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ANALYSIS OF SPATIO-TEMPORAL DYNAMICS OF AEOLIAN PROCESSES IN ARID AND SEMI-ARID AREAS USING REMOTE SENSING

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The interaction of wind and water over time is arguably the key influence upon the contemporary geomorphology and longer-term landscape development of arid regions of the world. Aeolian processes in arid and semi-arid areas need constant monitoring, as they often translate into sand encroachment, a common form of land degradation. The monitoring of aeolian geomorphic units is rendered through repeated and objective mapping in order to detect change. For this purpose we employed Landsat historical and present imagery data (from 1984 to 2014) in a hybrid-automated classification method involving visual interpretation and a customised classification scheme, proposed for this particular study. The entire analysis is supported by thorough ground truth data, including spectral field measurements of sand accumulations and psamophyte vegetation, using a full-range Vis/NIR field spectroradiometer and 30 m resolution digital elevation data of Shuttle Radar Topography Mission (SRTM, freely available from US Geological Survey web tools). The final objective is to argue driving forces, anthropic vs. natural, source areas and to understand the trend metrics of this desertification process. In the Oum Zessar study area, in Tunisia, the overall results show that there was substantial change in several landscape components in the last decades, related to increased anthropic pressure and settlement, agricultural policies and national development strategies. One of the concerning aspects is the increase of sand units coverage over the last three decades by 21%. This study is part of the WADIS-MAR Demonstration Project, funded by the European Commission through the Sustainable Water Integrated Management (SWIM) Programme (www.wadismar.eu).

