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New fluid flow mechanism at seismogenic depth in subduction zone

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Since pore fluid pressure may concern with seismogenesis, large amount of articles are published for fluid flow research, and -previous researches have been focused only crack flow in deep crust. In general, a pore between sedimentary grain decreases with depth, and fluid flows only within crack in deep crust. This study shows new fluid flow mechanism that doesn't depend on crack in the rocks. This produces new perspective of fluid flow of seismogenic depth in subduction zone.

The Shimanto accretionary complex at SW-Japan, formed at seismogenic depth suffers pressure solution deformation and generally includes brittle failure of web structure and crack-filled veins. The carbonate matrix is lacked in the sediments due to deposition below CCD.

Some sandstones in the late Cretaceous Nonokawa Formation, includes spotted carbonate deposit. This carbonate deposit occurs limited area less than several meters square within sandy layer without crack-filled vein. Microscopic observation shows following features as below.

The spotted carbonate minerals overprint with embayment structure in pressure-solution deformed sandy grains, and these are cut by web structure and crack-filled veins. The fluid may have dissolved the sandy grains, and carbonate minerals were deposited at latest stage of lithification process between pressure solution deformation and brittle failure. These occurrences suggest that fluid can flow with dissolution of rock-forming grains in rigid crust without crack.

Keywords: fluid flow, accretionary complex