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Fluvial incised networks on top of late Ordovician interglacial valley buried hills as the result of post glacial isostatic rebound; 3D seismic input

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It is classically assume that prior to deep glacial valleys incision below large scale ice cap, often interpreted as the results of ice flow melting during tidewater period, the initial glacial topography was flat or very low angle and created during a major phase of cold glaciers advance as suggested by quaternary studies. Therefore up to now we have assume that the top of late Ordovician buried hills separating major glacial valleys was the remains of this flat surface truncating the pre-glacial Ordovician Hawaz series, later on flooded by the Lower Silurian. Surprisingly by reinterpreting 3D seismic cubes using spectral decomposition technics on the Murzuk basin in SE Libya, it appears that the top of buried hills are not at all characterized by a flat erosional surface, but it is strongly irregular and shows the development of narrow valley networks displaying the classical dendritic erosional pattern diagnostic of fluvial erosion. These small valleys are organized into a tributary network and don't flow toward the ice margin, i.e. toward the N-NW but most of the time flow at right angle toward the adjacent main glacial valleys which are pointing toward the NW. These narrow valley networks in this context could be either glacial tunnel valleys located at the periphery of the ice cap in close relationships with glacial fronts (their common settings) or could correspond to fluvial valleys developed later on, in a subaerial setting at some distance from glacial fronts; we retain this second interpretation because in addition to the geomorphic features: (1) they flow parallel to the fronts that we have already recognized, Moreau et al. (2005), Rubino et al. 2007 and (2) they are suspended in the sense that these lateral networks do not reach the bottom of the main glacial valley but, they appear to be connected within the upper part of the glacial infill, immediately below the early Silurian post glacial flooding characterized by the well-known Rhuddanian hot shales. As a result, the incision of the valley network appears quite late in the ice cap melting history. It is why we tend to interpret these valleys erosion as the result of post glacial melting during ice retreat at some distance from the ice front and strongly enhanced by isostatic rebound. Some possible modern analogs of such valley fringing highs may exist in Artic Canadian islands.