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The depositional environments of the Muti Formation (Upper Cretaceous), a key to understand the obduction in the Oman Mountains

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During the Upper Cretaceous, the obduction of the Semail ophiolitic complex led to thrusting of the deep-marine sedimentary series previously deposited on the external margin (Hawasina nappes) and the ophiolite itself (Semail nappe) on top of the autochthonous units of the Arabian platform (Hajar Supergroup).
Before the thrusting of the allochthonous units, a flexure of the Arabian platform is recorded in the Oman Mountains by (i) an uplift marked by the erosion of the platform deposits, known as the Wasia-Aruma break (Glennie et al. 1974) and (ii) a deepening of the depositional environments and the creation of a slope recorded by the sedimentation of the Muti Formation (in the Oman mountains) and the Fiqa Formation (in the Oman Interior) (Aruma Group). The Turonian to Coniacian / Santonian Muti Formation is composed of (i) a Lower Unit with pelagic shales, carbonated and terrigeneous turbidites, and conglomerates and (ii) an Upper Unit characterized by the development of olistoliths interbedded with shales, carbonates and cherts (Robertson, 1987; Rabu et al. 1990).
On a large scale, the Muti Formation records the transition from a passive margin to a foreland basin (Robertson 1987; Boote et al. 1990; Warburton et al., 1990; Al Lazki et al. 2002). Nevertheless, on a smaller scale, the palaeogeographical evolution during the sedimentation of the Muti Formation is still poorly constrained. In consequence, different models have been proposed (i) for the evolution of the forebulge: migrating to the South (Robertson, 1987; Al-Lazki et al., 2002) or non-migrating (Rabu et al. 1990; Warburton et al., 1990) and (ii) for the area of sedimentation of the Muti Formation with respect to the bulge: South of the bulge (Rabu et al., 1990) or North of the bulge (Robertson et al. 1987).
However, a better knowledge of the evolution of the foredeep basin and adjacent forebulge during the early stages of the nappes emplacement would provide valuable tectono-sedimentary constraints on the geodynamical context of the obduction. For this purpose, a detailed sedimentological and biostratigraphical study of the Muti Formation has been initiated in order (i) to precise the relations between the sedimentation of the Muti Formation and the adjacent forebulge and (ii) to decipher the palaeogeometry of the margin (eventual asymmetry) before the nappes emplacement. Intensive field work and sampling have been performed in order to characterize the palaeoenvironments and to acquire new biostratigraphic constraints on the Muti Formation. We will then present the preliminary results and the future goals of our work.

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