

Multiscalar geomorphological mapping of the Kurdistan Region of Iraq: insights on Late Quaternary dynamics and evolution of archaeological landscapes

Pezzotta A.^{1*} & Forti L.^{1,2}

¹ Dipartimento di Scienze della Terra “A. Desio”, Università degli studi di Milano, Milano, Italy.

² Istituto di Geoscienze e Georisorse, CNR, Pisa, Italy.

Corresponding author e-mail: andrea.pezzotta1@studenti.unimi.it

Keywords: arid zone geomorphology, fluvial network, geoarchaeology, Late Quaternary, landscape evolution.

We present a multiscalar approach for geomorphological and Quaternary geology mapping of the Kurdistan Region of Iraq (KRI) aimed at understanding the Late Quaternary evolution of surface processes and their interaction with human agency. In the region, the interplay between tectonic activity of convergence between Arabian and Eurasian Plates and Quaternary climate influenced the evolution of landforms and the rate of geomorphological processes. We performed our mapping using data derived from the combination of remote sensing (recent and historical satellite imagery) and field surveys. At the more general scale, we performed the geomorphological mapping of the NW range of the Zagros, between Tigris and Great Zab Rivers (Forti et al, 2021), and we draw the geomorphological map of the Erbil Plain between Great Zab and Small Zab Rivers. At the meso-scale, we reconstructed the fluvial pattern of the part of the Tigris River that today is submerged under the Mosul Dam Lake. Finally, at the scale of detail we analyzed the evolution and preservation of the archaeological landscape between Tell Helawa and Tell Aliawa (Southern Erbil Plain).

Regional geomorphological mapping highlights that weathering, erosional and depositional processes in the mountain and flat areas are strongly connected to the interplay between neotectonics, litho-structural characteristics of the local bedrock, and Quaternary climatic fluctuations. At the mesoscale, the analyses of declassified CORONA imagery acquired in the 1960ies of the area of the Mosul Lake permitted to reconstruct the pristine pattern of the Tigris River and the seasonal variations of its riverbed and related landforms. At the scale of detail, geomorphological mapping, supported by field observations and remote sensing, of the area between Tell Helawa and Tell Aliawa permitted us to outline the environmental context of the two archaeological sites. The area is characterized by the interplay between large (paleo-)channels whose riverbeds are incised by extant wadis, distal bajada sedimentation from the Khurmala Anticline, and human exploitation of the channel network. Moreover, a more detailed geomorphological and geoarchaeological mapping of the two sites helped to understand how current geomorphological processes influence the preservation of the archaeological record. The correlation between natural and anthropogenic processes is evident looking at the building up and continuous reshaping of a complex landscape.

Forti L., Perego A., Brandolini F., Mariani G.S., Zebari M., Nicoll K., Regattieri E., Conati Barbaro C., Morandi Bonacossi D., Qasim H. A., Cremaschi M. and Zerboni A. (2021) - Geomorphology of the northwestern Kurdistan Region of Iraq: landscapes of the Zagros Mountains drained by the Tigris and Great Zab Rivers. *Journal of Maps*, <https://doi.org/10.1080/17445647.2021.1906339>.