Plan Overview

A Data Management Plan created using DMPonline

Title: Effects of fluids on the accretion and exhumation of young oceanic lithosphere at slower-spreading mid-ocean ridges

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Project abstract:

Fluids, from melt to water to CO2, have a profound effect on deformation of the Earth's crust; yet where the fluids come from, how they are transported, and what physical and chemical processes dominate fluid-assisted deformation remains unclear. This is particularly the case for detachment fault zones that bound oceanic core complexes along (ultra)slow-spreading ridges, where fluid-rock interaction/reaction is argued to directly impact the composition and thermomechanical behaviour of the fault footwall, but for which data are limited. This proposal focuses on investigating the dominant deformation mechanisms that accompany fluid-reaction processes during crustal accretion in a magma-rich environment as a function of strain, depth and temperature (proxy for time) in gabbroic rocks from the Atlantis Bank oceanic core complex (SW Indian Ridge). A combination of light and electron microscopy, and microbeam and mass spectroscopy techniques will be integrated with thermodynamic modelling using a unique combination of samples from Hole U1473A (IODP Expedition 360). We will constrain the consequences of fluid-rock exchanges that accompany deformation from hyper-solidus (i.e., melt-present) to ambient conditions. The results of this project will establish the role and impacts of fluid-lubricated deformation on the larger scale rheology in young ocean lithosphere in (ultra)slow-spreading environments near to ridge axes, especially in the highest temperature part of the system that has not previously been well understood or modelled with any existing flow laws.

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Effects of fluids on the accretion and exhumation of young oceanic lithosphere at slower-spreading mid-ocean ridges

Data Collection

What data will you collect or create?

The project will generate data from samples of core drilling (U1473A), drilled during Expedition 360 of the International Ocean Discovery Program. The generated data will include image files (TIFF, JPEG) (photographs of core drilling samples, photomicrographs of thin sections, electron backscatter images, electron backscatter diffraction images, compositional and pressure-temperature-deformation trajectory maps), text files (txt) containing petrographic observations, as well as chemical analyses of minerals presented as Microsoft Excel spreadsheets (xls).

How will the data be collected or created?

The photographs of core drilling samples will be taken with conventional cameras, and the photomicrographs of thin sections will be acquired using imaging systems attached to petrographic optical microscopes. Electron backscatter images and electron backscatter diffraction images will be generated using scanning electron microscopes (SEM). Compositional chemical images will be generated using an electron microprobe and/or a scanning electron microscope. Chemical analyses will be conducted in situ using a laser ablation system coupled with an inductively coupled plasma mass spectrometer (ICP-MS). The quality of analytical data will be assessed at all participating laboratories through the analysis of reference materials.

Documentation and Metadata

What documentation and metadata will accompany the data?

The Dublin Core metadata standard will be used, following the description recommendations of the United States Geological Survey (USGS).

Ethics and Legal Compliance

How will you manage any ethical issues?

Do not apply.

How will you manage copyright and Intellectual Property Rights (IPR) issues?

Priority will be given to journals that adopt either the gold or green open access publishing models.

Storage and Backup

How will the data be stored and backed up during the research?

The data will be stored on physical media at the Institute of Geosciences (IGc-USP) and also on the cloud infrastructure of the University of São Paulo.

How will you manage access and security?

Access will be granted through password control and Single Sign-On (SSO) authentication.

Selection and Preservation

Which data are of long-term value and should be retained, shared, and/or preserved?

The optical and electron microscopy images, as well as the compositional mineral maps, chemical analyses, and P-T-d trajectories hold significant long-term value for the scientific community and should be preserved and shared accordingly.

What is the long-term preservation plan for the dataset?

The published data will be preserved within the Institutional Repository of the University of São Paulo (USP) - https://repositorio.usp.br. The complete dataset as a whole will be stored in the Data Repository (USP) - https://uspdigital.usp.br/repositorio/.

Data Sharing

How will you share the data?

The data will be made available following associated publication through the University of São Paulo's Data Repository.

Are any restrictions on data sharing required?

The data will be shared on the University of São Paulo's Data Repository following associated publications.

Responsibilities and Resources

Who will be responsible for data management?

The project lead (Rhander Taufner)

What resources will you require to deliver your plan?

The resources are available.