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**Glaciers and grabens: the origin of palaeovalleys in the Tamadjert Formation
(Unit IV) of the Algerian Sahara**

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The Tamadjert Formation, known as Unit IV in the subsurface, is the principal Ordovician reservoir horizon in many parts of the Algerian Sahara, especially the Illizi Basin. During the course of a major project carried out by both Robertson Research International Ltd. and Sonatrach Division Exploration this Formation has been extensively studied across all Algerian basins utilising a database of more than 140 wells, 6,500metres of core, 19,000km of 2D seismic, aerial photographs, satellite imagery and data gathered during field trips to both the Tassili N’Ajers and Tassili Ahnet.

Capping the Cambro-Ordovician succession in most wells, the Tamadjert Formation is composed of six major horizons (Units IV-0a, IV-0b, IV-1, IV-2, IV-3 and IV-4) based on those originally identified in the Illizi Basin. In the current paper we consider the large-scale characteristics of this Formation, effectively the marked lateral variations in thickness (2-396m, av.119m) and facies, which contrast markedly with the ‘layer-cake’ aspect typical of the underlying succession. The more extreme examples of such variation are typically termed palaeovalleys reflecting their assumed origin as purely erosional features (tunnel valleys) related to the end-Ordovician glaciation. Whilst there is undoubtedly a significant erosional component it is a key observation that active structural controls were also of major significance as illustrated by the identification in outcrop and seismic data of faulted margins to half-graben structures associated with a suite of micro- to macrostructural features. A continuum of features is observed, ranging from deep (up to 400m), narrow (up to 2km) half-grabens through shallow, wider half-grabens (100-150m thick and up to 10 or 20km width) to seismically ‘flat’ zones. It is assumed that a tectonic event during the Lower Ashgill (Pusgillian), perhaps related to uplift of the Hoggar Massif resulted in areas of transtension along the major lineaments and the formation of depressions subsequently deepened by ice and/or pro-glacial outflow channels.