

Deformation beneath the mantle wedge: an example from the metamorphic sole in the Al Wasit, Sultanate of Oman

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The metamorphic sole below the Oman ophiolite is modeled to have been produced by an intraoceanic thrusting of a detached oceanic lithosphere emplaced onto an adjacent oceanic crust (i.e. juvenile subduction). The underthrusting oceanic materials were metamorphosed up to amphibolite and granulite facies by the heat from the overriding hotter mantle peridotites due to their thrusting movement in the late Cretaceous. We show distribution of some deformation structures against distance from ancient mantle wedge. We observed that the basic amphibolites close to the peridotite show a various deformation process such as a boudinage.

The Oman ophiolite is the largest scale ophiolite in the World, extending about 100 km wide and 400 km long in Sultanate of Oman and United Arab Emirates, north-eastern Arabian Peninsula. The metamorphic sole beneath the Oman ophiolite crops out sporadically as small slices over the whole range of the Oman Mountains. They are modeled to have been produced by an intraoceanic thrusting of a detached oceanic lithosphere emplaced onto an adjacent oceanic crust. The underthrusting oceanic materials were metamorphosed up to amphibolite and granulite facies by the heat from the overthrusting hotter mantle peridotites with influence of shear deformation due to their thrusting movement in the late Cretaceous. It consists of amphibolites and metacherts with minor amount of metapelites and marbles. The amphibolites close to the peridotites were highly deformed during oceanic thrusting: they exhibit non-coaxial boudinage structures related C1 shear and small scale deformation structures such as mineral lineation and porphyroclastic systems of feldspar.