Geophysical Research Abstracts
Vol. 19, EGU2017-1938, 2017
EGU General Assembly 2017

Thrust belt advance versus sediment-flux steering - Late Pleistocene river migrations in the southern Caucasus

Hans von Suchodoletz (1), Andreas Gärtner (2), Silvan Hoth (3), Josefine Umlauft (4), Lasha Sukhishvili (5), and Dominik Faust (6)

(1) Leipzig University, Institute of Geography, Leipzig, Germany (hans.von.suchodoletz@uni-leipzig.de), (2) Senckenberg Naturhistorische Sammlungen Dresden, Museum für Mineralogie und Geologie, Sektion Geochronologie, Dresden, Germany, (3) Stavanger, Norway, (4) Institute of Geology and Geophysics, University of Leipzig, Leipzig, Germany, (5) Institute of Earth Sciences, Ilia State University, Tbilisi, Georgia, (6) Institute of Geography, University of Technology Dresden, Dresden, Germany

One response of rivers toward allogenic controls is large-scale river channel migration in the form of avulsions or progressive lateral migrations (combing) that are widespread phenomena around the world during the late Quaternary. Sediment-flux steering, i.e. a lateral shift of rivers against a tectonically driven subsidence trend promoted by transverse sediment discharge exerts such control. Evidence for this mechanism to operate stems from numerous field and experimental studies in extensional settings, characterized by commonly small-sized transverse catchments compared with that of the main river and/or volcaniclastic sedimentation.
For the first time, this study investigates sediment-flux steering in a contractional tectonic setting with relatively large-sized transverse catchments compared with that of the main river. Geomorphologic, geochronologic, and heavy mineral provenance analyses were complemented with tectonomorphometric data to investigate late Quaternary channel migrations of the Kura River in the southern foreland basin of the Greater Caucasus. Large-scale migrations of the course of the Kura River during the late Quaternary reflect the interplay between a continuing southwestward advance of the Kura Fold-and-Thrust-Belt, leading to uplift in the NE and by climatically-triggered sediment-flux steering caused by aggradation phases of transverse rivers with comparatively large catchment areas in the Lesser Caucasus. During generally warmer periods such as the Holocene with fluvial incision and low sediment supply from the transverse rivers, the main Kura River could follow its tectonically driven trend toward the southwest. In contrast, during generally colder periods such as the upper late Pleistocene, sediment-flux steering caused by aggradation of the transverse rivers forced the main Kura River to migrate >10 km against that tectonically induced trend toward the northeast.
Generally, besides improving our understanding of the coupling between tectonics and surface processes in contractional tectonic settings this study provides information about the cause of a permanent threat to settlements and the loss of fertile agricultural land in the intensively labored Marneuli Depression in southeastern Georgia.