MEASUREMENTS OF COMPRESSIONAL AND SHEAR-WAVE VELOCITIES AT VARIABLE PRESSURE AND TEMPERATURE

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Knowledge of compressional and shear-wave velocities can provide important information about the bulk physical properties and composition of the subsurface rocks. Study of the pressure dependence of velocities can be useful to determine the range up-to which velocity can vary, in a particular rock type, as we go down depth. We measured the wave velocities in limestone rock samples, collected from the Rewa (Madhya Pradesh) region of the Vindhyan ranges. Measurements of wave velocities were conducted at variable pressures and temperatures, in a controlled laboratory conditions. Our experiments indicate that there is a decrease in compressional-wave velocity as the pressure increases, whereas shear-wave velocity increases with pressure. P-wave velocities decreases from 5.7 km/s to 5.1 km/s whereas the Shear-wave velocity increases from 2.8 km/s to about 3.15 km/s as we increase the pressure. The pressure dependence of the wave-speeds can be explained to some extent by general closure of the pore-space and cracks in the rock samples.