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ABSTRACT BOOK

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COVER IMAGE:

Aerial cityscape image of Turin during sunset.

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S3.

Geosciences for Cultural Heritage

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Geomorphological tools to assess the preservation of the archaeological record of tell-sites in the Kurdistan Region of Iraq

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Keywords: RUSLE model, geoarchaeology, Near East.

Geomorphology offers fresh tools for mapping landforms that are continually modelled by erosional and depositional processes; the same tools can be applied to archaeological contexts. In arid and semi-arid regions, such as the Kurdistan Region of Iraq, the preservation of the archaeological record is mined by ongoing climate changes and human overgrazing. In our work, we present a multiscalar geomorphological surveys of both the landscape around the archaeological sites of Tell Helawa and Tell Aliawa (SW of Erbil) and detail geomorphological mapping of erosional processes acting on the two archaeological settlements. Remote sensing and field survey highlights that at the scale of single tell sites – meaning archaeological mounds – ongoing erosional processes acting along slopes are threatening the preservation of the archaeological record. For the first time, we applied the RUSLE model for soil loss to tells. Data derived from UAV imagery of each tell and their programmatic elaboration highlight that the erosional risk is maximum where the slope gradient is moderately steep, the incision depth of gullies is higher, and grazing (cultivation and herding) intense. Our results suggest that the RUSLE model and other geomorphological tools allow assessing the erosional rate along anthropogenic mound thus estimating the risk of losing the archaeological record. Our approach allows to estimate the amount of soils/sediments loss and propose mitigation strategies to prevent the loss of the archaeological record.

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Reconstructing landforms and surface processes from declassified intelligence satellite imagery

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Keywords: declassified intelligence satellite imagery, fluvial geomorphology, seasonality.

Historical declassified intelligence satellite imagery (e.g., CORONA and Hexagon) are used in archaeology to assess the distribution and preservation of archaeological site in many parts of the Old World, and especially in arid lands, where the poor plant cover does not hamper the opportunities offered by earth observation tools. The same approach can be applied to geomorphology to reconstruct the evolution of surface processes and landforms in areas where recent urbanization had obscured natural features. In this contribution, we illustrate a first application of this approach to reconstruct the riverscape of the Tigris River in northern Iraq. The Mosul Dam reservoir in the Kurdistan Region of Iraq was built along the Tigris River between 1981 and 1988, submerging the course of the Tigris River for ca 100 km. Geomorphological mapping based of historical images derived from declassified Corona satellite imagery acquired between December 1967 and August 1968 reveals the pristine pattern of the Tigris River. Different spy images are snapshots of the seasonal changes of the Tigris riverbed, shifting from meandering to anabranching across the hydrological year, and illustrate the dynamic fluvial landforms such as the floodplain and point, middle, and longitudinal bars. Our approach underlines the relevance of historical declassified intelligence satellite imagery to reconstruct the ancient fluvial landscape below the Mosul Dam Lake and correlate it with litho-structural factors. We demonstrate the importance of historical aerial/satellite imagery in interpreting past natural geomorphic processes and landforms that suffered altering by human agency.

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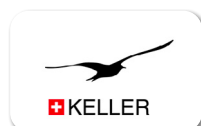
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