

## **Subduction in a vessel: petrology of eclogite-tempered ceramics from the Kiechlberg (Thaur, Tyrol)**

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In the course of this investigation ceramic fragments of the Neolithic and Early Bronze-Age settlement site at the Kiechlberg in Thaur (Tyrol, Austria) were petrographically examined. The ceramic fragments, which mainly represent wall parts of ceramic vessels, form a glassy matrix, which contains different kinds of tempers. Subordinate recycled ceramic fragments as well as slag temper occur in the ceramics. The addition of temper components reduces stress cracks during drying and firing and increases the fire resistance of the vessels. However, in this investigation for the first time eclogite fragments occur as temper. Since river rocks and especially metamorphic rocks are very difficult to crush, it can be assumed that they were heated in a fire and quenched with cold water ("firecracking"). The eclogites show a strong amphibolite-facies retrograde overprint and show characteristic symplectite structures. The eclogite-facies mineral assemblage is garnet + omphacite + epidote + amphibole + quartz. Garnet contains omphacite inclusions and omphacite has mostly been retrogressed to amphibole + diopside + plagioclase. Chemically the amphiboles can be classified as magnesiohornblende, tschermakite or edenite. Calculation of the P-T conditions of the eclogites using the mineral assemblage garnet + omphacite + epidote + amphibole + quartz and the program THERMOCALC v.3.21 yielded  $680 \pm 36$  °C and  $1.7 \pm 0.01$  GPa. Typologically these ceramic fragments have been assigned to the Altheim culture (ca. 3700–3300 BC) of southern Bavaria (Töchterle, 2015). Geographically this indicates that the provenance area of the eclogites temper is probably the Bohemian Massif or the Münchberg Gneiss Massif from the western margin of the Variscides. Another possibility is that the ceramics were made on site at the Kiechlberg and the eclogites were obtained from the river Inn. In this case eclogites from the central Ötz valley could have been used, which has been demonstrated by the use of eclogite hammer stones in the Lower Inn Valley in prehistoric times. More probable, however, is, since prehistoric trade between the Bavarian alpine foothills and Tyrol/South Tyrol took place, which was via the Inn valley, that the ceramics were made in the southern Bavarian area. Based on the mineral assemblage these eclogite temper fragments match petrographic observations from the Bohemian Massif, the Münchberg Gneiss Massif and the central Ötz valley, where latter two localities match even better. The mineral assemblage of the Münchberg eclogites matches that of the eclogite temper fragments in the Kiechlberg pottery very well and the obtained P-T conditions agree with estimates from the Münchberg Gneiss Massif. Why these eclogites were used as temper remains unknown but eclogites could be very suitable as temper, because of their low thermal expansivity at high temperatures. Nonetheless the occurrence of eclogite temper in ceramic fragments represents a unique find in Bronze Age pottery but due to the petrographic similarity of eclogites in general, the geological provenance of these eclogites cannot be exactly determined solely on petrographic observations.