Holocene sedimentation processes in the Ångermanälven River estuary

O.Hyttinen[1*], A.T.Kotilainen[2], P.Kekäläinen[1], S. Obrochta[3], T.Andrén[4], D. Ryabchuk[5], I. Snowball[6]

[1]*University of Helsinki, Department of Geociences and Geography (*correspondence: outi.hyttinen@helsinki.fi)*
[2]*Geological Survey of Finland (GTK)*
[3] *Akita University, Faculty of International Resource Science, Japan*
[4]*Södertörn University, School of Natural Sciences, Sweden*
[5]*A.P. Karpinsky Russian Research Geological Institute (VSEGEI), Russia*
[6]*Uppsala University, Department of Earth Sciences - Natural Resources and Sustainable Development, Sweden*

Ångermanälven River estuary, in the northern Baltic Sea, deglaciated ca. 10 ka ago. It has long been known (e.g. Cato 1987), that varve deposition is an ongoing process, which has continued for several thousand of years, at the estuary . At least AD 1901-1971 a correlation between maximum daily discharge and mean varve thickness exists in the Ångermanälven River (Sander 2002). Thus varve thickness and sediment geochemistry may yield estimations of the past changes in the precipitation and the sedimentation processes.

Up to 35 meters long sediment cores from two sites, M0061 and M0062 were studied. The cores were recovered during the IODP Expedition 347 "Baltic Sea Paleoenvironment". The sediment analyses included e.g. grain-size, LOI, xrf, total carbon and ICP-MS geochemical analysis (M0062). The preliminary age model for the cores is based on the compound specific-, paleomagnetic- and OSL-dating, and Pb-content records.

The Fe/Ca ratios show gradual increase from 17 to ca. 10.2 mcd, where the values drop sharply. From 10.2 to 5 mcd the ratios increase again, 5-0 mcd they decrease steadily. The Al/Si ratios show a relatively similar pattern. The Ti/Al ratios peak distinctively at 12.5 mcd, 4.5-5.5 mcd and 2.5-3.5 mcd.

This work is a part of the CISU project funded by the Academy of Finland and the Russian Foundation for Basic Research.

References:

Cato, I. (1987). On the definitive connection of the Swedish Time Scale with the present. SGU 68, 1-55.

Sander, M., Bengtsson, L., Holmquist, B., Wohlfarth, B., Cato, I. (2002). The relationship between annual varve thickness and maximum annual discharge (1909-1971). Journal of Hydrology 263, 23-35.