

Geoscience collections and data services in Estonia: current state and perspectives

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Collections of minerals, rocks and fossils constitute an integral part of geological research. If adequately documented and digitised, their value and usage are even greater as sources of new information and as physical evidence of research outcomes. In Estonia, the main geoscience collections are hosted by four academic and state institutions: Tallinn University of Technology (TalTech), Tartu University, Estonian Museum of Natural History and the Geological Survey of Estonia. Altogether, they host more than 0.8 million specimens of fossils, minerals, rocks, drill cores, material samples, preparations, etc. The scientific highlights of Estonian geocollections are related to Paleozoic rocks and fossils, primarily from the Baltic region, which have contributed to deciphering Earth's history worldwide. The Estonian microfossil collections are some of the largest

for the Ordovician and Silurian periods; they have been used to create and correlate regional and global geological time scales and biozoanal schemes. The central repository of drill cores in Estonia is managed by the Geological Survey, but TalTech also holds hundreds of cores from Estonia and neighbouring regions.

In 2004, the geoscience collections of academic institutions formed a virtual consortium, "National Geological Collection", and since 2011, the National Research Infrastructure Roadmap project "Natural History Archives and Information Network" (NATARC, <https://natarc.ut.ee>) has allowed renewing collection storage facilities and creating database tools. During the last few years, the Geological Survey has also invested significantly in building a new core repository and study centre at Arbavere with modern equipment and working environment. These developments have ensured proper preservation and physical accessibility to geological collections in Estonia for the coming decades.

The first efforts in using an electronic database for cataloguing geoscience collections were made already 30 years ago, in 1994, at the University of Tartu. A few years later, the development of an in-house data management system "SARV" started at TalTech. By 2004, it had evolved into a client-server system that provided online access to data. It was soon adopted by the Estonian Museum of Natural History and the University of Tartu. As of 2024, SARV has become a multi-institutional geoscience data management platform with a complex data model and many web-based user interfaces. Importantly, all recent software developments of SARV are open source. Most of the data can be accessed through a standardised API, as well as the central "eGeology" web portal (<https://geologia.info>), the portal of fossils (<https://fossilid.info>) and other services.

Extensive geological data are also managed by the Geological Survey and the Estonian Land Board. The largest state geological databases are "Geoloogiafond" (<https://fond.egt.ee>), a digital archive of geological reports, and the Survey's upcoming central database "GEA". In 2025, the geological expertise in these two institutions will be combined under the Geological Survey in order to create a stronger centre of geological competence.

The future perspectives on geoscience databases and e-services in Estonia are related to better interoperability between different platforms and applying the idea of "data spaces" or "data cubes". One such data space could be "a unified nature data space for Estonia". Another, not less important direction is the participation in the European Research Infrastructure Consortium "DiSSCo" (Distributed System for Scientific Collections; <https://dissco.eu>), which will be launched in coming years and hopefully help to ensure the application of common standards and improved accessibility of geological collections and data across Europe.

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