



## Puglia 2003 - Final Conference Project IGCP 437

Coastal Environmental Change  
During Sea-Level Highstands:  
A Global Synthesis with implications  
for management of future coastal change

Otranto / Taranto - Puglia (Italy) 22-28 September 2003  
Quaternary coastal morphology and sea level changes



Project 437

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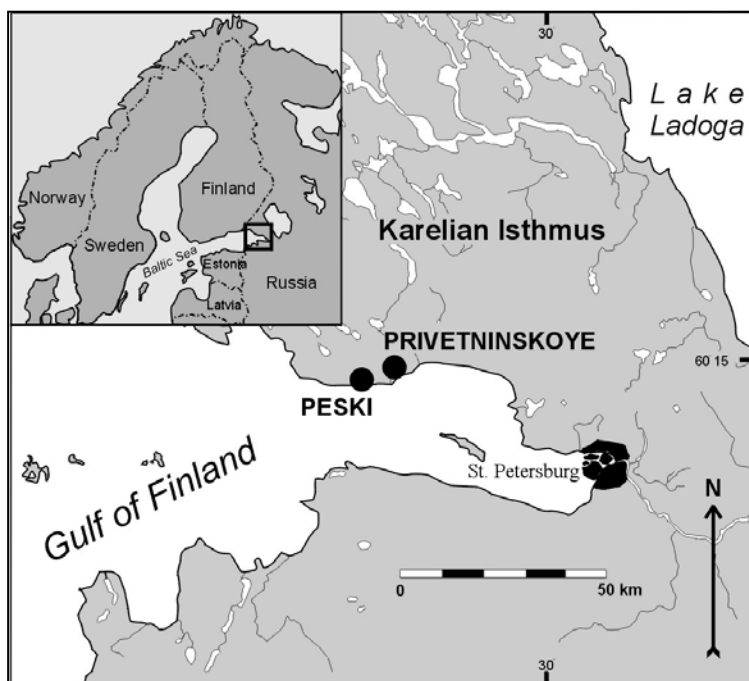
## Quaternary sea level highstands in the Eastern Baltic area

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**Keywords:** sea level, Holocene, Eemian interglacial, diatoms, transgression, Baltic Sea.

### Abstract

For comparing the sea level highstands during the last two interglacial stages (Eemian and Holocene), two sites, close to each other, Privetninskoye and Peski, in Karelian Isthmus, Russia, were studied for diatoms. The deposit at Privetninskoye represents the Holocene stage between 9-0 ka BP, while the Peski deposit represents Eemian Interglacial 130-116 ka.



**Figure 1.** Location of study area.

At Privetninskoye, the deposit representing the Holocene is 4.1 m thick at the depth of 9.0-4.9 m above present sea level. The sedimentary basin was isolated from the freshwater Ancylus Lake about 8000 BP, but as a result of the Litorina transgression, it was reconnected to the Baltic Sea basin between 7400-4500 BP. The diatom flora represents a brackish and shallow water environment (Miettinen, 2002).

At Peski, the deposit representing Eemian Interglacial is 3.8 m thick at the depth of 13.4-9.6 m above present sea level.

The polyhalobous and mostly planktonic diatom flora indicates the maximum of the marine transgression in early phase of the Eemian. The occurrence of the some arctic diatom species indicates the Baltic Sea – White Sea connection. Later the increasing proportion of brackish water diatoms indicates a lowering in the relative sea level, and the closing of the White Sea connection (Miettinen et al., 2002).

The diatom assemblages at Privetninskoye and Peski are very different. The diatom stratigraphy indicating more saline and deeper environment during the Eemian compared to the Holocene suggests that the sea level was situated at a higher level during the Eemian Interglacial than during the Holocene in the eastern part of the Gulf of Finland. The increased marine influence strongly suggests also a wider connection to the North Sea across and around Jutland (e.g. Funder et al., 2002), and a connection to the White Sea during the Eemian.

### References

- Funder S., Demidov I., Yelovicheva Y. (2002). *Hydrography and mollusc faunas of the Baltic and the White Sea-North Sea seaway in the Eemian*. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 184, 275-304.
- Miettinen A. (2002). *Relative sea level changes in the eastern part of the Gulf of Finland during the last 8000 years*. *Annales Academiae Scientiarum Fennicae. Geologica-Geographica*, 162, 100 pp.
- Miettinen A., Haila H., Hyvärinen H., Rinne K., Eronen M., Delusina I., Kadastik E., Kalm V., Gibbard P. (2002). *The marine Eemian of the Baltic: new pollen and diatom data from Peski, Russia and Põhja-Uhtju, Estonia*. *Journal of Quaternary Science*, 17:5-6, 445-458.

