# Crust-mantle interaction in continental subduction channel: Evidence from orogenic peridotites and mafic intrusives

YONG-FEI ZHENG*, ZI-FU ZHAO AND REN-XU CHEN

School of Earth and Space Sciences, University of Science and Technology of China, Hefei 230026, China (yfzheng@ustc.edu.cn)

At continental subduction zones, crustal materials enter the uppermost mantle to suffer ultrahigh-pressure (UHP) metamorphism. Some of these deeply subducted crustal materials are returned to the surface in the form of UHP metamorphic rocks, exhibiting a range of lithologies from felsic gneiss through mafic eclogite to ultramafic peridotite. Tectonic mechanism for mixing and transport of these crust- and mantle-derived rocks in the subduction zones has been enigmatic. A combination of results from the fields of geology, geophysics and geochemistry suggests that these UHP rocks are a type of tectonic melanges in continental subduction channel. There are at least three components in the mixed system: (1) felsic gneiss from the subducted granitic rock and shale, (2) mafic eclogite from subducted basaltic rock and graywacke, and (3) ultramafic peridotite from the overlying mantle wedge. The peridotite suffers metasomatism by aqueous solution and hydrous melt derived from subducting continental crust, generating such ultramafic metasomes as altered peridotite, pyroxenite and hornblendite. The element and isotope compositions of the metasomes are quantitatively dictated by the budget between the three components. The metasomes are stored in the lower part of orogenic lithospheric mantle for a variable time scale from few million years to hundreds of millions of years, serving as mante sources for synexhumation and postcollisional mafic magmatism. As such, different extents of physical mixing and chemical reaction in the subduction channel are a key to the crust-mantle interaction during continental collision. Therefore, the subduction channel processes are the tectonic mechanism that can account for compositional variations in orogenic peridotites and mafic intrusives on the microscale to macroscale.