

1 **Deepwater Sediment Facies and Sole Marks of the Numi-**
2 **dian Flysch, Algeria**

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11 **Abstract.** The sedimentology of the Numidian Flysch (Upper Oligo-
12 cene) of the Ouarsenis Mountains, Northwest Algeria, is presented here
13 for the first time. The outcrops of the Forêt des Cèdres section comprise
14 thick and very-thick bedded sandstones as the dominant facies, inter-
15 bedded with more minor mudstones. Five distinct facies have been
16 identified including: (1) massive sandstone, (2) normally-graded sand-
17 stone, (3) parallel-laminated sandstone, (4) siltstone, and (5) mudstone.
18 The range of bedding and facies characteristics observed can be inter-
19 preted as resulting from deepwater gravity flow processes. Many sole
20 marks are present on the bases of the overturned sandstone beds, in-
21 cluding groove casts, flute marks, gutter casts, longitudinal ridge and
22 furrow marks, mud ripples, and frondescent marks. A new type of flute-
23 mark structure is documented here for the first time on the base of me-
24 dium-grained sandstone beds. These features are designated as *curved*
25 *flute marks*. We suggest that they result from flow interaction with an
26 obstacle or irregular relief on the seafloor in the path of a strong turbidi-
27 ty current. Similar features have been generated in laboratory simula-
28 tions by Dzulynski (1965).

29 **Keywords:** Numidian flysch, turbidite, deepwater massive sand, sole struc-
30 tures, curved flute.

31 **1 Introduction**

32 The Numidian Flysch in Algeria is characterised by deep sea turbiditic sandstone and
33 mudstone deposits of Upper Oligocene to Lower Burdigalian age (Durand Delga et
34 Magné, 1958; Mattauer, 1954 in Mattauer, 1958; Raoult, 1974; Bizon et Hoyer, 1979;
35 Lahondère et al, 1979). This study focuses on the sediment facies and their distinctive
36 suite of sole mark structures as observed in the Numidian Flysch of the Ouarsenis
37 Mountains of NW Algeria. The study area is located 7 km northwest of the town of
38 Theniet El Had, and 50 km northeast of Tissemsilt, in the Nature Reserve of the Forêt
39 des Cèdres.