Kyanite eclogites and high-Mg garnet pyroxenites from the Czech Bohemian Massif were originally formed as cumulative gabbros

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It has been known that the granulite-migmatite terrane in the Gfoehl unit of the Bohemian Massif encloses numerous small bodies of mantle-derived garnet peridotite, some of which contain layers or lenses of eclogitic rocks (e. g. Medaris et al, 1995). These high-pressure rocks have generally been considered to be of high-pressure crystal precipitates of garnet and pyroxene in the upper mantle (e.g., Jakes, et al, 1994; Medaris et al, 1995). We present new data of whole-rock major and trace element analyses of three kyanite eclogites from the Nove Dvory garnet peridotite and demonstrate that these were all gabbroic origin (Obata et al, 2006). The primary phases are kyanite, garnet, omphacite and quartz, and they but quartz are all retrograded and symplectized. The geochemical characteristics are low SiO2 (ca 48%), high Al2O3 (16-19%), high CaO (14-16%) and high Mg number (76-81), and LREE depletion, low and flat HREE pattern and Eu and Sr positive anomalies. Theses features indicate that these rocks were originally formed as plagioclase-rich gabbros and have not suffered a geochemical modification during the high-pressure metamorphism. Furthermore Obata et al (2006) devided the published data of eclogites and garnet pyroxenites from the Moldanubian zone into high Mg# group (greater than 70) and low Mg# group (below 62) and demonstrated that the high Mg# group, including the three kyanite eclogites from the Nove Dvory lie on a single straight line in CaO/MgO-SiO2/MgO plot and demonstrated that this fact indicate that these rocks have a common, cumulative gabbro origin. We applied this method to other mafic layers embedded in mantle-derived peridotite such as Beni Bousera, Ronda, Horoman and conclude that high-pressure mafic rocks of low-pressure cumulus gabbro origin may be more pervasive than previously thought. Other groups of mafic layers of high-pressure cumulus origin as previously envisages do exist as well and the fact that these different types of mafic layers do occur closely associated to each other in space within the same massif bears significant implications to geodynamic evolutional processes of the mantle.

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