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The assessment of erosive potential: Application to the northern Rif (Morocco)

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In the current context of climate change, the Mediterranean regions are expected to go through longer dry periods in late Summer and intensified torrential rains in Fall, especially in mountainous areas, causing an exacerbation of geomorphic processes that could be damaging to human installations. We try to assess and discuss this hypothesis in Northern Morocco, in the Rif Mountains where erosion risk is potentially high.

The study area is located along the Gibraltar Strait, about 35km east of Tangier. It was chosen for two reasons: it encompasses a zone where geological formations (mainly flyschs) are prone to landsliding, and where the climate is particularly aggressive. We selected three watersheds in which soil and anthropogenic parameters differ from each other. Two of them remain mostly rural, whereas the third one, the river R'mel watershed, is currently experiencing significant transformations in its land use. More specifically, the "Tangier Med" harbor inaugurated in 2007, considered as the biggest port in Africa, lies at the outlet of the watershed where a dam was erected, in order to supply water drinking and protect the new industrial complex against flooding. Alongside this project, roads and railways strengthening is underway.

One objective of this study is to assess the relevance of different methods of quantification and mapping of potential erosion from the data available. "Erosive potential" is defined as the qualitative and / or quantitative volume of sediment that one given zone could release in the event of heavy rain or flooding. The information includes a set of climate, topographical, geological, hydrological, soil and anthropogenic data coupled with multitemporal aerial photographs (1958, 1988 and 2009), integrated in a Geographic Information System (GIS). One of the methods used (Abaoui et al., 2005) is the mapping of the erosive potential of five classes, obtained by the sum of indices assigned to three thematic layers (friable substratum, degree of slope and vegetation density) multiplied by the percentage contribution of each factor.

We present the first results of this method applied to the three watersheds, including the different layers of GIS, and eventually discuss the relevance of the indices we used.