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Indirect dating of deformation: a geochronological study from the Pan African Ajaj shear zone, Saudi Arabia.

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The metamorphic complexes of the Arabian-Nubian Shield were exhumed by different exhumation mechanisms (i.e. in extension or oblique transpression regime) during the Pan African activity of Najd Fault System - the largest pre-Mesozoic shear zone on Earth. The different exhumation mechanisms could be the consequence of (i) orientation of the complexes at slightly different angles with respect to the overall orientation of the principal stresses of the Najd Fault System, (ii) exhumation from different depths, or (iii) change of the stress regime through time. In order to test the third hypothesis, geochronological work will be applied on a representative suite of complexes across the Najd Fault System. In particular we focus on three complexes in the Arabian part of the shield named Qazaz, Hamadat and Wajh. In general, the metamorphic complexes of the Arabian part of the shield exhibit left-lateral transcurrent tectonism along the NW-SE Najd faults and right-lateral movement along conjugate NE-SW striking structures. The whole unit forms an anastomosing network of planar structures that demarcate large fish-shaped bodies of high grade metamorphics. The Hamadat complex is surrounded by a left-lateral greenshist facies WNW-ESE Ajaj shear zone. The complex consists of folds that are strongly pinched to the north and more open to the south marked by a well-developed parallel stretching sub-horizontal lineation. Granite intrusions along and across the Ajaj shear zone may allow testing the timing of the deformation. Deformed and non-deformed samples of these granites will be examined by age dating to determine the absolute timing of the metamorphism and the deformation for the complex. Some 20 samples are currently being prepared for zircon dating. Whilst no results are available at the time of writing of this abstract, they will be presented at EGU 2013.