



Fluvial dynamics of the lower Guadalete River in W-Andalucía (Spain) and decisive driving forces

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This study aims to work out a solid stratigraphy for the Guadalete River in W-Andalucía with focus on late Pleistocene and Holocene fluvial dynamics. We studied 14 profile exposures and 13 percussion drillings by using geomorphologic, sedimentologic and pedogenetic approaches. Supported by ample physical and chemical soil analyses and dating of 34 radiocarbon samples, we were able to reconstruct floodplain development over the last 14 ka.

The valley of the lower Guadalete River shows a fluvial architecture that is complex and inconsistent along specific river sections. According to stratigraphic findings, the lower reach of the Guadalete River can be divided into two sedimentary areas. These are characterized by a highly dynamic alternation of sedimentation and erosion, with Holocene terrace formation in the upper downstream section and more calm conditions with sediment preservation and the built-up of continuous sequences in the lower one. Stratigraphic records in combination with a disturbed longitudinal profile revealed that fluvial dynamics responded to various driving forces in late Pleistocene and Holocene times. Sea-level changes have been a determining factor on river dynamics, notably during the late Pleistocene and until the early Holocene, when phases of sea-level fall resulted in strong river incision and clearing-out of floodplain sediments. In the course of a rapid sea-level rise until the early to mid-Holocene, other parameters started to play a determining role, as fluvial dynamics became more and more the expression of environmental conditions in terms of stability and instability of the landscape. As the study area has to be characterized as tectonically very active, the magnitude of fluvial processes, such as river incision was furthermore influenced by small-scale tectonic uplift or subsidence.

Periods of floodplain sedimentation (before 9.2, after 8.0, at 4.6 to 4.3, at 2.0, 0.9 and 0.4 ka cal BP) are reflective for unstable landscape conditions, often related to aridification. For a comprehensive consideration of triggers of floodplain sedimentation, we have likewise to take human behavior into account. It is not possible, however, to clearly differentiate between the impact of climate and humans on geomorphologic activity, but it seems reasonable that anthropogenic exploitation and cultivation activities contributed to raise the environmental pressure exerted by increased aridity.