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Yulia is a Nippon Foundation / GEBCO Scholar from 6 (2009/2010). She will be defending her PhD in Geology and Mineralogy in fall 2016 at the Geological institute of the Russian Academcy of Science. Yulia is the Russian representative of IBCAO editorial board.

Nastia is a Nippon Foundation / GEBCO Scholar from Year 5 (2008/2009). Since graduation, she gained MS in Marine Geology/Ocean Mapping from UNH in 2012.

Nastia and Yulia are working at the Geological Institute (RAS), and the main objectives of their work are geotectonics and geodynamics of mid-oceanic ridges. In the past few years Nastia and Yulia have participated in several research cruises on board RV *Akademic Nikolay Strukhov*, RV *Academic Treshnikov*, NOAAS *Okeanos Explorer*, researching in the Arctic, Antarctic, Indian and Atlantic Oceans. They also participate in outreach efforts in Russia for popularizing ocean science, such as museum exhibitions and educational activities for children.

Outreach and education

Exhibition "Prepare to dive" at Darwin State Museum

Nastia and Yulia, together with Natalya Turko, have participated in preparation of an exposition at the State Darwin Museum "Prepare to dive", dedicated to the deep ocean exploration, in particular deep-sea animals and geological samples. They have provided 3D maps for biological and geological sampling sites and other GEBCO-related materials for the exhibition. Part of the exhibition was devoted to the history of GEBCO and contributions of the founder of the Oceanographic Museum of Monaco – HSH Prince Albert I, the Prince of Monaco. The exhibition was a joint effort of the Darwin Museum and several research Institutes. The Darwin Museum is the largest museum of natural history in the country and the exhibition was very popular among all ages. The exhibition was accompanied by a series of lectures on ocean exploration topics.

Research cruises and data contribution to GEBCO

Nastia and Yulia have participated as members of the bathymetry group in most of research cruises carried out by GIN RAS in collaboration with other organizations:

- 24, 25 and 26 cruises of RV *Akademik Nikolay Strakhov*, seismo-acoustic and geological survey in Norway-Greenland and Barents Sea in collaboration with Norwegian Petroleum Directorate (Fig. 1)
- 28 cruise of RV *Akademik Nikolay Strakhov*, an international training programme "Floating University" through UNESCO-Moscow State University
- 29 and 30 cruises of RV *Akademik Nikolay Strakhov*, seismo-acoustic and geological survey in the Indian Ocean (Fig. 2).
- 59 and 60 Russian Arctic and Antarctic expeditions onboard RV *Akademik Treshnikov* (Fig. 3 for Antarctic coverage), carried out by Russian Arctic and Antarctic Research Institute.

Most of the data that have already passed restrictions was contributed to IBCAO and GEBCO, including transit lines and gridded dataset of Knipovich mid-oceanic ridge. This year, Yulia as a member of IBCAO editorial board, will be providing more multibeam data.

Gridded dataset of Knipovich ridge, based on 24-28 cruises of RV *Akademik Nikolay Strakhov*, contributed to IBCAO datatset

Fig. 1 Map of 24 -28 cruises onboard RV *Akademik Nikolay Strakhov* by GIN RAS in the Norwegian and Barents Seas (2006-2011)

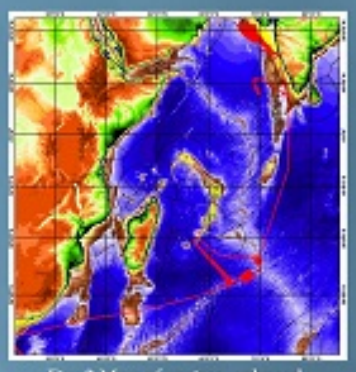

Fig. 2 Map of cruises onboard RV *Akademik Nikolay Strakhov* by GIN RAS in the Indian Ocean (2012-2013)

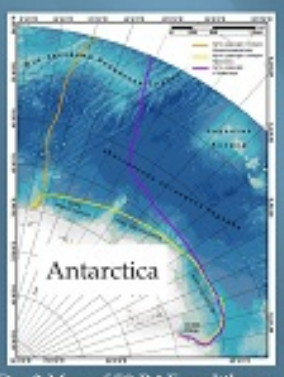

Fig. 3 Map of 59 RAE multibeam Track lines collected onboard RV *Academic Treshnikov* (2014)

Educational games and lectures: Mortema.ru

Since Spring of 2015 a series of lectures on marine topics were presented for children as a collaborative project with Moscow state libraries. Yulia, and several geographers, organized this series of lectures, which transferred into thematic games for children. The games cover a vast variety of topics – starting from an explanation of the Mariana Trench and geology behind it, biological games on deep sea fish types and definition of marine mammals, games showing navigation in rivers and making knots for survival after a shipwreck. The team has since received several awards such as Social Impact Award, Social Innovations, and has participated in 14 Moscow city events and created program for the Russian Geographical Society.

Geomorphology, seismicity and tectonics of mid-oceanic ridge in Norwegian-Greenland Sea and Fram Strait by Yulia Zarayskaya

Yulia's Ph.D project is based on the data collected during 24-27 cruises of RV *Akademik Nikolay Strakhov* and other data sources (AMOR, SCISEX, AWI, IBCAO 3.0, ANSS, Global CMT Project, GIN RAS databases).

Main objectives include:

- Geomorphological analyses of ultra-slow spreading Knipovich and Molloy ridges and Lena trough, based on high resolution MB data.
- Magnitude, frequency, spatial and temporal analyses of seismicity
- Definition of neotectonic structure zone in the Knipovich-Lena trough as a transit zone between Atlantic and Arctic tectonics.

Main Ph.D project defendable objectives include:

1. Knipovich ridge rift valley is separated into two distinctive segments: 1) mostly amagmatic southern segment (northern boundary at 75.7° N) and 2) northern segment with central type volcanic structures and volcanic rises in the rift valley (Fig. 7).
2. System of Molloy TF, Molloy ridge and Spitzbergen TF were formed by current plate kinematics with the azimuth of spreading 307°. This system is the only zone of orthogonal spreading, bounded by TFs along the 3,000 km zone between Jan Mayen FZ and 86° E of Gakkel Ridge.
3. Knipovich ridge structure has combined seismic characteristics typical for spreading system and transform fault (Fig. 6).

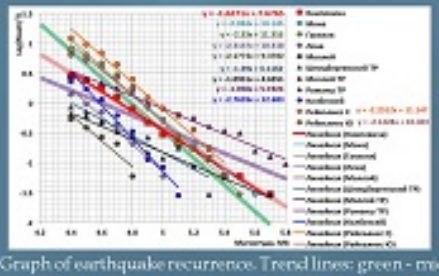

Fig. 6. Graph of earthquake recurrence. Trend lines: green - mid-oceanic spreading ridges, purple –transformfaults, pink – Knipovich ridge (based on ANSS for the time period 1978-2012).

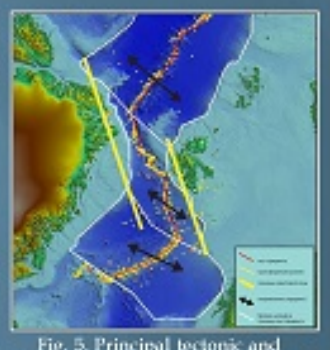

Fig. 5. Principal tectonic and kinematic scheme of the study region.

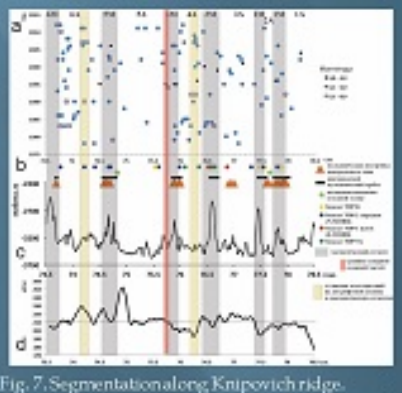

Fig. 7. Segmentation along Knipovich ridge. Correlation between (a) seismicity, (b) location of volcanic structures along the rift valley, basalt types (Dmitrev et al, 2006) and location of methan anomalies in water column (Cherkashev et al, 2001), (c) bathymetry profile, (d) Bouguer anomaly profile (Forsberg, Kenyon, 2005).

Mapping neotectonic elements at mid-oceanic ridge conditions, based on high resolution sub-bottom profiler data (Nastia Abramova and Sergey Sokolov)

The Edgetech 3300 sub-bottom profiler was used to collect data during 24 and 25 cruises of RV *Akademik Nikolay Strakhov*. The data was mapped for the following neotectonic features within the study area of Knipovich Ridge: faults, upthrow faults, terraces, folds, acoustic bright and dim areas, sedimentary lenses, presence of degasation in the water column etc. Event picking was carried out in RadExPro.

Mapped areas include key areas of Knipovich ridge:

- Northern area: where the Knopovich rift valley intersects with the Molloy TF, and
- Southern area: where Knipovich rift valley transfers into the Mohns rift valley.

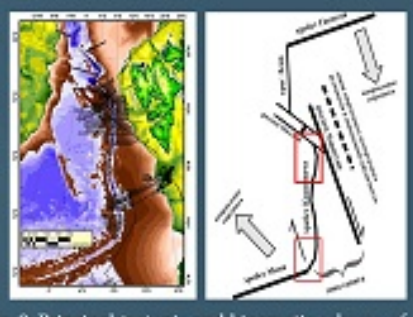

Fig. 8. Principal tectonic and kinematic scheme of the study region (Sokolov et al, 2014). Southern and northern study areas are defined in red.

Mapped faults, and their amplitudes, reflect the spatial variation of compression and trans-tension in the area.

In the **northern polygon,** the stress pattern is defined by right-handed transform fault in the Molloy and Knipovich rift valley that is oriented oblique to the main direction of plate opening (Figs. 8 and 9).

In the **southern polygon,** the stress pattern is defined by non-transform transition between structures of the Mohns and Knipovich ridge, oriented oblique to the direction of plate opening (Fig. 8,10).

Overall for both polygons upthrow faults prevail , which indicates that trans-tension dominates in both areas, but with linear zones of high amplitude up-thrust faults where trans-tension takes place.

Fig. 9. a) Morphology of the northern area of Knipovich ridge, b) distribution of faults and up-throw faults, c) map of amplitude of faults

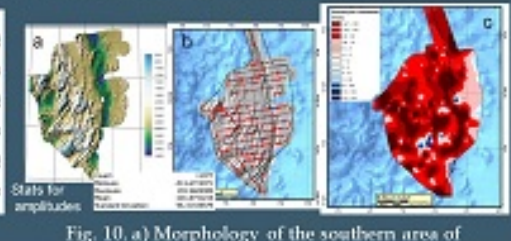

Fig. 10. a) Morphology of the southern area of Knipovich ridge, b) distribution of faults and upthrow faults, c) map of amplitude of faults in meters