The Neoproterozoic Visingsö Group of southern Sweden: Lithology sequence stratigraphy and provenance of the Middle Formation

Viktor Ahrenstedt
Department of Geology,
Lund University.
viktor.ahrenstedt@gmail.com

The depositional setting of the Neoproterozoic Visingsö Group has long been a subject of discussion. The study aims to provide additional insights into the lithological composition and provenance of the sediments and to set up a sequence stratigraphic framework in order to define the depositional setting. The study focused on rocks belonging to the Middle Formation of the Visingsö Group located at the Näs locality, Visingsö, Sweden. The methods employed included descriptions of lithology, stratigraphic variations and identification of sedimentary patterns through detailed facies logs. Furthermore LA-ICP-MS analyses of U/Pb ages on detrital zircons were performed to determine their provenance. The sediments are defined by an immature composition, short transport distance and wave-dominated deposition. The sedimentary cycles are composed of coarsening-upwards intervals terminated by short transgressive episodes. Identified detrital ages of zircons are largely composed of ages that can be found in the region. The sequence stratigraphic framework is in accord with existing rift-basin models and showed that the dep-osition was controlled by tectonic activity that created the space necessary for the deposition of sediments. This newly created space was filled in large parts by locally derived material with a smaller, more far-travelled, component.

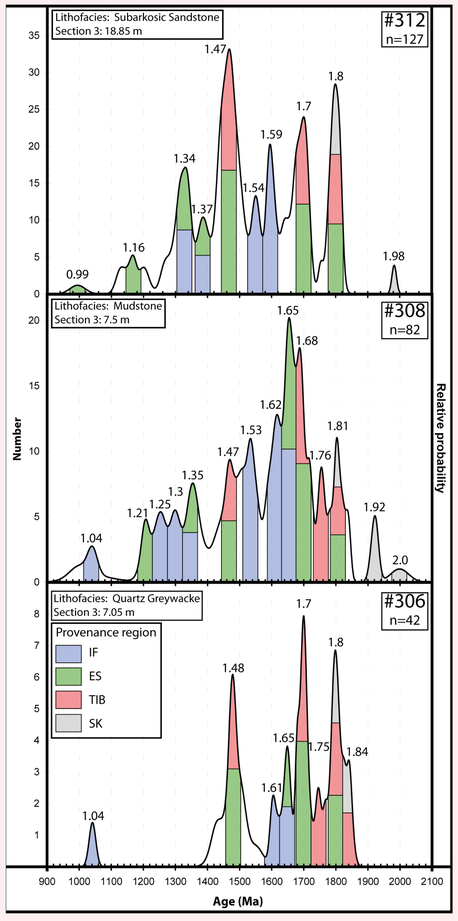

Fig. 1

Visualization of possible source areas for detrital zircon from the Näs locality. Coloured bars indicate possible provenance regions (Fig. 2).

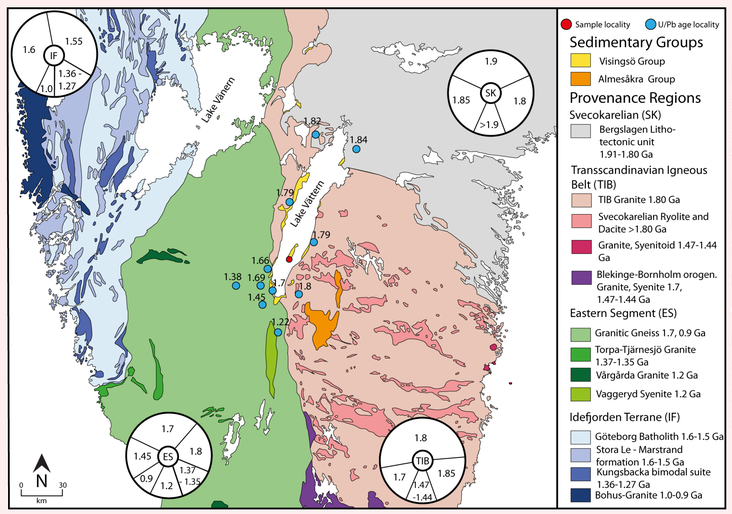

Fig. 2

Map showing protolith ages for rocks in south-central Sweden. Red dot indicates sample locality for the Näs sections at Visingsö. Blue dots are a selection of localities of dated Zircon in the vicinity of Lake Vättern. Pie-charts represent a tentative estimation of the proportion of rocks that belongs to specific ages based on their present day distribution. Based on maps, data and references in the Geochronological database provided by Swedish Geological Survey (© Sveriges Geologiska Undersökning).

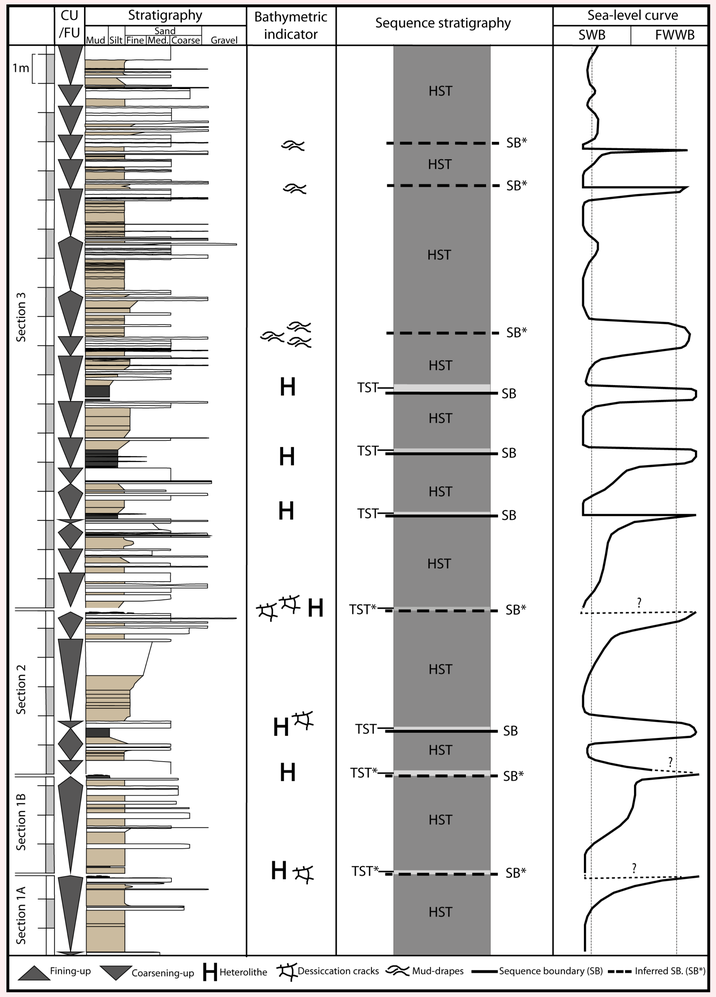

Fig.3

Proposed sequence stratigraphic framework and sea-level curve for the Näs sections. Coarsening up-wards trend (CU), fining up-wards trend (FU). Condensed stratigraphic log: Heterolithic Mudstone (Facies M. Dark grey), Siltstone (Facies S. Grey) and greywackes and sandstones (Facies: QGW, AGW, SST & AST. White). Bathymetric indicators found within the sections. Pro-posed sequence stratigraphic framework: HST = highstand systems tract, TST = transgressive systems tract, SB = sequence boundary. Asterisks indicate inferred occurrences. Proposed sea-level curve: SWB = Storm wave base, FWWB = fair-weather wave base.