

## **Zircon U-Pb and $\delta^{18}\text{O}$ isotope geochemical signatures of high-temperature metamorphism in the Kazdađı Massif (Northwestern Anatolia, Turkey).**

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The high-grade succession of the Kazdađı massif is one of the well-known in the northwestern Turkey (Biga Peninsula). The Kazdađı massif is characterized by, from bottom to top, oceanic-crustal ultramafic rocks, and unconformably overlain by the thick-platform type associations (marble and migmatite) with amphibolites and metagranitoids. These high-grade metamorphic rocks record amphibolite-granulite facies features as mineral assemblages and zircon-isotope trends. To reveal the zircon minerals response to the high-temperature metamorphism along the massif, zircon crystals from the meta-oceanic basement (metagabbro) and metaplatform associations (metagranitoids), are analyzed for trace element, U-Pb isotope, and  $\delta^{18}\text{O}$ .

Zircon minerals from the metagabbros are slightly smaller (60-90  $\mu\text{m}$ ) displaying very complex internal structures such as secondary events due to diffusion reaction processes as a result of high-grade metamorphism. Both U-Pb SIMS and ICP-MS LA analyses from the metagabbros are roughly in agreement with core (ca. 78-71 Ma) and rim (65-68 Ma) ages. Zircon  $\delta^{18}\text{O}$  VSMOW results from the metagabbros are mostly diverse 2.65-4.87‰ in different samples, however the consistency of the  $\delta^{18}\text{O}$  values in each sample cores' and rims' likely indicate metamorphic fluids took place as internal origin, therefore zircons only record the high-grade metamorphic fluids. Moreover, zircons from the metagranitoids of the meta-platform yield ca. 60-69 Ma core ages and display similar metamorphism related secondary affects in the CL images. Zircon  $\delta^{18}\text{O}$  values from the metagranitoids are identical from 7.07-9.88‰. These expected close radiometric ages and metamorphic features between metagabbros and metagranitoids due to their similar metamorphic link is also in agreement in terms of the geological frame of the massif. Overall, the geological and analytical results indicate that zircons from the metamagmatic associations of the Kazdađı Massif only equilibrated during the high-grade metamorphism at ca. 78-60 Ma.