

THE SEDIMENTS OF THE PO RIVER DELTA AND THE ADJACENT CONTINENTAL SHELF

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Abstract. A North Adriatic Würmian fluvio-lacustrine plain with clay, peat and sand deposits was covered by the Flandrian transgression. It occurred in two main stages (6000 and 2000 yr BP) reworking Würmian sediments and then deposited sand and mud. At first cusped and then lobate deltas were formed. Résumé. La plaine fluvio-lacustre würmienne de l'Adriatique du Nord avec argile, tourbe et sable fut recouverte par la transgression Flandrienne en deux stades (6000 et 2000 ans BP). Cela produit la réélaboration des sédiments würmiens et la déposition successive d'argile et sable. D'abord eut lieu la construction de deltas triangulaires et ensuite de deltas lobés.

The main sediment source on the shallow North Adriatic shelf is the Po River. It supplies an average of 20×10^6 ton/yr of mud and sand building up a large lobate delta. The sediment distribution on the shelf results from an interaction between the river input and a dispersal system controlled by the Adriatic drift currents. The actual sediment distribution falls into five groups: 1) coastal sand, 2) mud, 3) muddy sand, sandy mud and loam, 4) offshore sand, 5) biogenic concretions. Only the first two groups are related to the present sedimentation dynamics and are supplied by the rivers. The sand drops out soon at river mouths and is redistributed by the longshore currents. The mud is transported in suspension longer and is finally spread by the drift currents in a mud belt ranging in thickness from a few centimeters up to over 25 meters. The offshore sand (group 4) represents a relict of dunes, alluvial and beach deposits reworked by the transgressing sea. None or very thin modern sediments cover this group, its uneven morphology enhancing erosional processes. The group 3 represents a transitional mixing of modern mud and relict sand facies. Low-frequency echo-sounding profiles and numerous cores supported by radiocarbon dating, show below the modern mud and relict sand a sequence of clay, peat and sand. The sedimentological character and the fossil remains (pollens, fresh water molluscs, etc.) point out the existence of a fluvio-lacustrine plain which occupied the North Adriatic during the Würmian regression. In this environment rivers with high dynamics coexisted with swamps and bogs characterized by calm water. From the Meso-Adriatic Depression the Flandrian transgression covered the

fluvio-lacustrine plain northward progressing at an average rate of 20 m/yr. The advancing sea effected the study area in two stages. The first one brought the coastline to about 25 m below the present sea level and close the submerged sand dune ridges detected about 20 Km off Venice. The second stage was the maximum Holocene marine ingression and is marked by the Greek and pre-Etruscan sand dune ridges identified from Venetian lagoon southward to Ravenna. The age of this stage must be 2000-2500 yr BP whereas the first one may be tentatively dated at about 6000 yr BP. Cuspate deltas began to form from an almost stright coastline at about 2000-2500 yr BP. This process continued until about 1600 AD when the increasing sediment supply formed modern lobate deltas. Deforestation of the Po drainage basin and the construction of levees in addition to the rapid sinking (at present up to 13 cm/yr) of the delta area may have been responsible for the increased sedimentary load carried to the sea. The consequently higher turbidity of the sea water may have caused the regression or dying out of particular biotopes such as the biogenic formations and the prairies of *Posidonia oceanica* found off Venice and Chioggia.

