleoclimate-landscape interactions during the Holocene in the Conejos River Valley in southern Colorado. We have mapped surficial features and extracted a 12 meter core from Cumbres Bog, which lies above 3,100 meters along the Colorado – New Mexico border and we plan to compare these records in order to determine the affect of climate on landscape evolution since the last glacial maximum (LGM). Initial results from our mapping show that at least two distinct periods of deposition have occurred in alpine areas of southern Colorado since the end of the LGM. Radiocarbon dates have shown that the smaller, more recent period of deposition occurred ~1500 years B.P. but the earlier, larger depositional features are undated and assumed to have formed immediately after the LGM. We plan on determining the cause of these periods of deposition by creating a paleoclimate record from the core taken from Cumbres Bog.

The bog appears to be a stagnant ice feature created during the retreat of the San Juan Ice Cap at the end of the Last Glacial Maximum. The top three meters of the core consist of unconsolidated modern organic materials including living peat. Very low density and extreme saturation prevented the recovery of this material. The fourth and fifth meters consist of moderately consolidated fibrous organics which were recovered and placed in bags due to their poor consolidation. Sediment from 6 to 9.5 meters depth is characterized by fine grained, fibrous organics that alternate with silt- and clay-dominated units. Sediment from 9.5 to 11.5 meters depth is finely laminated mud with varying amounts of clay and sand. The bottom .5 meters is made up of rhythmically bedded clay and coarse sands which are interpreted to be varves. Below the varves, the corer was refused in what was thought to be glacial gravels.

Four radiocarbon dates were taken throughout the core and the results suggest that the basin began filling immediately after local deglaciation (~15 kya). Overall sedimentation rate appears to be relatively constant at ~0.4 m/ky although material below our lowest date likely accumulated at a higher rate. A general increase in organic content towards the top of the core combined with decreasing magnetic susceptibility is consistent with a shallowing kettle pond. Laminated muds and rhythmic bedding within this general trend indicate possible variability in climate over shorter time scales. Future research will focus on paleoecological indicators in the core and their implications for regional paleoclimate and recent landscape evolution.