New Thinking Sparkled in Deep-Subduction of Continental Crust

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It has been well evidenced that slivers of continental crust could be subducted deeply to mantle depth of more than 200 km. Materials from continental crust with low density could experience ultra-high pressure (UHP) metamorphism in high P/T regime (about 10 °C/km) at the mantle depths. For example, transition of Mg-rich spinel to garnet and that of Al-rich clinopyroxene to poor diopside with exsolution lamellae of garnet, as well as clinopyroxene bundle surrounded garnet grain, were reported from Bixiling and Maowu meta-mafic and ultramafic complex of the Dabie Mountains. Cr-rich ilmenite exsolutions in olivine were reported from Yangkou meta-ultramafics of the Sulu region. All their host rocks (meta-mafic and ultramafic complex) were emplaced into continental crust.

The UHP rocks were exhumed to surface shortly after their deep subduction. Such a geodynamic process of great scale has introduced many new thinking. How deep could continental crust be subducted during continent-continent collision? What kind of physical and chemical changes would these deeply-subducted continental materials experience? Could these subducted "dry" continental crust slivers react with mantle material? Has any fluid from shallow crust been brought down to upper mantle? How could UHP rocks exhume from mantle depths to surface? Paradox remain in answering most of these questions. Any progress in approach them will bring a mighty advance in understanding the planet where we live on.