Experimental Report

Proposal: **1-02-58** **Council:** 4/2010

Title: Texture analysis of oceanic submarine lavas

This proposal is a new proposal

Researh Area: Other

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Samples: natural silicates

Instrument	Req. Days	All. Days	From	To
D19	3	3	22/11/2010	25/11/2010

Abstract:

Superfast-spreading ridges (18-20 cm/year; e.g. East Pacific rise) produce an upper oceanic crust characterized by multistage basaltic flows, locally thicker than tens of meters. Ocean Drilling Program - Integrated Ocean Drilling Program Site 1256 was drilled in the Cocos Plate near a super-fast segment of the East Pacific Rise. Site 1256 is also characterized by a shallow thick basaltic flow (“Lava Pond”), which is ~70 m thick, 120 km2 wide, and more than 3 km3 in volume. “Lava Pond” from Site 1256 is the biggest basaltic flow drilled in the ocean crust and has interpreted as an off-axis flow. We propose to perform Quantitative Texture Analysis of such lavas in order to investigate relations between crystallographic textures, lava flows, seismic anisotropies and deformation mechanisms of submarine oceanic lavas. Magmatic structures within these giant lava bodies are important for understanding the evolution of upper oceanic crust. Textural data, combined with microstructural analyses and magnetic anisotropy, provide the understanding of the magmatic flow direction and allow for inferences of the lava source and its related path.

Experiment 1-02-58

Texture analysis of oceanic submarine lavas

The experiment was aimed at studying samples collected from the oceanic crust by ocean drilling project.

The samples were cut from a lava flow of about 70m thick in cube of 0.5-1cm side.

D19 setup was chosen to analyse such large sample selecting 0.5-0.8 diameter beam stops.
No particular problems occurred during the acquisition time

RESULTS

Though the crystallographic preferred orientation of rock-forming minerals is very low, the QTA data are capable of showing a constant and clear preferred orientation of pyroxene and plagioclase within lava samples (fig. 1) which may be related to the lava flow and is related to the development of a shape preferred orientation in plagioclase.

The crystallographic and shape preferred orientations are not constant in depth, likely representing a consequence of the flow in lava.

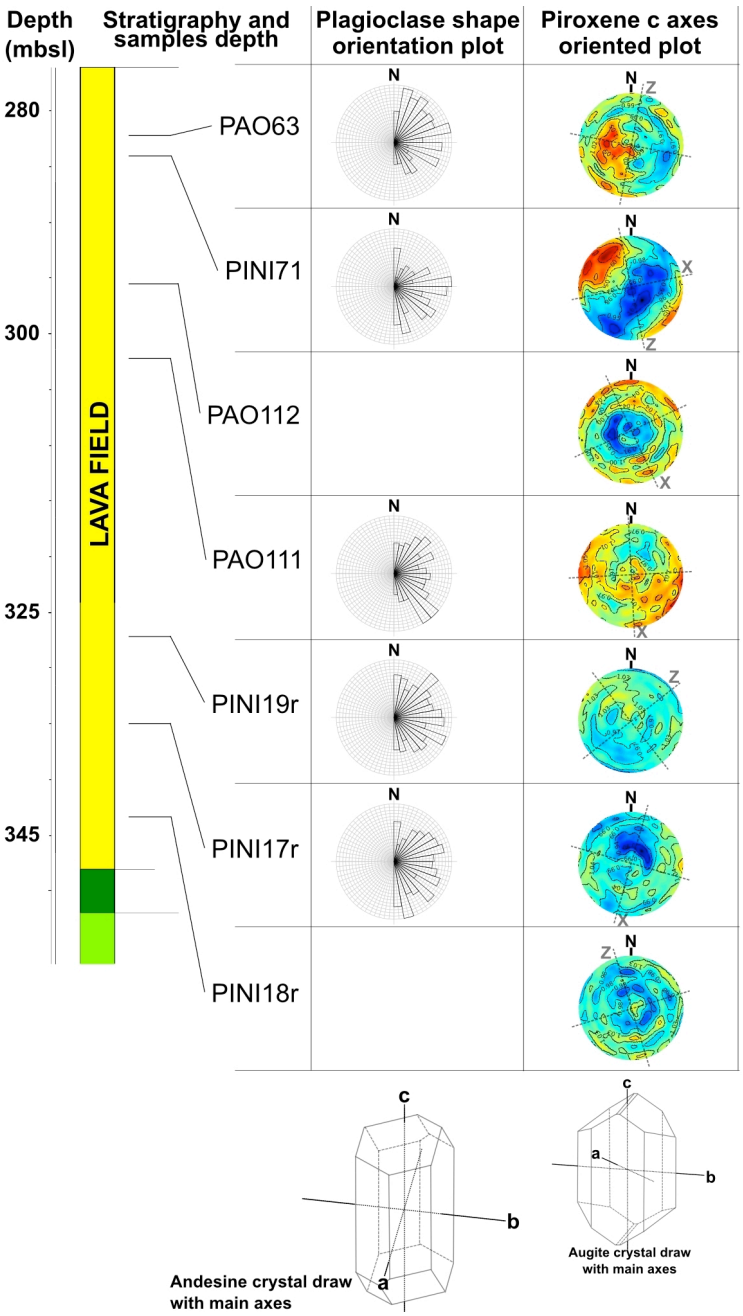

Figura 1 - Shape and Crystallographic preferred orientations in Lava Flows from Coco Plate