TTÜ GEOLOOGIA INSTITUUDI TEADUS- JA ARENDUSTEGEVUSE AASTAARUANNE

2013

TTÜ GEOLOOGIA INSTITUUT
TEADUS- JA ARENDUSTEGEVUSE AASTAARUANNE 2013

1. Instituudi struktuur

TTÜ Geoloogia Instituut, Institute of Geology at Tallinn University of Technology, direktor Atko **Heinsalu**

- Administratsioon ja haldustalitus, Administration, Atko **Heinsalu**
- Füüsikalise geoloogia õppetool, Chair of Physical Geology, Alvar **Soesoo**
- Isotoop-paleoklimatoloogia osakond, Department of Isotope-paleoclimatology, Rein **Vaikmäe**
- Litosfääriuuringute osakond, Department of Lithosphere Studies, Alvar **Soesoo**
- Paleontoloogia ja stratigraafia osakond, Department of Paleontology and Stratigraphy, Olle **Hints**
- Pärastjääaja geoloogia osakond, Department of Postglacial Geology, Siim **Veski**
- Teaduskogude osakond, Department of Collections, Ursula **Toom**

2. Geoloogia Instituudi T&A iseloomustus

2.1 struktuuriüksuse koosseisu kuuluvate uurimisgruppide teadustöö kirjeldus ja aruandeaastal saadud tähtsamad uurimistulemused *(inglise keeles*), uurimisgrupi kuni 5 olulisemat publikatsiooni aruandeaastal.

Isotoop-paleoklimatoloogia osakond, Department of Isotope-paleoclimatology, Rein Vaikmäe

The main research applies isotopic and geochemical indicators of climate and environmental changes on four integrated directions in this field: 1) study of new polar ice core records in order to link climate records from different polar areas; 2) impact of Quaternary ice sheets on groundwater flow systems; 3) Late Pleistocene glacial chronology of Estonia and adjacent regions and development of dating methods; 4) estimation of capacity and safety of Baltic sedimentary basin for CO_2 geological storage.

The main scientific results include:

1) An ice core extracted from Holtedahlfonna ice cap, western Spitsbergen, record spanning the period AD 1700–2005, was analyzed for major ions and stable isotopes. The Holtedahlfonna $\delta^{18}O$ value is less negative than in the more easterly Lomonosovfonna ice core, suggesting that moist air masses originate from a closer source, most likely the Greenland Sea. During the Little Ice Age the lower methanesulfonic acid (MSA) concentration and MSA non-sea-salt sulfate fraction are consistent with the Greenland Sea as the main source for biogenic ions in the ice cores. Both the melt index and the MSA fraction suggest that the early decades of the 18th century may have exhibited the coldest summers of the last 300 years in Svalbard (Beaudon et al 2013). Sea ice is an important parameter in the climate system and its changes impact upon the polar albedo and atmospheric and oceanic circulation. Iodine (I) and bromine (Br) have been measured in a shallow firn core drilled at the summit of the Holtedahlfonna glacier (Northwest Spitsbergen, Svalbard). The first comparison between halogens in surface snow and Arctic sea ice extension suggest that I and Br can be linked to variability in the spring maximum sea ice extension and seasonal sea ice surface area (Spolaor et al 2013);

2) Oxygen isotope composition of dissolved sulphate in the Cm-V aquifer system, northern Estonia, suggests that sulphate was derived from oxidation of sulphide minerals when glacial meltwater was intruded into the aquifer system during Last Glacial Maximum. Dissolved sulphate $\delta^{34}S$ values are enriched compared with $\delta^{34}S$ composition of sulphides in the aquifer system rock. Additional, the enrichment of sulphate $\delta^{34}S$ accompanied with depleted $\delta^{13}C$ values of the dissolved inorganic carbon in the Cm-V groundwater. These observations can be explained by bacterial reworking of the sulphate that causes $\delta^{34}S$ isotope fractionation in the residual sulphate (Raidla et al 2013);

3) A number of new conclusions regarding environmental and climatic peculiarities, chronology and correlation of warm and cold intervals of the period between about 100,000 and 25,000 years inferred from palynological, IR-OSL and ESR analyses of the reference sections in Estonia, Lithuania and in the Arctic regions (Streletskaya et al 2013);

4) Based on petrographic, cathodoluminescence, electron microprobe and geochemical data ($\delta^{13}C$, $\delta^{18}O$), diagenetic evolution of The Upper Devonian Plavinas Regional Stage dolostones of different genesis in southern Estonia and northern Latvia were investigated and six dolomite textures were identified (Kleesment et al 2013);

5) Reservoir and cap rock properties and CO_2 storage potential was estimated in details for two onshore (Dobele and South Kandava) and two offshore (E6 and E7) Baltic Sea region structures in Latvia. The largest capacity in Latvia were found in the offshore E6 structure (conservative capacity is 158 Mt). Total optimistic capacity of four studied structures is on average 630 Mt and conservative capacity is 210 Mt (Shogenov et al 2013).

13 WoS papers (ETIS 1.1) were published in 2013.

1. Baltrūnas, V., Šeirienė, V., **Molodkov**, A., Zinkutė, R., Katinas, V., Karmaza, B., Kisielienė, D., Petrošius, R., Taraškevičius, R., Piličiauskas, G., Schmolcke, U., Heinrich, D. 2013. Depositional environment and climate changes during the late Pleistocene as recorded by the Netiesos section in southern Lithuania. *Quaternary International* **292**, 136-149. http://dx.doi.org/10.1016/j.quaint.2012.11.038

2. Beaudon, E., Moore, J., Pohjola, V., **Martma**, T., van de Wal, R., Kohler, J., Isaksson, E. 2013. Lomonosovfonna and Holtedahlfonna ice cores reveal east–west disparities of Spitsbergen environnment since 1700 AD. *Journal of Glaciology* **59**, 1069-1083. doi: 10.3189/2013JoG12J203

3. **Kleesment**, A., **Urtson**, K., **Kiipli**, T., **Martma**, T., Põldvere, A., **Kallaste**, T., **Shogenova**, A., **Shogenov**, K. 2013. Temporal evolution, petrography and composition of dolostones in the Upper Devonian Plavinas Regional Stage, southern Estonia and northern Latvia . *Estonian Journal of Earth Sciences* **62**. 139-159. doi: 10.3176/earth.2013.12

4. Mažeika, J., **Martma**, T., Petrošius, R., Jakimavičiūtė-Maselienė, V., Skuratovic, Z. 2013. Radiocarbon and Other Environmental Isotopes in the Groundwater of the Sites for a Planned New Nuclear Power Plant in Lithuania. *Radiocarbon* **55**, 951-962. DOI: 10.2458/azu_js_rc.55.16318

5. **Shogenov**, K., **Shogenova**, A., Vizika-Kavvadias, O. 2013. Petrophysical properties and capacity of prospective structures for geological storage of CO_2 onshore and offshore Baltic. *Energy Procedia* **37**, 5036-5045. doi: 10.1016/j.egypro.2013.06.417

Litosfääriuuringute osakond, Department of Lithosphere Studies, Alvar Soesoo

The research is focused on correlation based on bentonites of Ordovician and Silurian, carbonate mineralogy, environmental geochemistry, metal-rich shales and genesis of Precambrian rocks of the Fennoscandian Shield. Bentonites of the eastern Baltic demonstrate chemical variation in Caledonian Lower Palaeozoic volcanic products. The use of high-resolution geochemical methods on Silurian bentonites allowed distinction of several magmatic events during Telychian and correlation over the paleocontinent. A correlation based on trace elements and feldspar was further

developed. Correlation of Estonian ash products and Norwegian magmatic intrusions commenced and a set of Caledonian intrusions was compositionally correlated with Estonian bentonites. Model for correlation of Silurian bentonites in Baltoscandia using immobile trace elements was worked out and published. Method enables to extend correlations to the areas where rocks have gone through significant post-depositional changes (Scandinavia). This method was also applied on the bentonites from Ukraine. Aspects of the geochemistry of stadial formation of Upper Devonian dolomites were studied. Research on phosphorus distribution and nitrogen isotope systematics of Ordovician and Silurian paleobasins is studied and now allows better understanding of oil shale formation. Nitrogen isotopes in kukersite and black shale clearly show different origins of these two organic rich sediments. Black shales are of cyanobacterial (N_2 fixers) origin, but kukersites were formed by nitrate users. A study of granites and shoshonites of the Estonian basement shows that magmatism continued during the stabilization of the Craton producing a large variation of granitic rocks and other rocks with shoshonitic compositions. Shoshonites are thus similar to those of southern Finland. New and unique geochronological data on iron-quartzites from the Jõhvi zone were obtained using SHRIMP technique in Stockholm. Chemistry of magmatic systems is not only depending on source rock, apart to melting particularities, an important factor of controlling batch chemistry is melting dynamics. Using numerical methods and field observation, it has been shown that from a single source, a variation of magmatic products can be derived in the course of melting/emplacement. In cooperation with German partner, the numerical code was developed, which allows assessment of relationship between melts chemistry, melt fraction and tectonism during the partial melting process. Estonian graptolite argillites (black shales) were studied in respect of metal content, metal distribution and lithological features. Calculated metal distribution maps were generated and amounts of Zn, Mo, U, Pb were estimated. **10** WoS papers (ETIS 1.1) were published in 2013.

1. **Kiipli**, T., **Soesoo**, A., **Kallaste**, T. 2013. Geochemical evolution of Caledonian volcanism recorded in the sedimentary rocks of the eastern Baltic region. *Geological Society, London, Special Publications* (published online 26. September 2013). doi: 10.1144/SP390.5

2. **Kiipli**, T., **Kallaste**, T., **Kiipli**, E., Radzevičius, S. 2013. Correlation of Silurian bentonites based on the immobile elements in the East Baltic and Scandinavia. *GFF* **135**, 152-161 DOI:10.1080/11035897.2013.783104

3. **Lepland**, A., Joosu, L., Kirsimäe, K., Prave, A.P., Romashkin, A.E., Črne, A.E., Martin, A.P., Fallick, A.E., Somelar, P., Üpraus, K., Mänd, K., Roberts, N.M.W., van Zuilen, M.A., Wirth, R., Schreiber, A. 2013. Potential influence of sulphur bacteria on Palaeoproterozoic phosphogenesis. *Nature Geoscience* (published online 17. November 2013). doi:10.1038/ngeo2005

4. **Kleesment**, A., **Urtson**, K., **Kiipli**, T., **Martma**, T., Põldvere, A., **Kallaste**, T., **Shogenova**, A., **Shogenov**, K. 2013. Temporal evolution, petrography and composition of dolostones in the Upper Devonian Plavinas Regional Stage, southern Estonia and northern Latvia . *Estonian Journal of Earth Sciences* **62**. 139-159. doi: 10.3176/earth.2013.12

5. **Voolma**, M., **Soesoo**, A., **Hade**, S., **Hints**, R., **Kallaste**, T. 2013. Geochemical heterogeneity of the Estonian graptolite argillite. *Oil Shale* **30**, 377-401. doi: 10.3176/oil.2013.3.02

Paleontoloogia ja stratigraafia osakond, Department of Paleontology and Stratigraphy, Olle Hints

The research was focused on Early Paleozoic paleontology, environments and stratigraphy. The department's target financing project ”Ordovician and Silurian biodiversity in Baltica: evolution and impact of the changing environment“ involved taxonomical and phylogenetical studies, palaeoecology and palaeobiogeography, sedimentology, and integrated bio- and chemostratigraphy.

The main results in 2013 include the following:

A new global scheme of Silurian vertebrate biozonation was proposed, based on new data from Baltic region, NW Russia, southern Britain, Canada, Greenland, Scotland and Arctic Russia.

Correlations of conodont and vertebrate biozones, and gaps in sedimentation in the northern East Baltic Silurian sequence were discussed, the most extensive hiatus being between the Paadla and Kuressaare regional stages. Diversification history of Silurian chitinozoans was studied by quantitative stratigraphic approach, revealing long-lasting effects of the end-Ordovician extinction and severe impact of the Ireviken Event. A distributional database was built for tabulate corals showing the main trends of diversification of the group in different areas of the Baltoscandian paleobasin throughout the Late Ordovician and Silurian. Also, the distribution of Baltic trilobite faunas was analysed and compared to those on other paleocontinents, and their biostratigraphic usefullness was reassessed. New aspects of morphology, ontogeny and distribution of Hirnantian brachiopods were revealed, providing insights into their taxonomy, phylogeny and biogeography. Moreover, global biogeographic patterns of Early Paleozoic stromatoporoids and jawed polycahetes were summarised by the team members.

For the first time, Late Ordovician sulfur isotope record was published from the eastern Baltic area, showing tight coupling with carbon cycling and suggesting basin-wide environmental disturbances, possibly linked with mass extinction. New evidence for the Guttenberg carbon isotopic excursion indicated a major biotic event and carbon cycle perturbation, from which pCO_2 was constrained and global carbon cycle changes were reconstructed. The results confirmed that global carbon-cycle reconstructions are complicated by ecological and environmental changes during the GICE.

The carbon isotope composition of different palynomorph groups from the Llandovery-Wenlock strata of Gotland were compared to gain knowledge about carbon cycling in the Silurian (sub)tropical shelf environment. New data on carbon isotopes and bentonies enabled to revisit Upper Silurian stratigraphy of Podolia. Overall the research contributed to a better understanding of the biodiversification history of Ordovician-Silurian biotas, and its driving mechanisms.

In January 2013 postdoctoral researcher Petra Tonarova joined the department for 2.5 years. In addition, two new doctoral projects started in September 2013, targeting Ordovician chitinozoan taxonomy and biostratigraphy, and Late Ordovician environments. **18** WoS papers (ETIS 1.1) were published by the team and several more have been submitted.

1. Eriksson, M.E., **Hints, O.**, Paxton, H., **Tonarova, P.** 2013. Ordovician and Silurian polychaete diversity and biogeography. *Geological Society, London, Memoirs* **38**, 265-272. doi:10.1144/M38.18

2. **Hints, L.**; Harper, D.A.T. 2013. The Hirnantian (Late Ordovician) brachiopod fauna of the East Baltic: Taxonomy of the key species. *Acta Palaeontologica Polonica*. doi:10.4202/app.2013.0010

3. **Märss, T.**, **Männik, P.** 2013. Revision of Silurian vertebrate biozones and their correlation with the conodont succession. *Estonian Journal of Earth Sciences* **62**, 181-204. doi:10.3176/earth.2013.15

4. Pancost, R.D., Freeman, K.H., Herrmann, A.D., Patzkowsky, M.E., Ainsaar, L. & **Martma, T.** 2013. Reconstructing Late Ordovician carbon cycle variations. *Geochimica et Cosmochimica Acta* **105**, 433-454. doi:10.1016/j.gca.2012.11.033

5. **Pärnaste, H.**, Bergström, J. 2013. The asaphid trilobite fauna: Its rise and fall in Baltica. *Palaeogeography, Palaeoclimatology, Palaeoecology* **389**, 64-77. doi: 10.1016/j.palaeo.2013.06.007

Pärastjääaja geoloogia osakond, Department of Postglacial Geology, Siim Veski

The institutional research funding (IUT1-8; 2013–2018) “Postglacial paleoecology and paleoclimate in the Baltic area” aims at reconstruction of ecosystems, climate and environment change, both natural and man-made, at high temporal resolution in the Baltic area. Quantitative

paleoclimatic, biodiversity, aquatic, and land-use reconstructions reveal connections between past environments, climates and man.

Climate modelling of long and extra long time series reveals certain repeated patterns during the last deglaciation (Laumets et al 2013) and 500 ka before present (Pidek & Poska 2013). These climate variations are governing changes in vegetation, which in the late Holocene are superimposed by changes caused by mankind. Human-mediated changes in landscape structure influence both palynological and floristic diversity (Meltsov et al 2013) and in N Europe, the importance of human impact on vegetation (forest) composition is likely to exceed the influence of climate over the last 4000 years (Reitalu et al 2013). When interspecific competition influences plant diversity at fine scale (< 1 m^2), at larger (landscape) scale which is compatible with the scale reflected by the paleorecords, environmental heterogeneity and dispersal processes influence plant diversity patterns (de Bello et al 2013). Our studies of different aspects of contemporary diversity (Carboni et al 2013; Reitalu et al 2013; Rosengren et al 2013; Vandewalle et al 2013) help to understand the importance of historical processes and time-lags for contemporary plant diversity and also give a better idea about the possible influence of time-lags for the diversity estimates in paleo-records.

The role of recent climate-driven and anthropogenic changes on the trophy levels of aquatic ecosystems was studied on the basis of dissolved organic matter (DOM), paleopigments and phosphorus fractions in recent sediment records in two large lakes − Võrtsjärv and Peipsi (Tõnno et al 2013; Leeben et al 2013b). Beside a number of traditional paleoindicators, some novel spectroscopic and chromatographic sediment proxies of paleolimnological processes and environmental conditions were applied. A methodological spectroscopic study of sedimentary humic substances from lakes with different trophy levels demonstrated excellent consistency with measured lake productivity and sources of organic matter and the method has thus great potential in the reconstruction of past lake conditions (Leeben et al 2013a). Additionally, the metabolism of Lake Võrtsjärv was characterised by the proportions and transformations of the autochtonous and allochtonous DOM in the lake water (Toming et al 2013) as well as the distribution of bacterial community composition in its surface sediments (Tšertova et al 2013).

Past shoreline displacement and long-term paleosalinity studies of the earlier stages of the Baltic Sea during the postglacial are reassessed based on new AMS ^{14}C ages (Vassiljev & Saarse 2013). BIL A1 phase developed during 13.8–14 ka BP in front of the Pandivere ice margin. BIL A2 stage developed between 13.2–13.5 ka BP in front of Palivere ice margin. Rosentau et al (2013) and Grudzinska et al (2013) reconstruct the shorelines of northern Estonia in association with human occupation during the Stone Age.

Three postdoctoral projects ended in 2013, one of the postdocs Reitalu joined our research team. The IUT currently hosts three doctoral fellows. Altogether **19** WoS papers (ETIS 1.1) were published in 2013.

1. de Bello, F., Vandewalle, M., **Reitalu**, T., Lepš, J., Prentice, H.C., Lavorel, S., Sykes, M.T. 2013. Evidence for scale- and disturbance-dependent trait assembly patterns in dry semi-natural grasslands. *Journal of Ecology* **101**, 1237-1244. DOI: 10.1111/1365-2745.12139

2. **Grudzinska**, I., **Saarse**, L., **Vassiljev**, J., **Heinsalu**, A. 2013. Mid- and late-Holocene shoreline changes along the southern coast of the Gulf of Finland. *Bulletin of the Geological Society of Finland* **85**, 19-34. http://www.geologinenseura.fi/bulletin/Volume85/Bulletin_vol85_1_2013_Grundzinska_ea.pdf

3. Meltsov, V., **Poska**, A., **Reitalu**, T., Sammul, M., Kull, T. 2013. The role of landscape structure in determining palynological and floristic richness. *Vegetation History and Archaeobotany* **22**, 39-49. DOI 10.1007/s00334-012-0358-y

4. **Reitalu**, T., Seppä, H., Sugita, S., Kangur, M., Koff, T., Avel, E., Kihno, K., **Vassiljev**, J., Renssen, H., Hammarlund, D., Heikkilä, M., **Saarse**, L., **Poska**, A., **Veski**, S. 2013. Long-term drivers of forest composition in a boreonemoral region: the relative importance of climate and human impact. *Journal of Biogeography* **40**, 1524-1534. DOI: 10.1111/jbi.12092

5. **Vassiljev**, J., **Saarse**, L. 2013. Timing of the Baltic Ice Lake in the eastern Baltic. *Bulletin of Geological Society of Finland* **85**, 9–18. http://www.geologinenseura.fi/bulletin/Volume85/Bulletin_vol85_1_2013_Vassiljev_Saarse.pdf

Teaduskogude osakond, Department of Collections, Ursula Toom

Geological collections constitute an essential part of Earth Sciences, and the Institute of Geology at TUT holds the largest such collection in Estonia, curated by the Department of Collections, whose staff ensures access to the physical specimens (fossils, rock samples, drill cores, etc.) as well as the development of the electronic catalogue and virtual visibility of the data.

In 2013, 30 researchers of the institute used the collections in their daily work; furthermore, the geological collections were visited by 23 foreign scientists from 13 countries (altogether 225 visiting days) and 14 loans were dispatched embracing more than 1,000 specimens and samples. The electronic database of Estonian geocollections has been developed in the institute and currently implemented in other Estonian universities and museums. In 2013, the institute contributed nearly 40,000 new data records to the system. The total number of collection items digitally catalogued exceeded 190,000 in 2013. Most of these are publicly available on-line at *http://geokogud.info/git*. Since 2013, all public images of collection specimens are accessible also in Europeana (http://europeana.eu).

The Department of Collections participated in three projects: (1) the National Research Infrastructure Roadmap "Natural History Archives and Information Network (NATARC)", led by the University of Tartu, with the objective of developing the storage infrastructure and information system for natural collections. Within this project, a new storage building for drill cores was built in the Särghaua field station. This notably improves storage conditions and accessibility of drill cores for researchers. (2) INTERREG IVA project "Towards Transboundary Access of Nature Observation Data (BALTICDIVERSITY)" fostered digitalisation of palaeontological data and enhanced their accessibility. As part of this project a version of web portal of fossil species of Baltoscandia was launched at *http://fossiilid.info*; (3) the National Programme Environmental Conservation and Environmental Technology R&D Programme (KESTA) project Geoinformatic development of biodiversity and Earth Science information systems (ERMAS), launched in 2012, aims to increase accessibility of various primary research data, including a large amount of geological analytical data deposited at the Institute over several decades. In 2013, ca 23,000 new data records were added.

In addition, an international evaluation of collections by two SYNTHESYS experts took place, who pointed out in the conclusion of their inspection a very good level of curatorial practice and excellence of the collection database system.

Füüsikalise geoloogia õppetool, Chair of Physical Geology, Alvar Soesoo

The Chair is providing teaching and practicals in geological subjects at BSc (commencing in 2010/2011), MSc and PhD levels. No PhD dissertations and MSc thesis were defended in 2013, one MSc thesis was defended in Tartu University (mainly supervised by the institute's researchers). A preliminary activity, merging two existing BSc, MSc curricula into a joint curriculum of "Earth Sciences and Geotehnology" commenced late 2013.

2.3 Loetelu struktuuriüksuse töötajatest, kes on välisakadeemiate või muude oluliste T&A-ga seotud välisorganisatsioonide liikmed.

Tiiu **Alliksaar**, 2007–... Rahvusvahelise Paleolimnoloogia Assotsiatsiooni liige;

Olle **Hints**, 2009–… IUGSi Rahvusvahelise Stratigraafia Komisjoni Ordoviitsiumi alamkomisjoni liige;

Dimitri **Kaljo**, 2006–… Rahvusvahelise Paleontoloogia Assotsiatsiooni graptoliitide töögrupi liige; Londoni Geoloogia Seltsi auliige;

Enn **Kaup**, 2008–... Saksa polaaruurijate ühingu teadusnõukogu liige; 1992–... Rahvusvahelise teoreetilise ja rakendusliku limnoloogiaühingu liige;

Tarmo **Kiipli**, Rahvusvahelise Geoanalüütikute Assotsiatsiooni liige;

Elga **Mark-Kurik**, Rahvusvahelise Geoloogiateaduste Liidu Stratigraafia Komisjoni Devoni alamkomisjoni kirjavahetajaliige;

Peep **Männik**, 2008–… IUGSi Rahvusvahelise Stratigraafia Komisjoni Siluri alamkomisjoni aseesimees;

Tiiu **Märss**, 2007–... IUGS'i Geoteaduste Programmi teadusnõukogu liige; 1997–... Rahvusvahelise Selgroogsete Morfoloogia Uurimise Ühingu liige; 1995–... Rahvusvahelise Paleontoloogia Ühingu liige;

Tõnu **Martma**, 2006–... Rahvusvahelise Glatsioloogiaühingu (IGS) liige; 1996–... Euroopa Isotoopuuringute Ühingu (ESIR) liige, asepresident 2013–…, nõukogu liige 2013 –…

Anatoli **Molodkov**, 1989–... Rahvusvahelise EPR-Ühingu tegevliige; 2000 – ... Venemaa Ametkonna Vahelise Stratigraafilise Komitee (MSK) Kvaternaari Süsteemi Komisjoni liige;

Viiu **Nestor**, Paleosoikumi Mikrofloora Rahvusvahelise Komisjoni (CIMP) koosseisu kuuluva Kitinosoade Alamkomisjoni liige;

Anneli **Poska**, 2009–... NordForsk LANDCLIM võrgustiku nõuandva kogu liige; 1999–... INQUA PMP (Pollen Monitoring Program) asutaja ja tegevliige;

Anto **Raukas**, Rahvusvahelise Geomorfoloogide Assotsiatsiooni Eesti rahvuslik esindaja; Rahvusvahelise Geoloogiateaduste Liidu keskkonnaplaneeringute komisjoni (GOGEOENVIRONMENT) korrespondentliige ja Eesti rahvuslik esindaja; USA Rahvusliku Geograafia Seltsi liige; New Yorgi Teaduste Akadeemia liige; Poola teadusühingu Societas Scientiarum Gedanensis välisliige; Soome Geoloogia Seltsi korrespondentliige; Soome Maa Füüsika Seltsi liige; Ülemaailmse Teadlaste Föderatsiooni liige;

Triin **Reitalu**, 2011–... Rahvusvahelise Taimeteaduse Assotsiatsiooni liige;

Alla **Šogenova**, 2004–... Geoenergia Uurimise Euroopa võrgu (ENeRG) Eesti esindaja;

Alvar **Soesoo**, Ameerika Geokeemia Seltsi liige; Kanada Mineraloogia Seltsi liige; Euroopa Geotermaalenergia Nõukogu (European Geothermal Association) grupiliige; Euroopa Loodusteaduste Akadeemia liige; American Association for the Advancement of Science liige;

Rein **Vaikmäe**, 2012–2016 UNESCO & INQUA rahvusvahelise Programmi „Groundwater and Global Palaeoclimate Signals (G@GPS)" juhtkomitee liige ja Euroopa peatüki kaaskoordinaator; 2009–... Euroopa Strateegilise Teadusinfrastruktuuri Foorumi keskkonna töörühma liige; 2008–... INQUA Maismaaprotsesside Komisjon - paleopõhjavete grupp,

koordineeriva grupi liige; 2008–... Jääpuursüdamike Teadusuuringute Rahvusvahelise Partnerluse (IPICS) juhtkomitee liige; 2006–... COST Programmi Maa Süsteemi Teaduste ja Keskkonnakorralduse Valdkonna Komitee liige; 2001–... ESF Euroopa Polaarnõukogu liige; 2003–... Academia Europaea liige; 2003–… Ameerika Geofüüsika Ühingu (AGU) liige; 2001–… Euroopa Geoteaduste Ühingu (EGU) liige; Euroopa Isotoopuuringute Ühingu (ESIR) nõukogu liige; 1999- Rahvusvahelise Glatsioloogiaühingu (IGS) liige;

Siim **Veski**, COST Intimate teadusvõrgustiku rahvuslik esindaja.

2.4 Soovi korral lisada aruandeaastal saadud T&A-ga seotud tunnustusi (va punktis 2.2 toodud tunnustused), ülevaate teaduskorralduslikust tegevusest, teadlasmobiilsusest ning anda hinnang oma teadustulemustele.

Triin **Reitalu**; Eesti Rahvuskultuuri Fondi noore teadlase stipendium

Enn **Kaup**, Eesti Geograafia Selts, auliige

Struktuuriüksuse töötajate poolt avaldatud eelretsenseeritavad teaduspublikatsioonid *(ETIS klassifikaatori alusel 1.1, 1.2, 2.1, 3.1).*

1.1 [61; 11]

1) Agasild, H., Zingel, P., Tuvikene, L., Tuvikene, A., Timm, H., Feldmann, T., **Salujõe**, J., Toming, K., Jones, R.I., Nõges, T. 2013. Biogenic methane contributes to the food web of a large, shallow lake. *Freshwater Biology* **xx**, xx-xx. (published online 22. October 2013). DOI: 10.1111/fwb.12263

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