

Paper Number: 1398

Unconformities aid the stratigraphic division of strata in a formerly glaciated semi-enclosed basin: the Baltic Sea prototype

Virtasalo, J.J.¹, Bitinas, A.², Buynevich, I.³, Hyttinen, O.⁴, Ojala, A.E.K.¹ and Kotilainen, A.T.¹

¹ Geological Survey of Finland (GTK), P.O. Box 96, 02151 Espoo, Finland. Email: joonas.virtasalo@gtk.fi

² Open Access Center for Marine Research, Klaipėda University, 84 H. Manto Str., LT-92294 Klaipėda, Lithuania.

³ Department of Earth and Environmental Science, Temple University, Philadelphia, Pennsylvania 19122, USA.

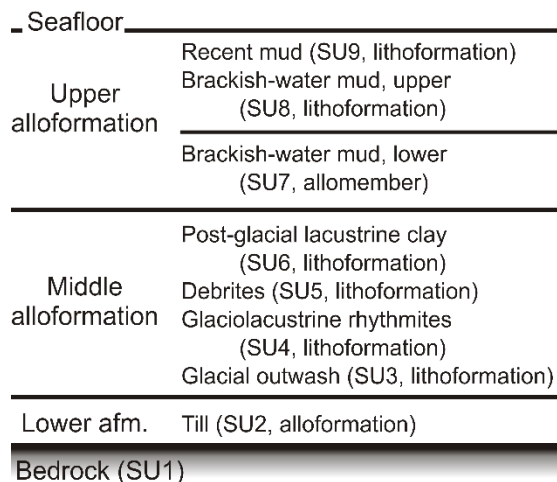
⁴ Department of Geosciences and Geography, P.O. Box 64, FI-00014 University of Helsinki, Finland.

Sediments filling formerly glaciated epicontinental basins are characterized by frequent unconformities for two reasons: 1) the dynamics of the retreating ice-sheet, and 2) relative sea-level changes driven by eustasy and glacio-isostasy. This study examines a suite of unconformities (local/regional/basin-wide) recognized in seismic-acoustic profiles and sediment cores across the Baltic Sea basin.

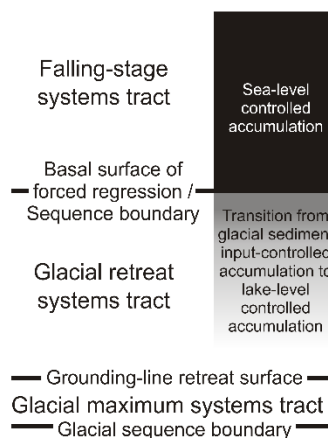
The Late Pleistocene and Holocene, late- and postglacial development of the Baltic Sea and adjacent lowlands is traditionally divided into the so-called Baltic Sea stages: Baltic Ice Lake, Yoldia Sea, Ancylus Lake and Litorina Sea. These stages are identified in sediments based on mixed criteria such as lithology, diatom assemblage zones, geochemical composition, sediment physical properties and their various combinations. Indeed, the traditional sediment classification practice is receiving increasing criticism for being ambiguous and not particularly suitable for basin-wide stratigraphic correlation and extrabasinal comparison[1].

A community effort was recently initiated with an aim to explore the utility of discontinuities in the stratigraphic division of the Baltic Sea sediments. Several groups work around the Baltic Sea in order to produce local (allo)stratigraphic divisions based on significant unconformities. In the future, these case studies will be compared in order to recognize the viability of local bounding surfaces, as well as regional unconformities for basin-wide correlation. This presentation includes an update of the progress of this community effort.

A Proposed stratigraphic division



B Sequence model



C Baltic Sea stages

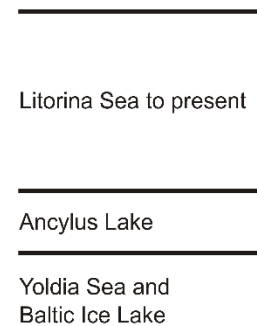


Figure 1: A. Stratigraphic division of glaciolacustrine and postglacial sediments in the northern Baltic Sea[1]. B. The corresponding glacial sequence stratigraphic features[2] and depositional systems (boxes[3]). C. Correlative Baltic Sea stages.

References:

[1] Virtasalo JJ et al. (2014) *Boreas* 43:924-938.

[2] Powell RD and Cooper JM (2002) Geological Society of London, Special Publications 203:215-244.

[3] Brookfield ME and Martini IP (1999) *Sedimentary Geology* 123:183-197.

