DSeis Report 2 Chemical and physical property of the mafic/ultramafic adjacent dykes accompanying aftershocks and hypersaline brine in deep and non-meteoric water environment

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The DSeis project (1) targeted the seismogenic zones elucidated by the dense seismic monitoring networks in the forerunning project, successfully (2) reached seismogenic zones in country rocks with density and Vp as high as those in rock mass in the upper crust (2.7 g/cm^3 and 6 km/s, respectively), not seismic faults in sedimental covers or fault zones in unconsolidated formation (Vp<4 km/s);
(3) recovered full-core of a total of 1.6 km length with a wire-line NQ and BQ diamond drilling (with the drilling rigs underground from 2.9 km depth from the surface; we used a 1.5m triple-tube for the most critical section);
(4) below the mining horizon, intersected altered mafic or ultramafic intrusives in felsic Archean metasedimental formations. Some sill-dyke complexes are associated with the Ventersdorp (2.7Ga) Large Igneous Province activity (LIP) and additional later mantle plume activities in several generations. The ~N-S altered ultramafic dykes (thinner than several meters) adjacent to each other host the aftershock zone of the M5.5 earthquake and the non-meteoric hypersaline brine rich in abiogenic dissolved organic carbon, respectively.

Industrial XCT, XRF scan, EPMA, and FTIR at Kochi Core Center successfully characterize the difference between the ultramafic altered dykes mentioned above. We could elucidate the significant spatial variation in XCT-value, density, magsus, and chemical composition in the altered ultramafic dyke adjacent to the core loss zone. This spatial variation toward the core loss zone is consistent with that in seismic velocity reported in another poster (Fujita et al. in the same session S-CG46);

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