A comparison of shocked zircon and quartz from the Reis impact structure, Germany

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Shock metamorphism is well established within the zircon and quartz mineral systems. Shocked quartz has been documented in a number of impact locations on the Earth and the shock deformation mechanisms have been identified, allowing for a well constrained thermobarometer of shock conditions to be developed [1]. Zircon is an important mineral in crustal studies and also records shock metamorphism through crystallographic deformation.

Shocked zircon has been identified from a number of impact structures, however development of a thermobarometer for shock metamorphism in zircon has been limited to one emperical study [2] and work on naturally shocked zircons from the Earth [3, 4, 5] and the Moon [6]. The work of Leroux *et al*. (1999) have determined that zircon exhibits planar microstructures >20 GPa, begins to transform to reidite >40 Gpa, completing conversion >60 GPa. Timms *et al*. (2012) further documented shock metamorphism of zircon and began to develop a shock deformation mechanism map. The aim of this study is to further constrain the development of shock features in zircon through the careful comparison of shocked zircon and quartz from the Reis impact structure.

We have therefore analyzed a suite of thin sections from the 14.4 Ma Reis impact structure in Germany from samples collected between 300 and 1204 m depth in the Nördlingen 1973 borehole. Previous work by Wittmann *et al*. (2006) determined shocked zircons in suevites from Reis exhibit planar microstructres, granular texture and reidite indicating samples were shocked >40 GPa, while other mineral systems indicate pressures >60 GPa. In this study shocked zircon and quartz have been analyzed petrographically and by SEM including EBSD to further resolve the correlation of shock deformation within these two mineral systems.

[1] Stöffler and Langenhorst 1994 MAPS [2] Leroux *et al*. 1999 EPSL [3] Wittmann *et al*. 2006 MAPS [4] Moser *et al*. 2011 CJES [5] Erickson *et al*. 2013 Am Min [6] Timms *et al*. 2012 MAPS

Petrology, mineral chemistry and Sr–Nd–Pb isotopic compositions of granitoids in the central Menderes metamorphic core complex: Constraints on the evolution of Aegean lithosphere slab

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Salihli and Turgutlu granitoids in the central Menderes metamorphic core complex are most suitable rocks in order to understand the magma forming processes in extended terrains. They are granodiorite in composition and contain monzonitic and monzodioritic microgranular enclaves. Host rocks are geochemically similar to each other while their enclave chemistry is in contrast with low SiO_2 and high Mg≠ values. Mineral chemistry data confirm a chemical equilibriation of distinct magma batches. Geochemical modelling suggests that these granitoids were derived from mixing of mantle and lower crustal components, which were finally modified by upper crustal contamination and fractional crystallization processes. Early-Middle Miocene syn-extensional granitoids across the Aegean region form a magmatic belt associated with roll-back of the Aegean lithosphere slab. Roll-back induced magmatism together with ductile deformation in western Turkey ceased after cooling of the Salihli granitoids at 12.2 Ma as defined in previous geochronologic work. But core-complex related magmatism was continuous in the Cycladic metamorphic core complex during Late Miocene and was followed by an active arc volcanism in the southern Aegean. Such abrupt change in the geodynamic setting of western Turkey can be explained by opening of a slab window on the Aegean lithosphere slab, which would lead to upwelling of fertile subslab asthenospheric mantle, forming transitional and finally OIB-type basalts.

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