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The role of 'water' and pargasite in the formation of the LAB beneath the Pannonian Basin

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The proposal is evaluated whether the dehydration solidus of pargasitic amphibole-bearing upper mantle with very low bulk water (hundreds ppm) may be the main reason for the formation of the lithosphere-asthenosphere boundary (LAB) beneath the Pannonian Basin. The pargasite belongs to the amphibole group of hydrous chain silicates containing 1.5 – 2.0 wt.% 'water' in its structure and a relatively common mineral of the shallow upper mantle. The dehydration solidus may be associated with a very small degree of partial melting in the upper mantle at temperatures in excess of 1050 °C at pressures below $\sim$ 90 km. This is the temperature where the decomposition of pargasitic amphibole produces small amount of partial melt (<1%) which may be responsible for changes in geophysical properties (e.g. lower seismic velocity, higher attenuation of seismic waves, higher electrical conductivity). This petrologic model could be checked based on the large body of geophysical knowledge on the Pannonian Basin (central Europe). The high resolution heat flow data enables us to calculate the depth of the 1050 ^{0}C isotherm beneath the area. There is relatively small mismatch (< 5 km) between the position of this isotherm and the geophysically determined LAB in the Pannonian Basin. These observations may confirm the theory that the dehydration solidus may be responsible for the formation and depth variation of the LAB in young continental extensional basins. The model has important implications for the numeric and analogue modelling of lithospheric deformation.