Experimental report

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Proposal: 1-02-163 **Council:** 4/2014

Title: Rheology of the lower crust: Quantitative Texture Analysis of High Pressure - High Temperature rocks from Alps and Iberian Variscan belt.

Research area: Other...

This proposal is a new proposal

Main proposer: Michele ZUCALI

Experimental team: Jose Manuel BENITEZ PEREZ
Juan GOMEZ BARREIRO
Daniel CHATEIGNER
Luca LUTTEROTTI
Michele ZUCALI

Local contacts: Bachir OULADDIAF

Samples: FeMgCaNaAlSiOH

Instrument	Requested days	Allocated days	From	To
D20	4	0		
D1B	15	7	30/09/2014	07/10/2014

Abstract:

The proposed experiment aims at quantifying the texture of rocks collected from the continental lower crust, now exposed in two orogens of Europe: the Alps and the Iberian Massif. We believe that a quantitative comparison of rock texture may shed light on rheology of lower crust during relevant geodynamic processes such as those recorded in these two chains, subduction and collision. Texture is used to determine deformation mechanisms of rock-forming minerals and the physical properties of rocks like elastic anisotropy.
Neutron diffraction in combination with Rietveld method has emerged as the best technique to analyze large samples composed of low symmetry phases with enough statistics and resolution on such large grained samples.
We propose to study 10-15 samples of lower crust rocks, namely eclogites and granulites, formed during deep-sited processes at Variscan (380-290Ma) and Alpine (100-30Ma) times.
Selected rocks have been cut in approximately 1 cm3 samples allowing a large volume of crystallites to be analyzed even though a large grain-size (100-1000µm) is expected. D1B and D20 beam-lines are proposed for the experiment.

Experimental report

As proposed we **successfully** quantified the texture of rock samples from lower crust from two orogens of Europe: the Alps and the Iberian Massif.
Part of the experimental time has been devoted to optimize the procedure balancing between data acquisition time and resolution and the solution of several problems related to data treatment with Maud

We obtained clear texture data form most of the samples with few exceptions, probably related with specific mineral phases as serpentine of other hydrated phases.

data acquisition
In order to cover the entire Orientation Space we need 1368 scans (from 0 to 355° in phi and from 0 to 90° in chi, 5° step). In the past, at **D1B** ≈8-10 hours/sample were needed with 30 secs each step; during this experiment we had 2-2.30 hours/experiment with an important increment in terms of time use of the beam-line and resolution.