# Plagioclase Lherzolite as Matrix to Reactive, Porous Flow of Basaltic Magmas

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We have studied the compositions of liquids in equilibrium with plagioclase lherzolite residue at pressures to 1GPa. We have particularly emphasised the change of liquid composition as the residual plagioclase changes from albite to anorthite-rich and mapped the compositional changes in co-existing pyroxenes and Cr-Al spinel, while maintaining olivine at Mg89-Mg92 composition. At 1 GPa, liquids are olivine and hypersthene-normative and with low Ca/Al ratio, below values for primitive MORB.. However, for residual plagioclase more sodic than An60, basaltic liquids in equilibrium with plagioclase lherzolite residue are olivine and nepheline normative i.e. alkali olivine basalt compositions, with low Ca/Al ratios. The most sodic liquid i.e. the liquid coexisting with olivine and enstatite in the CaO free system, remains in the nepheline-normative volume of the basalt tetrahedron to pressures of between 0.25 GPa and 0.375 GPa.
At 0.75 GPa and 0.5 GPa, liquids in equilibrium with calcic plagioclase in plagioclase lherzolite are quartz and hypersthene normative but become olivine + hypersthene and olivine + nepheline-normative as plagioclase becomes more sodic. The data provides a basis for evaluating observed MORB, particularly including glasses with relatively high Mg#, for their possible origin as ‘primary’ or ‘plagioclase-lherzolitebuffered’ melts which last equilibrated with plagioclase lherzolite residue in the uppermost mantle.