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Constraining timing of metamorphism and ductile deformation in the Guacha Corral shear zone using U-Pb and Ar-Ar geochronology (Sierra de Comechingones, Argentina)

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Constraining timing and duration of metamorphic and deformation events is important for understanding of the evolution of mountain belts. This contribution discusses the Guacha Corral shear zone (GCSZ) – a major orogenic front located in the Eastern Sierras Pampeanas of Central Argentina. Currently, the GCSZ is still lacking reliable age constraints. We present combined mineralogical and isotope data from this shear zone, in order to address this issue. The hanging wall, predominantly consisting of granulite facies migmatites, is thrust over the lower grade footwall, mainly represented by amphibolite facies gneisses. REE chemistry of the pre-, early syn-kinematic garnet in the hanging wall suggests that crystallisation of garnet cores occurred on the prograde path in the absence of zircon and monazite. Garnet rims record simultaneous growth with both of these accessory phases. Two hanging wall migmatite samples were subjected to U-Pb dating. Eighteen SHRIMP analyses of recrystallized zircon rims and cores from the deepest western segment of the hanging wall yielded concordant age of 517 $\pm$ 4 Ma. This age is supported by ten concordant monazite analyses from the same sample yielding 523 $\pm$ 2 Ma. In the structurally shallowest, eastern portion of the hanging wall, one out of nine zircon analyses yielded age 522 $\pm$ 6 Ma while the remainder gave a spread of inherited ages ranging from 600 to 2600 Ma. Ten monazite analyses yielded the concordant age of 520 $\pm$ 5 Ma and complement the single zircon age. Based on these analyses the peak metamorphism in the Sierras de Comechingones is dated at 524 $\pm$ 3 Ma. This metamorphic event is thought to be related to the collision of the Pampean terrane with South-Western Gondwana during the Early Cambrian Pampean Orogeny. U-Pb studies will be complemented with zircon and monazite isotope ages from the footwall gneisses. Furthermore, we will acquire Ar-Ar ages for three biotite-muscovite pairs and a single amphibole specimen from mylonitic rocks from different locations throughout shear zone. Combined this is expected to provide a detailed cooling profile for the GCSZ and help constrain the duration of ductile deformation.