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Hydrous aluminosilicate metasomatism in an intra-oceanic subduction zone: implications from the Kurancali ultramafic-mafic cumulates within Alpine Neotethys Ocean, Turkey

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The Kurancali ultramafic-mafic cumulate body, an allochthonous sliver in central Anatolia, is characterized by the presence of abundant hydrous phases as phlogopite and pargasite besides anhydrous phases as augitic diopside and plagioclase with accessory amounts of rutile, sphene, apatite, and calcite. Based on modes of the essential minerals, the olivine-orthopyroxene-free cumulates are grouped into six types as clinopyroxenite, clinopyroxenite with hydrous minerals and plagioclase, phlogopitite, hornblendite, layered gabbro, and diorite. Petrographical and chemical evidences suggest crystallization from a hydrous magma to form phlogopite with high Fe2+-Fe3+-Al[6]-Ti, diopsidic-augite with high Ca-Al(t)-Ti, Si-undersaturated pargasite with high Al[4]-Ca-K-Na-Ti-contents and intercumulus plagioclase with a wide range of composition (an%=40.61-98.58). Trace element signatures of the cumulates including clinopyroxenite indicate that hydrous magma is enriched in K, Rb, Ba, Sr, P, Th, U, and LREE, and depleted in HFSE (Nb, Ta, Zr, Hf, Ti), HREE, and is typical of subduction environment. Petrographical, mineralogical and geochemical features of the cumulates show that the hydrous magma has high-K calc-alkaline affinity with slight alkaline character and display a metasomatic origin. Metasomatizing component modifying the composition of mantle wedge is H2O-, alkali, carbonate rich aluminosilicate melt which is likely to be derived from a subducted slab. Our evidences imply that metasomatic agents in subarc mantle lead to generation of hydrous magma producing Kurancali cumulates in an intra-oceanic subduction zone during closure of

the Izmir-Ankara-Erzincan branch of Alpine Neotethys.