Structural mapping adjacent to the 'Woman-in-White amphibolite' in the Olary Domain, South Australia.

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ABSTRACT

A structural study of Palaeoproterozoic Willyama Supergroup rocks to the southeast of Old Boolcoomata approximately 20 kilometres north of Olary, South Australia, discloses a complex history of deformation. This includes an axial planar S_1 schistosity and several intersecting locally developed subsequent planar fabrics. The main findings support previous unpublished company studies. Structural maps were produced at various scales in areas surrounding the 'Woman-in-White' amphibolite and all available observations were used to form a chronology of events and tectonic model for the geometric and kinematic evolution of the area.

In a domain east of the 'Woman-in-White' amphibolite the S_1 is parallel to the axial plane of a major isoclinal synform closing to the east. S_2 is axial planar to tight to open class 2 and class 1c F_2 folds that trend generally north to northeast. Regionally, and particularly in the vicinity of the 'Woman-in-White' amphibolite, a third deformation is very intensely developed generating two fabrics. The S_3 schistosity is the axial planar fabric to tight to isoclinal F_3 folds trending consistently east-west. The S_3 fabric is also expressed as a crenulation of the S_1 regional schistosity. These pre-Adelaidean structural elements are recognised as comprising the Olarian Deformation.

Fold interference is present on all scales. Olarian deformation events two and three have given the flat lying western limb of the principal F_1 synform a luniform, dome and basin morphology. Type 2 and type 3 interference patterns are the most common in the area mapped. The occurrence of the two interference patterns is due to the variable angle between OD_2 and OD_3 compressions, which is commonly approximately 40° in the west-southwest part of the mapped area.

This work conforms closely in complexity to previous regional studies and has been supplemented by other new investigations of an important northeast-southwest trending shear zone corresponding to OD_3, lying further to the north, and a geochemical investigation of the 'Woman-in-White' amphibolite indicating its probable mantle origin and possible emplacement before all deformations occurred.

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