

# Fluid distribution in crust inferred from seismic velocities and electrical conductivity

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Geophysical observations have been conducted to study the composition, structure and dynamics in the island-arc continental crust. Detailed profiles of seismic velocity and electrical conductivity have suggested that fluids (mostly aqueous fluids) exist pervasively within the crust. Spatial variations in velocity and conductivity are primarily attributed to a spatial variation in the fluid volume fraction. The variation in velocity is within 20%, while that in conductivity up to 4 orders of magnitude. The observed highest conductivity of 10 S/m requires the volume fraction of 10% or more. Cracks have strong influence on seismic velocities. If fluids exist in cracks, extremely low velocities (e.g., 50% or more) must be observed. However, such extremely low velocities have not been observed. Fluids thus should be in shapes which weakly affect seismic velocity. Cracks should be mostly closed at crustal depth. Only large aperture segments of cracks must form interconnected networks to provide conduction paths. They can be treated as stiff tubes, which have cross sections of large aspect ratios. Such stiff tubes have relatively weak influence on seismic velocities. I will discuss about the geometry of fluids on the basis of high pressure experiments and microstructural observations.

Keywords: crust, fluid, seismic velocity, electrical conductivity