Geophysical Research Abstracts,
Vol. 11, EGU2009-2760, 2009
EGU General Assembly 2009


# Vegetation and climate history in the Laptev Sea region (arctic Siberia) during Late Quaternary inferred from pollen records

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A number of permafrost sections dated by 14C, TL, IRSL, and 230U/Th were analysed for pollen. Pollen spectra suggest that wet grass-sedge tundra habitats dominated during an interstadial c. 200-170 ka ago. The climate was rather wet and cold. The pollen spectra reflect sparser grass-sedge vegetation cover during the Late Saalian stadial, c. 170-130 ka BP. Environmental conditions were much more severe compared with the previous interstadial. Open Poaceae and Artemisia communities dominated at the beginning of the Last Interglacial. Some shrubs (Alnus fruticosa, Salix, Betula nana) grew in more protected and wetter places. Climate was rather warm (similar to modern conditions)during this time. Shrub tundra with Alnus fruticosa and Betula nana s.l. dominated in the area during the Eemian climatic optimum, when summer temperatures were 4-5°C higher than today. Early Weichselian pollen records reflect harsh environmental conditions; sparser vegetation (mostly grass and sedge communities) during this time. Middle Weichselian (Karginsky) Interstadial records with dominance of Cyperaceae and Poaceae with some Artemisia and Salix reflects tundra- and steppe-like associations with willow shrubs dominated the area. The climate was relatively moist and warm. A rather high content of algae colonies in the sediments indicates shallow water habitats (e.g. centres of ice wedge polygons). Dominance of Poaceae, Cyperaceae, Artemisia, and Caryophyllaceae pollen with some other herbs is typical for the 40-32 ka BP (climatic optimum) old sediments when open herb dominated the area. High pollen concentrations reflect that dense grass-sedge dominated vegetation; presence of Salix is also characteristic. The records point to climate amelioration during the Middle Weichselian compared to the Early Weichselian. Climate conditions became colder and drier c. 30-26 ka BP. Pollen spectra reflect that sedge-grass-Artemisia with some Caryophyllaceae and Asteraceae dominated the vegetation. Mostly grass co-nenoses with some Caryophyllaceae, Asteraceae, Cichoriaceae, Selaginella rupestris predominated during the late Weichselian (Sartan), ca 26-16 ka BP. Climate was very cold and dry. Later, 16-12 ka BP, grass and sedge associations with Caryophyllaceae, Asteraceae, and Cichoriaceae dominated the vegetation. Climate was significantly warmer and moister than during the previous interval. Accumulation of Ice Complex sediments stopped ca 12 ka BP, at the beginning of Allerød. Higher pollen concentration, the presence of willow and birch pollen points to a relatively warm climate between 12 and 11 ka BP reflecting significant climate amelioration. Pollen of shrubs disappeared from the Younger Dryas spectra pointing to the harsher climate. Early Holocene spectra are dominated by alder, birch, Poaceae, and Cyperaceae. Climate reconstruction inferred a temperature substantially warmer than present (up to 12°C). Shrubs gradually disappeared from the area after 7.6 14C ka BP and vegetation cover became similar to modern tundra.