

## **Integrative Approaches to Mitigate Soil Erosion in the High Atlas: A GIS-Based Morphostratigraphic Model for Iguerferouane Watershed Management and Hydraulic Risk Mapping**

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**Abstract** – Soil erosion in the High Atlas region is a significant issue, resulting in the degradation of fertile land and subsequently causing a substantial accumulation of solid material in waterways. This can have detrimental consequences during floods and substantially contribute to the sedimentation of dams. Addressing these harms has led to a prioritization of watershed management. The Iguerferouane basin contains diverse geological formations that create favorable conditions for erosion, thereby amplifying natural hazards. The utilization of the Geographic Information System (GIS) technique, in combination with sedimentological analysis as well as geological and geomorphological investigations, has facilitated the detection of regions that are extremely prone to water erosion.

The integration of these analyses has resulted in the development of a dynamic model describing the behavior of several particularly hazardous watercourses in the region. The subsequent data were crucial instruments for undertaking the study:

- a) Meteorological stations offering a sequential record of precipitation;
- b) Watersheds encompassed by top-notch digital topography data;
- c) Watersheds with uninterrupted exposure to river deposits and terraces were examined as past analogs of present transport dynamics.

Using the facts at hand, a morphostratigraphic model has been created to predict the behavior of specific watercourses and provide hydraulic risk maps that take into account both present and previous conditions (namely, the end of the Quaternary period)

*Keywords* – Western High Atlas, Basin, Iguerferouane, Natural hazards, Erosion, GIS.