TEMA L2-1 Dynamic of sediments production, storage and transport in the Atacama Desert sediment-routing system: Insight from cosmogenic nuclides concentration and numerical modeling

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The concentration of Terrestrial Cosmogenic Nuclides (TCN) depends of the time exposure of surface to cosmic radiation and the age of these surfaces (Lal, 1991). So, usually the TCN concentration in sediments are used to calculate erosion rates in watersheds and exposure age of surface (Carretier et al., 2007). The first use is widely developed since the works of Brown et al. (1995), Granger et al. (1996) and Bierman and Steig (1996) to know the erosive history of the landscape involved on catchment. The TCN concentration in sediments has been used to calculate the erosion rates at scale of thousands of years and know its distribution along the Andes (e.g. Carretier et al., 2013, 2015; 2018; Val et al., 2018). Usually accumulation of nuclides during its transport is considered negligible because time of exposition during its transfer is short related to long-lived exposition in the bedrock surface. Nevertheless, in arid environments the path of sediments from bedrock to evacuation from the catchment is complicated as sediments are stored as regolith and colluvial mantled and during this epoch there is likely production of additional cosmogenic nuclides (e.g., Clapp et al., 2000, 2001, 2002; Nichols et al., 2002, 2005a, 2005b). So, variation of TCN concentration can be used to track sediments-routing as they flux through an arid landscape and measure the erosion in different geomorphic elements of the valleys. Thus, exploring the TCN concentrations and measurement erosion from 100 samples in Pan de Azucar creek (25), Salado River (25), Copiapo River (25) and Huasco River (25) Valleys will help measure erosion and understand the sediment routing on the Atacama Desert. The results the TCN concentration will be tested with theoretical models that explain the variability of concentration considering different processes within the history of exposure to cosmic radiation of alluvial sediment (eg. Carretier et al., 2007; 2009; Yanites et al., 2009; Regard, 2012).

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