

FLUIDS RELEASED FROM EXHUMING DRY ECLOGITES, DABIE-SHAN, CHINA

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Quartz-veins, ranging from mm to dm in width, developed in eclogites from the Dabie-Shan, China. These veins cut across eclogitic foliation at outcrop-scale and peak pressure metamorphic minerals (garnet, omphacite) at thin-section-scale, implying they formed during exhumation. The vein compositions depend on their host rocks. Quartz-veins with kyanite and anthophyllite (Anth) developed in Jinhe coesite-bearing eclogite that contains talc in addition to omphacite and pyrope(Py)-rich garnet, and with kyanite and zoisite in Zhujiaochong and Hualiangting eclogites that were lawsonite-bearing. These veins developed at depth of 50km and T around 700°C according to our P-T calculations. The similarity in O-isotope between quartz-veins ($\delta^{18}\text{O} = -2.6 - +2.2 \text{ ‰}$) and their host eclogite ($\delta^{18}\text{O} = -2.8 - +1.6 \text{ ‰}$) suggests the vein-forming fluids were derived from the host eclogite. Possible reactions to release fluids include: $2 \text{ Py} + 5 \text{ Tc} = 2 \text{ H}_2\text{O} + 2 \text{ Ky} + 3 \text{ Anth}$, $4 \text{ Lw} = 7 \text{ H}_2\text{O} + 2 \text{ Zs} + \text{Ky} + \text{Qz}$, and $8 \text{ Lw} + \text{Py} = 13 \text{ H}_2\text{O} + 4 \text{ Zs} + \text{Tc} + 3 \text{ Ky}$. A release of H₂O due to P-decrease and perhaps additional T-increase is the result of all these reactions. It is proposed that hydrous fluids are derived in-situ from exhuming dry eclogite as an alternative or competitive process to the H₂O influx from external sources. If sufficient water would be released, syn-exhumation partial melts could develop in dry roots of a collision orogen such as the Dabie-Shan.