Geophysical Research Abstracts
Vol. 20, EGU2018-16045, 2018
EGU General Assembly 2018

Transient landscape evolution induced by drainage network integration in the actively extending central Italian Apennines

Anneleen H. Geurts (1), Patience A. Cowie (1), Guillaume Duclaux (2), Robert L. Gawthorpe (1), and Ritske S. Huismans (1)

(1) Bergen University, Bergen, Norway, (2) Université Côte d'Azur, CNRS, OCA, IRD, Géoazur, 06560 Valbonne, France

Modifications to the river network over time have been documented in many regional-scale studies of extensional continental systems. An often-observed trend is the progressive integration of previously isolated drainage basins to one another, a phenomenon that we call drainage integration. Previous modelling work by the authors has shown that drainage network integration is an autogenic process that forms the background to other transient responses related to allogenic forcing, e.g. fault slip rate variations or climate. We consider drainage integration to be of key importance in transient landscape studies in particular for continental extensional systems. From modelling we know that modifications to the fluvial connectivity between basins generate abrupt and complex shifts in sediment dispersal patterns, suggesting its major importance for studying feedbacks between surface processes and tectonics as well as for interpreting the basin stratigraphy. However, our understanding of the way drainage integration impacts landscape evolution and how it is recorded by the geomorphology, particularly drainage networks, is limited. Here we use the seismically active central Italian Apennines, where good constraints exist on fault slip histories, regional uplift and basin stratigraphy, to address this issue. We combine previously published field observations with new geomorphic observations (longitudinal river profiles, fluvial terraces, abandoned river valleys and windgaps) and with new insights from our numerical modelling of this area. Our study reveals that on the regional scale, transient river profiles in this area (e.g., convex reaches) may be a product of both drainage integration events and fault slip rate variations.