Geophysical Research Abstracts
Vol. 12, EGU2010-8614, 2010
EGU General Assembly 2010

Reconstruction of the sediment transport conditions in the Quaternary Ürümqi alluvial system (northeast Tian Shan, China)

Laure Guérit (1), Laurie Barrier (1), François Métivier (1), Clément Narteau (1), Éric Lajeunesse (1), Youcun Liu (2), and Beicheng Ye (2)

(1) Université de Paris 7 - Institut de Physique du Globe de Paris, 4 place Jussieu, 75252 Paris cedex 05, FRANCE, (2) Cold and Arid Regions Environmental and Engineering Research Institut - Chinese Academy of Sciences, 320 Donggang West Road, 730000 Lanzhou, P.R. CHINA

Over the last twenty years, sediment transport by rivers and erosion dynamics have been the focus of a huge research effort. However, the morphological makers of erosion are often scarce, fragmented and they correspond to a very discontinuous record. At the outlet of drainage basins submitted to erosion, sedimentary series often constitute more frequent, perennial and continuous archives in space and through time for the evolution of reliefs upstream. Thus, some studies have used volumes of these deposits to roughly reconstruct this evolution. Yet, beyond their volume, the alluvial sediments also contain information about physical parameters of palaeorivers that have deposited them. That is why we decided to couple a physical analysis of water flow, erosion and transport in an active river with a faciological analysis of its present and past deposits to reconstruct some of its palaeohydraulic characteristics. As an example, we chose the northeastern foothills of the Tian Shan range where the Ürümqi braided and gravel-bed river is inset in its own Quaternary deposits. Hence, in this area, it is possible to observe and compare the present and ancient sediments of a single alluvial system. First, we gathered an extensive dataset on hydraulics and transport dynamics of the present river, as well as on grain size and structure of its deposits. These depositional features were characterized at the river-bed surface, but also in depth by the means of a trench. From the measurements performed, we built a facies model fully quantified, in term of grain and structure sizes of the present sediments, and calibrated regarding the relationships between deposition, transport and water flow. Additionally, we documented also the grain size and structure of the ancient Ürümqi deposits by describing the sediments of the Quaternary alluvial fan and terraces of the river. Eventually, the facies model calibrated in term of transport law and the data collected for the old deposits would be associated to reconstruct evolution curves of variables such as flow velocity or bed load during the study period (from – 250 to 0 kyr approximately). In this way, we hope to set the basis of palaeohydraulic reconstructions of the ancient Ürümqi river, which will bring precious information about the long-term sediment transport and erosion dynamics in the study area.