

The well- and unknown Vetlanda sedimentary sequence

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The Vetlanda sedimentary sequence, formed by arkoses, greywackes and conglomerates, is located in southern Sweden and is surrounded by the 1808-1794 Ma generation of the Transscandinavian Igneous Belt (TIB 1a) in the north and the 1793-1769 Ma generation (TIB 1b) in the south (Salin et al. 2019). These rocks were thought to represent an older supracrustal unit intruded by the TIB (Småland) granitoids (e.g., Magnusson 1962, Röshoff 1975, Mansfeld et al. 2005). Another sedimentary sequence is located within the Malmbäck supracrustal formation northwest of Vetlanda (Appelqvist et al. 2009). This formation consists of 1796 Ma volcanic and volcanoclastic rocks as well as conglomerates surrounded by TIB 1b granitoids and was interpreted to belong to the TIB 1 by Appelqvist et al. (2009).

This research is based on field observations, petrological and chemical studies as well as preliminary U-Pb age determinations of detrital zircons from the sedimentary rocks in the Vetlanda and Malmbäck areas. The aim of this contribution is to show the similarity of these two sedimentary sequences and to suggest an interpretation of the depositional environment.

Both sedimentary sequences are composed of arkoses, greywackes and conglomerates. The arkoses and greywackes are dominantly poorly- to moderately-sorted and contain moderately-rounded quartz and/or feldspar grains in a groundmass of feldspar, quartz and biotite with minor opaque minerals. The conglomerates are composed of rounded and elongated lithic fragments (quartzite, K-feldspar granites and tonalites) embedded into a moderately-sorted groundmass, mostly composed of feldspar, biotite, quartz and opaque minerals. U-Pb zircon dating of an arkose at Sunnerskog (eastern part of the Vetlanda sequence) demonstrates a derivation from a source with the age of 1849 ± 1 Ma.

Biotite and feldspar are not resistant for a long transportation. A large proportion of these minerals in the groundmass of arkoses and conglomerates, as well as quartzite fragments, is an evidence for a short distance from a source rock with a granitic composition, even if feldspar is not observed in the lithic fragments of some conglomerates. The homogeneous age of the Sunnerskog zircons is another evidence for a local source. Furthermore, the unsorted character of the sediments indicates a rather rapid sedimentation.

To conclude, a probable depositional environment for the studied sedimentary rocks is a shallow marine environment (e.g., a beach) close to a granitic source rock. This is consistent with the assumption that the Vetlanda and Malmbäck successions were not formed prior to the TIB emplacement. It is instead suggested that the 1808-1794 Ma TIB 1a was a significant source for these sediments, but the 1849 ± 1 Ma zircon age at Sunnerskog indicates even more complex provenance pattern.

References

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