Challenges of Determining Carbon Pools in Arctic Tundra Soils. (S05-bockheim144047-Oral)

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Abstract:

Whereas the cold ecoregion comprises 20% of the global land area, it contains 42% of the global soil C pool. In the Northern Hemisphere, dramatic increases in winter and spring air temperature since ~1970 have been accompanied by increases in the seasonal thaw layer, warming of permafrost, and a possible shift in Arctic Tundra from being a sink to a source for atmospheric CO2. There are several challenges in determining C pools in permafrost-affected soils, including high small-scale variability due to patterned ground, mixing of organic C into the subsoil by cryoturbation, the presence of large amounts of C in the permafrost at depths >1 m, the difficulties in scaling up from the pedon to the landscape or regional level, preparing soil C maps, providing soil C databases, and modeling warming impacts. In this paper we discuss how cryopedologists have addressed these challenges through specially adapted field techniques for Gelisols and scaling up through the use of ground-penetrating radar and satellite imagery. The availability of soil C maps and databases is discussed.

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