_____EXPERIMENTAL REPORT_____

EXPERIMENT N° 5-26-162 INSTRUMENT **D1B**

DATES OF EXPERIMENT – 15-25 /7/2003

TITLE

Quantitative texture analysis of poly-mineralic naturally deformed rocks, developed under different metamorphic conditions.

EXPERIMENTAL TEAM

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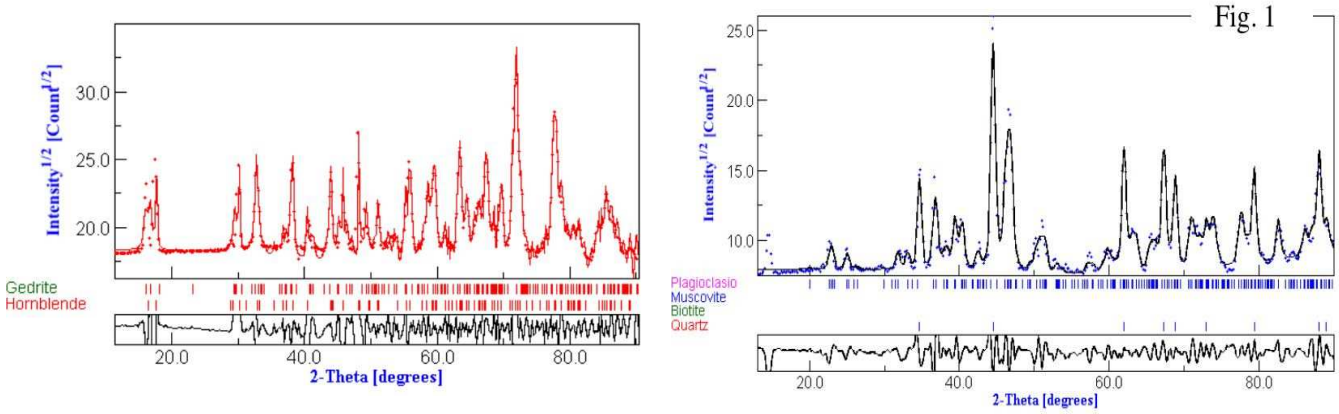
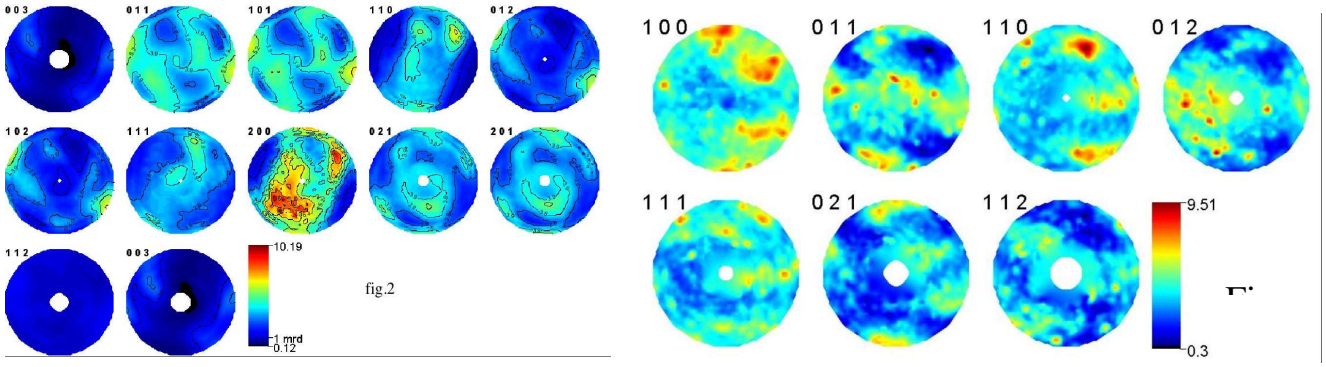
The **aim** of these experiments was to apply QTA to polyphasic rocks, mainly constituted of low-symmetry minerals (e.g amphiboles, micas, clinopyroxene, plagioclase).

The amount and chemical compositions of rock-forming mineral is related to deformation intensity and Pressure-Temperature conditions under which rocks formed during Alpine subduction and collision. QTA has been succesfully applied to mono-mineralic natural rocks using neutron and X-rays diffraction data [1]: the comparision of theese acquisition techniques shows that neutron diffraction is the most powerfull technique for such kind of natural material.

In these experiment we applied the same acquisition technique to poly-phasic rocks (e.g. hornblende [cam] + gedrite [oam]; quartz + mica + plagiclase+ others in fig. 1) in order to obtain quantitative information on texture for each mineral phase, with respect to mesoscopic fabrics. In these experiments we obtain reliable orientaition data for most of rock-forming minerals: in fig. 2 quartz recalculated texture are reported from a qtz+grt+mica-bearing micaschist, while in fig. 3 experimental Pole Figures for qtz are reported from qtz+pl +mica-bearing gneiss. We lowered the acquisition time (about 1/2 time gained), in order to increase the number of studied sample, by performing a forward-backward scanning of *phi* positions and selecting the appropriate acquisition time for each of 1328 steps (about 30 secs). Results in fig. 2 and 3 exhibit well defined texture of qtz with respect to mesoscopic fabrics (mylonitic foliations/lineations).

These experiments also demonstrate that it is possible to obtain QTA, from polyphasic rocks (fig. 4), for each mineral component. This is an important advance in QTA and structural analysis of natural rocks because allow to relate texture evolution with metamorphic transformation





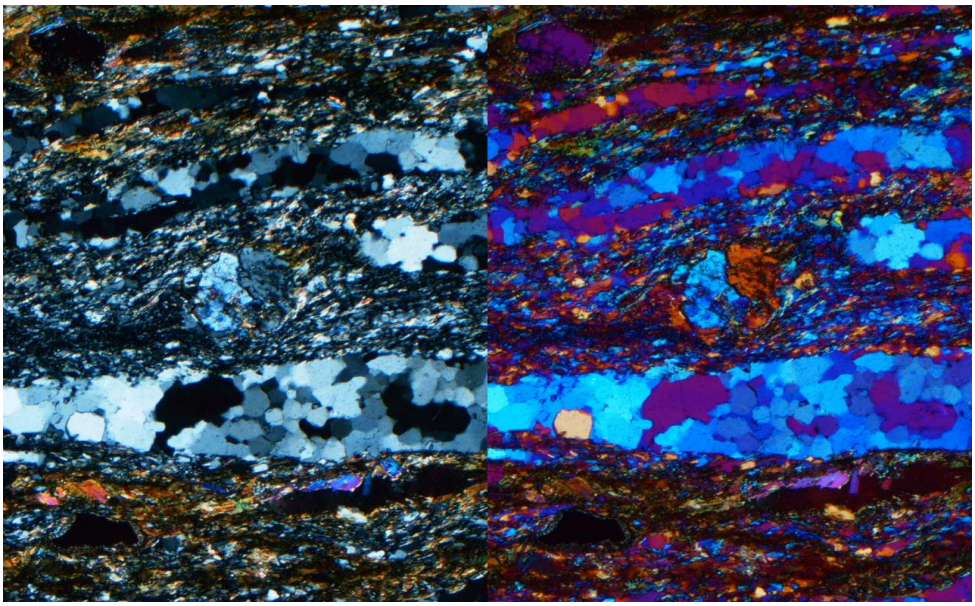


Fig. 4. Microphotograph of qtz+bt+kfs gneiss

[1] Zucali, M., Chateigner, D., Dugnani, M., Lutterotti, L. & Ouladdiaf, B. 2002. **200**. Geological Society, London, Special Pubblications, 239-253.