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Lower Amplitude Energy and Seismic Reflection Loss from Nonlithologic Acoustic Impedance Changes at a Elastic to Pressurised Viscous-Plastic Fluid Interface in the Cilicia-Adana Basin,

NE-Mediterranean Sea

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Acoustic impedance changes as combined with density and velocity contrasts within elastic and viscous-plastic salt-sediment environment in the Cilicia Basin are investigated and well analysed to do a scientific overview on seismic reflectivity of elastic and viscous-plastic materials. Recording the amplitudes of the reflections as they return to the surface enables us to assess the magnitude of the acoustic contrast causing reflection. This can have geological and geophysical significance as which kind of elastic factors affects it to produce lower amplitudes and reflection loss through low density, pressurised fluid environments.

The underlying salt material in the form of diapiric products is a viscous-plastic homogeneous medium in ductile manner and pressurised fluid, and being able to be fluidised or liquified by the effect of abnormal pore water pressure, temperature and salt dissolution processes in the Cilicia Basin, and thus, having suddenly the lower products of

velocity and density. In the basin, sediment-salt interface, as elastic to viscous-plastic interface, is the interesting and unusual reflector boundary, from which nonlithologic acoustic impedance changes appear, and causing the lower reflection amplitudes or no reflection data. Because a compression becomes a rarefaction upon reflection from a medium having a lower product of seismic velocity and density. Thus, the formation mechanisms of lower amplitudes in the propagation velocity of the seismic pulse in unconsolidated soft materials can be considered by the Zoeppritz equations, and the interpretation of lower amplitude values can extend beyond the limit of Hook's relations associated with the nonlinear stress-strain curve. Additionally, elastic energy is gradually absorbed into the medium by internal frictional losses, leading eventually to the total disappearance of reflections. Visco-plastic frictional loss of the type usually associated with highly viscous liquids suggests that the mechanism of absorption is solid friction associated with the particle motion in the seismic wave through the homogeneous salt medium in the Cilicia Basin.

Within viscous-plastic, hydro-plastic, high pore water-bearing salt-sediment and overpressure systems in the Cilician diapir-rich sedimentary basin, the mechanisms for the absorption of energy and loss of seismic data or lower reflection amplitudes are more complex than ever expected.