

STEPS Students Report

Ekaterina Kislitsyna (M1)

Faculty of Geology, MSU

This summer from July 30th to September 2nd, 2018 I have been taking part in Students and Researchers Exchange Program in Sciences. A possibility to participate in this program is a unique chance for young scientists who wants to develop their career. I was working for five weeks at the Atmosphere and Ocean Research Institute. I have joined the research group of Prof. Yuji Sano, which belongs to the Marine Analytical Chemistry, Department of Chemical Oceanography. Sano-san kindly provided me with a workplace and introduced to other researchers Naoto Takahata, Takanori Kagoshima and Kentaro Tanaka. We stayed in touch with all of them throughout the whole period of my internship.

The aim of my visit to Japan was to continue working with the subject of my master thesis. During last three years, I was a member of gas-geochemical team in Class@Baikal expeditions onboard of research vessel «G.Yu.Vereshchagin». The main idea was to analyze the gas samples collected from the sediments and to discuss the results with Japanese colleagues. That is why before my visit to Tokyo we have to decide with Sano-san which equipment can be used for our aims.



Figure 1. Transferring of gases.

My first step was to transfer gases from penicillin bottles to the Giggenbach-type bottle using a syringe (fig.1).

The next step was to measure gas composition. The chemical compounds (He, CH₄, N₂, O₂, Ar, H₂S and CO₂) of sampled gases was measured using a quadrupole mass spectrometer at AORI, by comparing peak heights of the sample with those of standard gases. After that, we were able to measure ³He/⁴He ratios using a noble gas mass spectrometer (Helix-SFT). The ⁴He/²⁰Ne ratios were analyzed using a quadrupole mass spectrometer. Helium and neon were separated using a cryogenic trap operated at 40 K. The measured ³He/⁴He ratios were calibrated against atmospheric helium. The last measurement was the isotopic composition of d¹³C and d¹⁵N using a conventional gas source mass spectrometer (Iso-Prim100, Isoprime Ltd.). The carbon isotopic composition was measured in CO₂+C₂₊ and CH₄ gaseous component. In addition, during my internship I had a chance just to get acquainted with inductively coupled plasma mass-spectrometry, ICP-MS. I was working with dolomite samples from gas hydrate collected in Japanese sea.

At the end of my staying after analyses of Baikalian gases Professor Sano asked me to help him while collecting samples at Hakone volcano (fig.2)



Figure 2. Hakone volcano

It was a fantastic experience! We were able to take some samples from low temperature fumaroles (fig.3).

During my stay in Tokyo, I really improved my skills and the understanding of gas-geochemistry especially everything about noble gases. Our results are good and some of the data needs to be discussed further in the future. These results are rather interesting and certainly deserves to be published in a reputed geological journal. However, it is still

a lot to do before publishing.



Figure 3. Collecting of samples with Professor Yuji Sano

I am lucky to have the ability and chance to visit Japan and to take part in STEPS program. It was a great pleasure for me to meet Professor Sano and associated professor Takahata. I am very happy that I have been working during a month with such professional people. It was a great experience for me!!! I hope to continue our work and develop Russian-Japanese geological collaboration (fig.4)



Figure 4. Staff of laboratory of Professor Sano