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Quantitative texture analysis by neutron diffraction in deformed crystalline aggregates: Contín Shear Zone, Morais Complex, N Portugal.

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Two samples of mylonitic-ultramylonitic ortogneisses collected along the Contín shear zone were investigated for crystal preferred orientation and seismic anisotropy. Neutron diffraction data obtained at the D1B beamline at ILL (Institute Laue-Langevin, Grenoble) were analyzed with the Rietveld method as implemented in the code MAUD, to obtain the orientation distribution functions (ODF) of the principal phases (quartz, K-feldspar, plagioclase, phlogopite, muscovite and riebeckite). Texture and microstructure are compatible with the plastic deformation of the aggregates under medium to low-temperature conditions. Kinematic analysis supports a top-to-the SE sense of shear, suggesting a thrust character. Using preferred orientation data and single crystal elastic tensors, P and S-waves velocities and elastic anisotropy have been calculated. We have explored the role of several factors controlling the elastic properties of rocks, particularly the role of strain state and mineral changes in a shear zone. Those factors have a direct impact on the medium impedance and consequently on the interphase reflectivity. P-wave velocities, S-wave splitting and anisotropy increase with muscovite content. Seismic anisotropy is linked with the texture symmetry, which can result in large deviations between actual anisotropy and that measured along Cartesian XYZ sample directions (lineation/foliation reference frame). This is significant for the prediction and interpretation of seismic data. (Research support CGL2016-78560-P)