Carbon data and organic matter characteristics from ice-rich permafrost-sites (Yedoma) in northern East Siberia

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- Ice-rich permafrost sequences (Ice Complex) are a large carbon pool sensitive to global warming
- Ice Complex deposits in Yakutia have been studied as a Late Pleistocene palaeo-environmental archive by joint German-Russian projects for more than 10 years
- Carbon characteristics (TOC, TIC, C/N, δ13C) are used as proxy parameters for palaeo-environmental reconstructions
- Variations in TOC, C/N, and δ13C values reflect changes in bioproductivity, vegetation, pedogenesis, and organic matter decomposition
- δ13C values indicating terrestrial freshwater and sub-aerial environment with dominating terrestrial C3 plants within the organic matter
- High TOC and C/N values combined with low δ13C values reflect less-decomposed organic matter preserved under anoxic conditions, which is characteristic of Middle Weichselian interstadial periods
- Less variable low TOC and C/N values indicate stable environments with reduced bioproductivity, and high δ13C values reflect relatively dry, aridic conditions during glacial and stadial periods

Estimations of future greenhouse gas release from degrading Ice Complex deposits should carefully consider:

- Spatial distribution of Ice Complex in Arctic lowlands is only approximately known
- Arctic lowlands are dominated by thermokarst basins; only remnants of Yedoma hills are preserved
- The carbon distribution is highly variable in Ice Complex sequences
- Ice-rich permafrost contains up to 80 % of ground ice