

Reconstruction of palaeoenvironment and Baltic Sea level changes during Holocene by the records of archaeological and geological evidences on Stone Age sites

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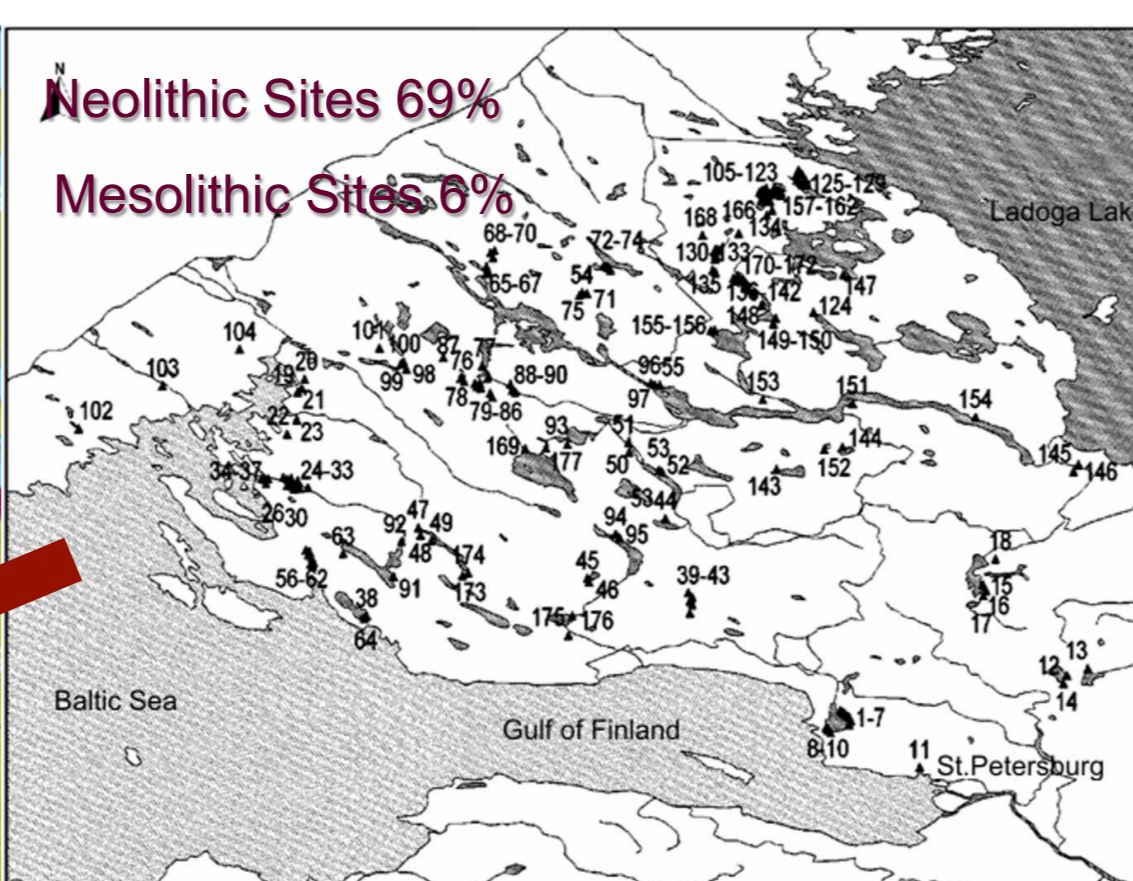
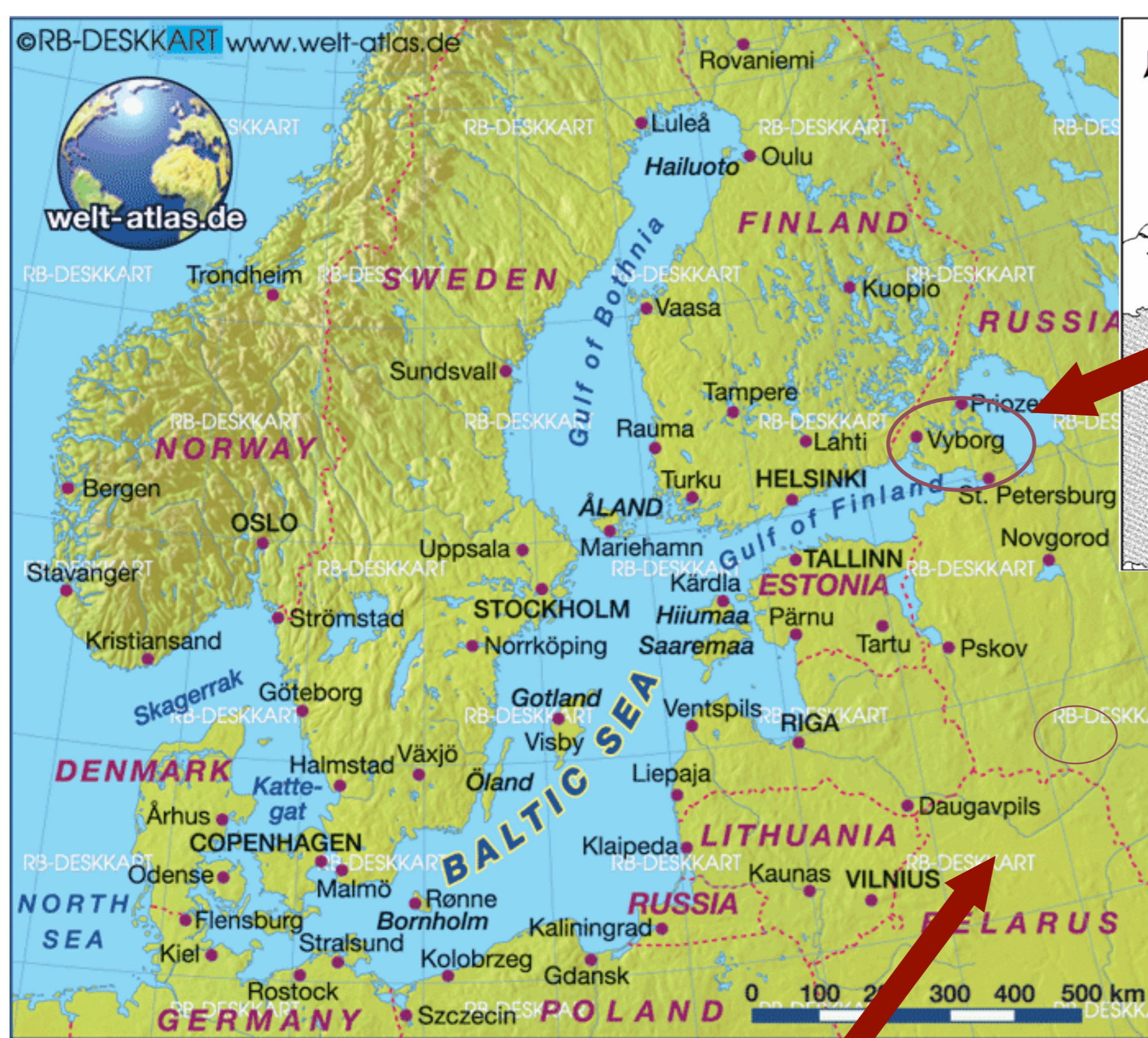
Introduction

- The region of North-Western Russia connecting with Baltic Sea presents a dynamic ecological system that was sensitive to environmental changes at the end of the Last Glacial Period and during the Holocene.
- Contextual remains of ancient human occupation sites can be the only evidence of surface stabilization in monotonous sediments, such as aquatic and subaquatic deposits.
- Prehistoric settlements also mark ancient shorelines. The last is of great importance for studying the history of water oscillations and costal lines displacement on territory of North-Western Russia.
- The complex investigations (lithology, geochemistry, pollen analysis, diatom analysis, radiocarbon dating) were carried out on the sites.

Karelian Isthmus

- The first archeological evidence of human penetration to this territory was related to the period, coinciding with the maximum of the Ancylus transgression, which culminated ca. 10150 cal BP.
- On the territory of the Karelian Isthmus the Littorina transgression is recorded from 9400 to 8700 cal BP and ca. 7000 cal BP. Sites of Early Neolithic in the coastal zone of Ladoga Lake are located on the same terraces as the Late Mesolithic.
- Breakthrough Lake Saimaa in Lake Ladoga ca. 5650 cal BP clearly was recorded in the sections of the archaeological sites Kurkijoki 33, 35, Silino, Veschelo 1 and 2, Komsomolskoe 3. After a break in the Saimaa in Ladoga beach propagates the so-called Typical Comb-Pits ceramics, marking the beginning of the period of developed Neolithic.

Regions of investigations



Archaeological sites of the Karelian Isthmus

The chains of ancient lakes in the Dvina-Lovat' area were formed during Holocene within the fluvio-glacial and moraine depressions after recession of Late Würm stage Ice-sheet. The prehistoric sites from Mesolithic to Early Middle Age were excavated on the lake shores.

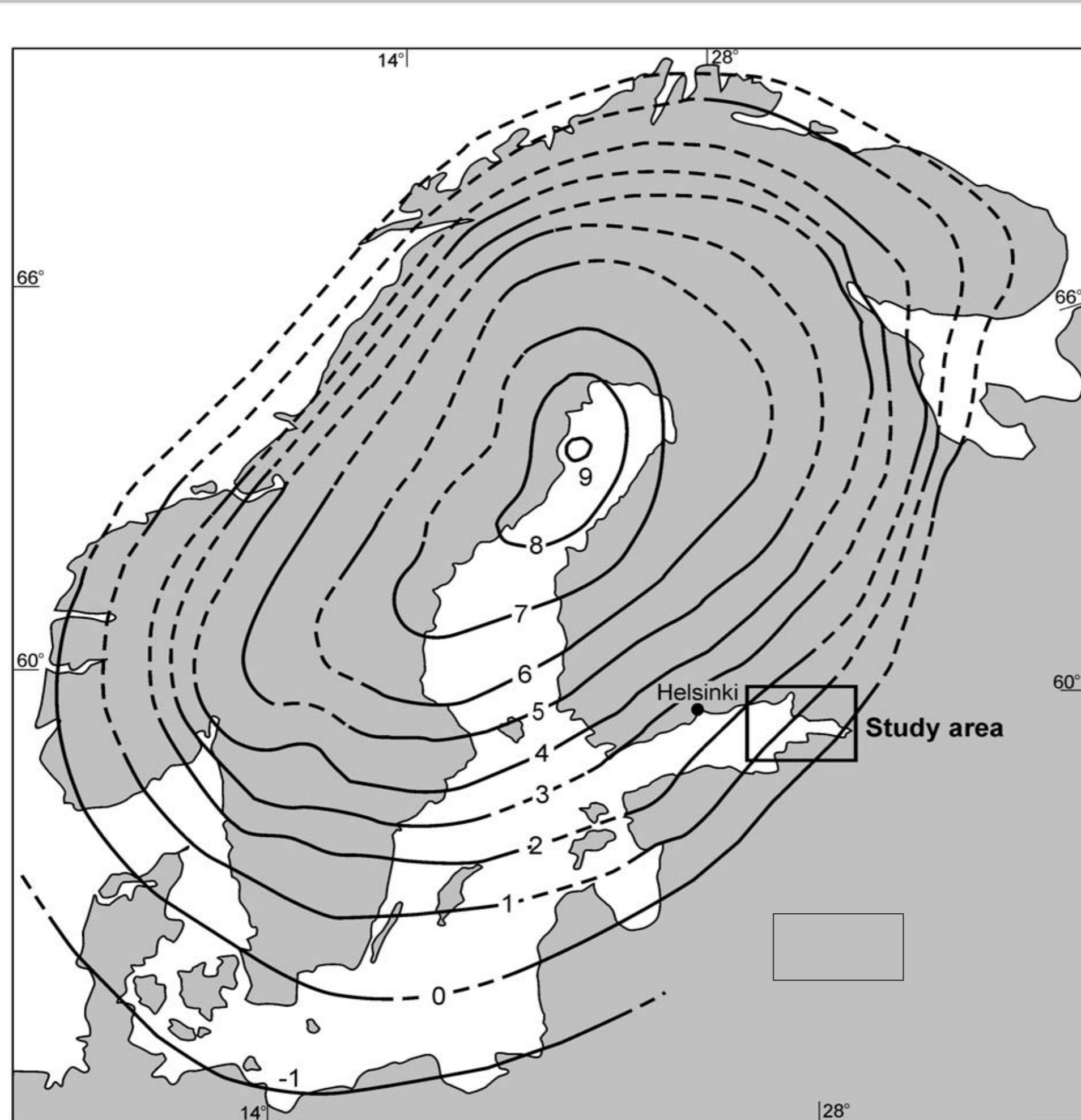
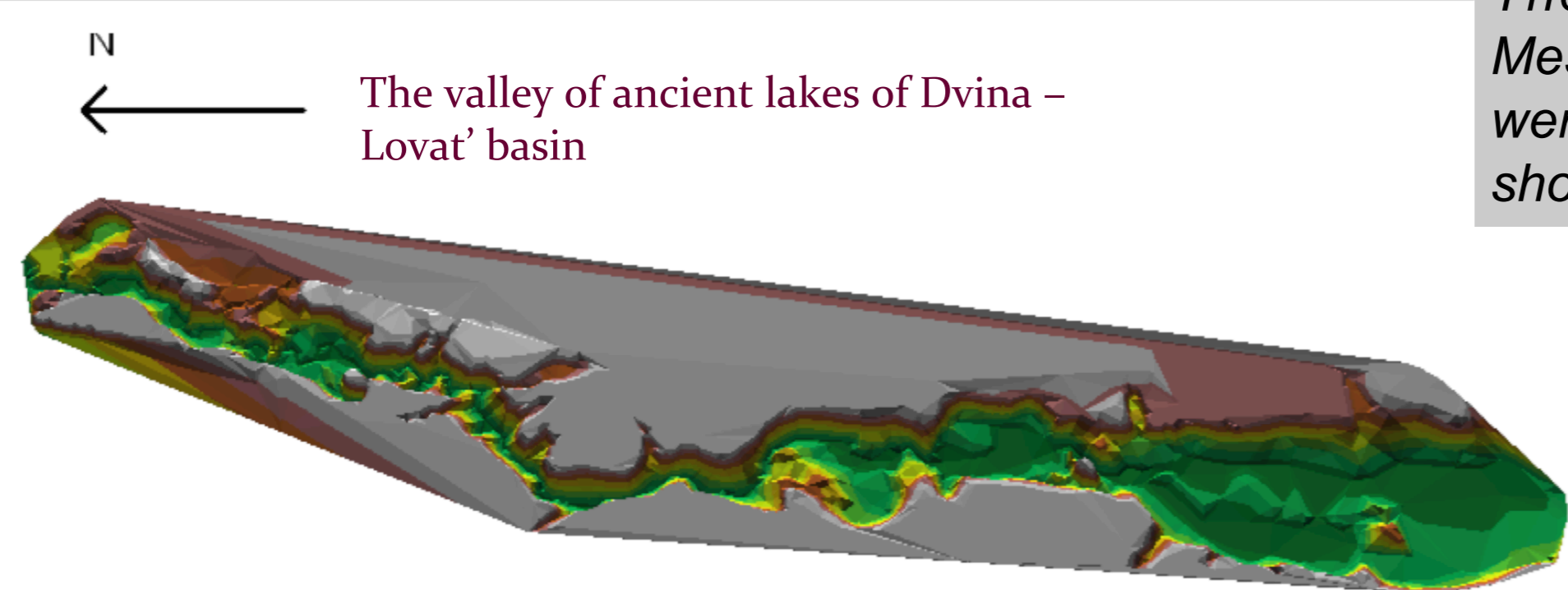


Maps of a) Early Mesolithic sites in the coastal zone of Ancylus Lake; b) Late Mesolithic and Neolithic sites in the coastal zone of Littorina Sea.



After breaking the Neva ca. 3100 cal BP and sharp drop in the level of Lake Ladoga there was a transformation of the ancient settlements. Archaeological sites of the Early Iron Age - Early Middle Ages are recorded in the Northern Ladoga beach on the terraces 10 m above Sea level.

Dvina-Lovat' region



Apparent land uplift (mm/yr) in Fennoscandia [1]

Age calBP	The lake level (transgression/regression)	The climate (warmth, humidity)	The climatic period
950			
1450			
1950			
2450	Dnepro-Dvinskaya	cold humid	SAT1
2950			
3450	Uzmenskaya	warm humid	Sb2
3950	North-Beloruskaya		
4450	Zgizgitskaya		
4950	Usvjatskaya	warm dry	Sb1
5450			
5950			
6450		cold humid	At3
6950	Rudnjanskaya	warm humid	At2
7450			
7950	Serteyskaya		
8450			
8950		cold dry	At1
9450		warm dry	Bo
9950			
10450		cold dry	PB

Conclusions

- In the North-Western part of Russia the appearance and settlement of ancient people was connected with an environmental changes during Holocene. The fluctuations of Baltic Sea have played an important role.
- Isostatic oscillations of the Earth's crust after the retreat of Würm Ice Sheet were a cause of Baltic Sea transgressive-regressive stages and connected with them the changes in the hydrological system of North-Western Russia.
- These processes influenced on the system of ancient people settlements in the coastal zones of water basin as on the Karelian Isthmus as in the Dvina-Lovat' lake basins.

[1] Miettinen A., 2004. Holocene sea-level changes and glacio-isostasy in the Gulf of Finland, Baltic Sea. *Quaternary International* 120, pp. 91–104

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