



BOOK OF ABSTRACTS

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ROLE OF LITHOLOGICAL PROPERTIES ON DEVELOPMENT OF BADLANDS IN ARID REGIONS

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By definition, badlands are poor agricultural landscapes that can develop in a range of low-permeable but normally erodible materials and can occur in a variety of climatic conditions characterized by high erosion rates and sparse vegetation. The research questions concerning lithological controls on badland development has received attention; however no clear trends and especially the link between the properties and processes have still not been established. The effects of climate on material behavior cause variability of erosional responses in badland areas indicating that they cannot be treated as simple landscapes with immediate reactions to climate change. In badland areas where two or more different lithologies are present, erosion rates, slope properties and processes are often different on different lithologies. Some of the main features of the lithological characteristics leading to the development of badlands are soil dispersivity and the changes in dispersivity along hillslopes. Physical weathering as a necessary process for badland development on most rocks was studied both at the field and laboratory scales for wetting–drying cycles. In arid badlands, with annual precipitation below 200 mm, vegetation has no relevant role and the processes are governed by climate properties. Lithological properties that should be considered are particle size, sorting, clay mineralogy and porosity.

In this study we compared materials from less investigated badland sites in Turkey and China. Critical composition in badland material is the presence and ratio of the clay and silt size particles, clay mineralogy and presence of mobile ions, especially anions. In analyzed materials the presence of smectite governed the formation of surface crust. Surface cracks enabled ion leaching and became preferential paths from sediment movement. Critical composition in badland material is the presence and ratio of the clay and silt size particles and poor sorting. Sulphate and carbonate ions proved to be crucial for surface processes on these materials. Summarizing results it can be concluded that erodibility of badland lithologies is a combination of clay type, silt content and ion concentration.