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Incision and deformation of Quaternary fluvial terraces on the exposed Makran Accretionary Wedge in SE Iran

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The well-preserved sequences of marine and fluvial terraces found along the coastal and onshore Makran Accretionary Wedge are the geomorphic expression of surface uplift. These terraces provide an excellent opportunity to study their genesis with respect to the tectonic and climatic driving forces that contribute to the feedback between surface processes and the growth of an accretionary wedge. We focused on the previously poorly described Quaternary sequences and fluvial terraces to extract possible tectonic and climatic signals. For this purpose, we are correlating river terraces between catchments and between different segments of the same river to document the distribution of deformation – uplift on the wedge in recent times. We investigated four main catchments in the Iranian Makran, where several terraces are preserved. Four terrace levels can be traced from field survey and detailed mapping. Out of these four levels, two are regionally preeminent. The preliminary 10Be ages provides a large variety of abandonment ages of the strath of these terraces. They are in the range of 220ka and 17ka with an increase eastward. The results illustrate a strong correlation of terraces in the western catchments compared with the eastern ones, where they apparently experienced less tectonic influence. Based on 10Be exposure ages the abandonment of the two preeminent terraces are ca. 90ka and 21ka in the western part of the study area, whereas the abandonments ages for the eastern part vary between 218ka and 28ka and make the regional correlation difficult. We are performing further 10Be analysis with the goal of clarifying the latter terrace ages. These ages imply a uniform, average fluvial incision rate of 0.5 mm/yr throughout Pleistocene times. There is a marked change in incision rates (0.9mm/y) where the rivers cut across a regional streak of folds. We suggest that this alignment of folds played a key role in folding and tilting the oldest terraces. These preliminary results differ from previous work on marine terraces, which documented 0 to 0.2mm/yr uplift rate in Pleistocene times along the coastal Makran. The temporal difference of terrace abandonments between eastern and western catchments suggests the idea that the wedge experienced different deposition, incision and tectonic histories during the Pleistocene.