



Adaption of drainage and depositional systems to tectonic and climate forcing – New insights from terrestrial cosmogenic nuclide exposure dating in the hyperarid core of the Atacama Desert

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The timing and driver of the onset of (hyper)- aridity in the Atacama Desert is still controversial. Cosmogenic nuclides, from the hyperarid core (Coastal Cordillera between 21- 19°S) indicate a Miocene age of aridity. The aridity and consequent low erosion rates result in the preservation of depositional surfaces (e.g. alluvial fans) and erosive fluvial features (e.g. inactive channels) that can be used as paleoclimate archives. Despite the long-term arid to hyperarid climate, wetter periods are recorded by fluvial features and sediment deposition of alluvial fans which can be dated with cosmogenic nuclides. The occurrence of meander systems (~5km long) in the surrounding of the Huara batholith, are a clear indication that higher local run-off created by higher precipitation in small catchments led to the formation those fluvial systems/features. This study provides new ages for pluvial episodes in the Atacama Desert, including new insights about the interplay between climate and tectonic activity, creating and preserving these landscape features.