

# Rock physical interpretation of the relationship between S-wave velocity and fluid saturation in rocks

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There have been many studies on the relationship between seismic velocity and fluid (water) saturation in rocks. As for the S-wave velocity, it is reported that it increases and decreases with the increase of the saturation degree, and it shows a more complicated aspect than the P wave velocity. In recent years, the application of seismic exploration and monitoring methods using surface waves has rapidly expanded and the importance of S-wave velocity of rocks which governs surface wave propagation is further increasing. In this study, to understand and model the relationship between S-wave velocity and fluid saturation, the data on the relationship between seismic velocity, especially S-wave velocity, and fluid saturation obtained in the laboratory tests are analyzed. It is also examined whether the observation data as described above can be explained or not by the proposed model. As a result, it is confirmed that the relationship between the S-wave velocity and fluid saturation is changed according to the type and age of the rock, and that the relationship can be represented by the rock physical model.

Keywords: S-wave velocity, fluid saturation, rock physics model