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Tectonic evolution of the Neoproterozoic in the western Jabal Akhdar Dome, northern Central Oman Mountains

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The present work aims to improve the understanding of Pre-Permian tectonic events that affected the Neoproterozoic rocks of the western part of the Jabal Akhdar Dome (central Oman Mountains). The Pre-Permian rocks belong to the Arabian platform sedimentary sequence with an age ranging from the Cyrogenian to the earliest Cambrian. The sequence is made up of five formations. From bottom to top these are the Mistal-, Hajir-, Muaydin-, Kharus- and Fara formations. The Neoproterozoic formations are truncated at an angular unconformity. Rocks above this unconformity consist of a sedimentary sequence ranging from Permian to Cretaceous in age. The younger sequence is only brittlely deformed and non-folded which differs in style and intensity of deformation of the refolded Neoproterozoic rocks. We could differentiate two Paleozoic compressional events (post-Fara Fm. and pre-Permian unconformity) in the western sector of the Jabal Akhdar Dome (Wadi Bani Awf and Wadi Sathan), applying remote sensing data interpretation, local- to regional-scale structural analyses and tectonic reconstructions. The evidence for the older Paleozoic deformation (D1) has been identified within the black fetid limestone of the Hajir Formation. These rocks are intensely deformed, preserved in inclined tight to close cylindrical folds (F1). The folds' amplitudes range from 5-50m, with a short overturned limb, sub-horizontal to gently inclined plunging fold axes and moderately inclined axial surfaces. The vergences of the F1 folds are systematically variable, overprinted by the D2 event. This younger event has refolded the F1 fold axes by open to close folds (F2) with amplitudes between 1 to 3km and wavelengths of 3 to 5km. The F2 folds are reclined with fold axes plunging to the ENE with about 50° at the northern side of the Jabal Akhdar Dome and fold axes plunging to the SW with about 30° at the southern side of the Jabal Akhdar Dome. The axial planes of the F2 folds are sub-vertically to steeply inclined, dipping to the NNW. The F2 folds have been recognized by, e.g., Beurrier et al. (1986) and Mann and Hanna (1990). The folding style changes from the western part of the Jabal Akhdar Dome to the eastern sector. Towards the east, the folds' amplitudes and wavelengths are reduced. In the eastern Jabal Akhdar Dome, only minor (D2) folding can be observed, while in the western Saih Hatat Dome no F2 folds are recorded.