

JSPS Short Term Postdoctoral Fellowship report

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Host researcher: Dr. Yoshihiko Tamura

Overview

I spent three months at the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) in Yokosuka from January to April 2012. This was the first time for me to visit Japan and I was lucky to be there in spring when the climate is very pleasant and for two weeks the cherry blossom changes the appearance of Japan into something everyone is getting excited about months in advance.

Research

I study magma generation processes beneath island arcs. Island arc volcanoes are produced where oceanic plates are being transferred into the Earth's mantle. This is an essential part of plate tectonics and responsible for many of the largest earthquakes on Earth as well as volcanic eruptions all around the Pacific, producing the 'Pacific ring of fire'. The release of water from the oceanic plate as it dives into the mantle lowers the melting point of overlying mantle rocks and is the main process leading to volcanism in these environments. Yet, other components, like sediments that accumulated on top of the oceanic plates, are also thought to be transferred back to the surface after having reached depths of ~ 100 km and constitute a component in arc volcanoes.

During my time in Japan I collected volcanic rock samples from the Izu volcanic arc, a chain of volcanic islands extending South of Japan, beginning at the Izu peninsula. Back in Bristol, I am going to analyse these samples for their Molybdenum isotopes and radioactive decay products of Uranium. The newly developed technique of analysing Molybdenum isotopes is thought to enable us to trace components released from the oceanic crust into island arc volcanoes whereas the Uranium decay chain contains information on the time-scale from the production of melts within the mantle to their eruption at the surface. Both techniques require carefully selected samples and I had

the chance to obtain samples that were collected during detailed field campaigns and research cruises by researchers at JAMSTEC, at the National Institute of Advanced Industrial Science and Technology (AIST) and by doing field work myself on Miyake-jima (Figure 1).

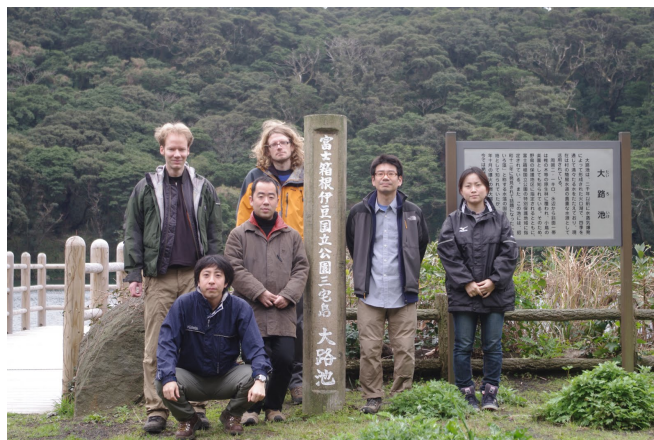


Figure 1: Field work on Miyake-jima. From left to right: Heye Freymuth, Tetsuya Sakujama, Kenji Niihori, Alex Nichols, Hiroshi Shukuno, Akiko Nunokawa.

I also had the possibility of joining a research cruise on board RV Natsushima to the Mariana islands during which we used the diving robot 'ROV Hyper Dolphin' (Figure 2) to collect volcanic rocks from the ocean floor. This has been a very exciting and valuable experience.



Figure 2: RV Natsushima at the JAMSTEC harbour and ROV Hyper Dolphin.

Outlook

Apart from the project outline above while at JAMSTEC I also worked on a petrographic study of a similar set of samples from the Mariana arc. The collaboration on these two and hopefully other projects between Yoshi Tamura and his group and me will continue in the future. I have also been invited to attend next year's Japan Geoscience Union meeting, a possibility to return to Japan that I very much welcome.