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Plusieurs unités morpho-sédimentaires actuelles ont été distinguées le long de la vallée actuelle. Chaque type de tronçon se caractérise par un assemblage des unités morphosédimentaires du lit et de la plaine d'inondation liées génétiquement par une association de processus-formes et par une capacité naturelle d'ajustement différente aux événements perturbateurs hors site et au débit liquide et solide. La variation de cet assemblage dépend surtout du degré de confinement de la vallée, de l'espace d'accommodation, du style

Mots clés : Hydromorphologie, Système hiérarchisé et emboité, Oued Sebou, Degré de confinement, Contrôles antécédents, Bassin d'avant pays, Saïss oriental, Maroc, Analyse des faciès, Modèle de faciès, cône alluvial, Contrôle tectonique et climatique



Geomorphological and Sedimentological Study of Current and Ancient Alluvium of the Low Fluvial Terraces of the Middle Sebou Near Fez

Abstract : This research focuses on the geomorphological and sedimentological study of current and ancient alluvial deposits in the floodplains and low river terraces of the Middle Sebou, near the city of Fes. The first objective is to understand the hydromorphological functioning, the conditions of sedimentary form morphogenesis, and the antecedents controls on contemporary hydromorphological processes of the Middle Sebou river at different spatiotemporal scales. The second objective focuses on the study of ancient floodplain deposits and low terraces to determine the sedimentary dynamics of their formation, as well as to reconstruct and understand the spatiotemporal evolution of paleoenvironments.

The geomorphological and sedimentological characteristics of the Middle Sebou Valley have been analyzed at various scales within a hierarchical fluvial system. This system comprises five levels of analysis: the watershed, the landscape unit, the valley segment, the reach, and the morphosedimentary unit. The Middle Sebou Valley crosses two distinct landscape units: the tabular plateaus of the Middle Atlas and the hills of the Saïss foreland basin. In these two morphostructural domains, which differ in terms of structural, lithological, and physiographic characteristics, the river valley is first carved into Jurassic carbonate bedrock, and then into the ancient deposits of its fluvial terraces and the Mio-Pliocene sandstone-marl-conglomerate formations of its substrate.

At the valley scale, three homogeneous reaches have been distinguished based on the traversed landscape unit and the valley setting, which includes the degree of confinement, the absence or presence of floodplains, and the fluvial style. In the plateau landscape unit, the upstream reach R1 is confined in deep gorges and exhibits a sinuous style. The Saïss hills landscape unit comprises two reaches: a partially confined middle reach R2, characterized by a sinuous to slightly sinuous pattern with entrenched meanders and a tendency to braid, and a laterally unconfined downstream reach R3, generally exhibiting a meandering style with free meanders of varying dimensions. Along these three reaches the floodplain pockets are respectively absent, discontinuous, and/or continuous. This valley receives inputs from several lateral hydrographic tributaries, with the most important ones being the Lihoudi River upstream and the Fez River downstream.

Several current morphosedimentary units have been distinguished along the present-day valley. Each type of reach is characterized by an assemblage of instream and floodplain morphosedimentary units genetically linked by a process-form association and by a different natural capacity for adjustment to disruptive events outside the site and to liquid and solid discharge. The variation in this assemblage mainly depends on the degree of confinement of the valley, accommodation space, the fluvial style of the river, the presence or absence of confluence zones, and the extent of anthropogenic influence. The geomorphic river diversity and its behavior along the Middle Sebou catchment are shaped by the imprint of geological, climatic, and anthropic memory, which continues to influence contemporary processes.



The facies analysis of the deposits of the floodplain and low terraces of the Middle Sebou Valley through the Saïss Basin has allowed the identification of 21 facies grouped into three associations corresponding to eight architectural elements. The identification of these elements was based on the study of their lateral and vertical profiles. The identified architectural elements include the channel (CH), gravel bars and bedforms (GB), sandy bedforms (SB), downstream accretion (DA), lateral accretion (LA), sediment gravity flows (SG), natural levee (LV), floodplain (FF), and abandoned channels and meanders (FF (CH)). The alluvial deposits are organized into rhythmic and fining-up elementary sequences, reflecting their deposition in different fluvial environments: alluvial fan, straight to weakly sinuous and braided fluvial style, and meandering fluvial style. The deposits of the alluvial sediments are controlled by lithology, climate, and tectonics. Lithology and tectonics have controlled the slope, degree of valley confinement, accommodation space, and development of alluvial fans.

Climate has controlled the flow regime, sediment dynamics, and the formation of paleosols and calcretes.

Keywords : Hydromorphology, Hierarchical and nested system, Sebou River, Degree of confinement, Antecedent controls, Foreland basin, Eastern Saïss, Morocco, Facies analysis, Facies model, Alluvial fan, Tectonic and climatic controls.