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Comparison between calculated texture-derived velocities and laboratory measurements conducted on samples from a gold-hosting structure.

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Most lode gold deposits worldwide are associated with structures such as shear zones. Thanks to their capacity to couple resolution and depth of investigation, seismic methods can identify these indirect indicators of mineralization and help extend gold exploration targets to greater depths. Rocks from shear zones are usually seismically anisotropic. Seismic anisotropy is generally related to the intrinsic texture of the rock and the presence of cracks at depth. Determining seismic anisotropy in relation to the texture of the rock, and its evolution with depth (pressure) is therefore necessary to help interpret exploratory seismic surveys. We report here the results of such a correlation conducted in the laboratory with rock samples extracted from the Thunderbox Gold Mine in Western Australia. Four samples — including two from the shear zone — were selected to assess the pressure and directional dependency of the P-wave velocities. In addition, an independent texture analysis was carried out on the two samples from the shear zone using the quantitative Neutron diffraction method. We then computed the texture-derived velocities using as inputs the mineralogy and texture of the samples. The good agreement between calculated texture-derived velocities with experimental measurements shows that the texture of the shear zone samples is the main source of seismic anisotropy. This study seeks to improve the understanding of the seismic response across mineral deposits that are structurally controlled by shear zones.

Level of Expertise

Student

Presenter Gender

Man

Pronouns

He/Him

Which facility did you use for your research

Australian Centre for Neutron Scattering

Students Only - Are you interested in AINSE student funding

Yes

Do you wish to take part in the Student Poster Slam

Yes

Condition of submission

Yes

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