

## **Mineralogical and seismic properties of serpentinite of Ait Ahmane fault zone of Bou Azzer ophiolite, Central Anti-Atlas of Morocco**

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In Bou Azzer, two major serpentization stages of Pan-African orogen are observed: pseudomorphic early stage materialized by the isotropic serpophite preserving the primary form of olivine crystals, often with antigorite needles. Brucite is fairly frequent, as micrometric inclusions in other serpentine minerals as antigorite and serpophite and tectonic late stage materialized by framework or parallel veins and fractures filled by chrysotile. These minerals are often cross-cutting the antigorite, serpophite and brucite crystals. The microscopic and Raman analyses confirm that the investigated serpentinite rocks suffered of a variable degree of serpentization and the dominant variety of serpentine mineral is antigorite. The crystal preferred orientation (CPO) results show that the [001] axes of antigorite deformation are aligned subnormal to the foliation while the [010] axes are mostly aligned subparallel to the lineation, which are significantly different of that produced in the recent high-pressure experiment. The seismic anisotropy results of shear waves are large, the sample with the lowest serpentine content (30%) shows the lowest P- and S-wave anisotropy ( $V_p=7.2\%$  and  $AV_s=6.55\%$ ), and the sample with the high content of serpentine (85%) shows the highest P- and S-wave anisotropy ( $V_p=8.6\%$  and  $AV_s=11.06\%$ ). These results reflect that the seismic anisotropy increases with antigorite volume fraction. In addition, effects of the serpentization degree and composition on seismic anisotropy are shown in the equal and lower areas of hemisphere projections.

**Keywords:** Serpentization, Antigorite, Seismic anisotropy, Seismic velocities, CPO, Ait Ahmane, Morocco