

MORPHOLOGICAL AND SEDIMENTARY FEATURES OF THE SIMETO DELTA (EASTERN SICILY, ITALY): AN EXAMPLE OF MAN-ALTERED DELTA SYSTEM

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Abstract

This study illustrates the Simeto delta, an example of man-altered system, that during Holocene evolves from an active prograding delta to eroding coastal plain. Accelerated erosion is due, among others, to the construction of four dams, consequent entrapment of sediment, and effect of barrages and other factors of lower impact. Also considered important are natural factors, including climatic warm up of last 50 years and strong coastal current processes.

Keywords: deltas, sedimentology, coastal management.

The Simeto delta is one of the largest present-day deltas in Sicily and lies in the foothills of the Etna volcano, along the eastern coast of the island (Fig. 1). It represents a naturalistic protected area because of the characteristic faunal content.

The Olocene evolution of the delta suffered the control of both several geological hazards (earthquakes, volcanism, active tectonics) and of anthropogenic activity.

In particular the delta can be considered a man-altered system, that evolved from an actively prograding delta to an eroding coastal plain.

The drainage basin of the Simeto River consists of sedimentary terrains referable to the Apenninic Belt units and to the Plio-Quaternary cover, which occur on the right side of the river; the left side is instead represented by volcanic terrains belonging to the Etna volcano (1).

The Simeto alluvial and deltaic plain is formed mainly by sand, silt and mud, and extends for 4185 km² with a low gradient and with over 130 km of water stream length. The delta system is located into a low-energy microtidal coastal environment, where river-mouth processes should dominate and marine influence should be minimal. During the last 10 years, however, the competence of the Simeto River decreased for natural and human influences and wave energy became predominant into other control factors.

In the '50 and '60 the emplacement of barrages and canals into the Catania Plain (2; 3), built to constrain the Simeto hydrological regime, has strongly influenced the development of sedimentary processes in the lower delta-plain sub-environments, causing a change in the distribution of the sedimentary facies.

Today the Simeto delta plain has stopped to prograde into the Ionian sea and is locally receding, causing important risks for the naturalistic heritage of the area. Accelerated erosion of the Simeto deltaic coast is attributed to the emplacement of four dams along the course of the river, to the destruction of dune ridges and their vegetation, to the emplacement of maritime and protection works, to uncontrolled withdrawal of sands and gravels from river beds and beaches. This caused a quick decrease in sediment supply, accentuated by reduction of annual meteoric precipitation and a strong environmental impact on to the entire coastal plain of the Simeto delta plain. This is mainly due to the lack of territorial planning of human constructions and of coastal management programs in this area (4).

References

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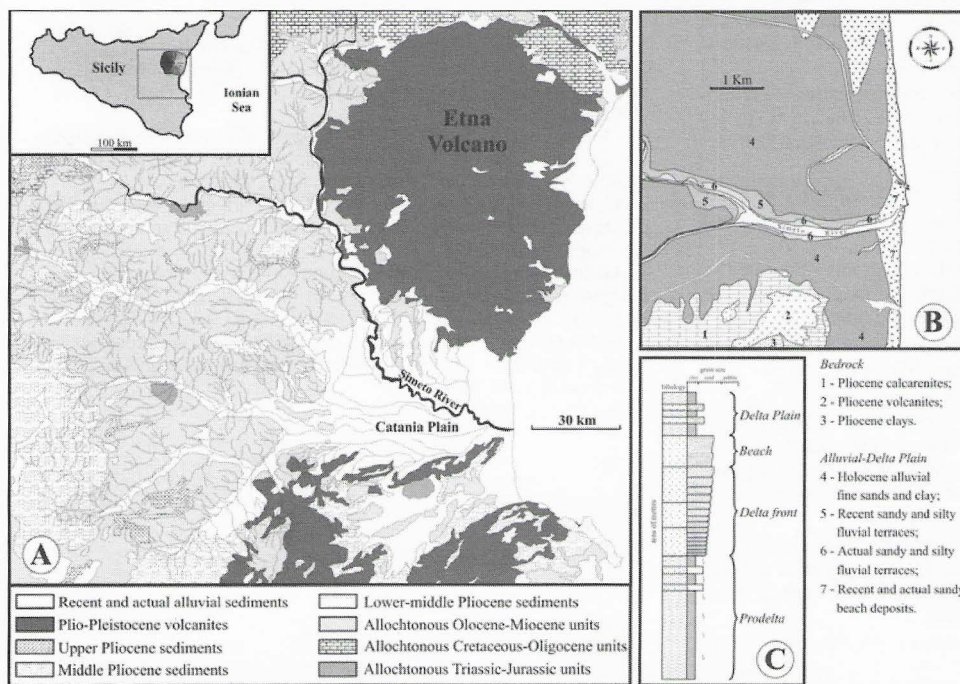


Fig. 1. Geological framework of Simeto drainage basin and its hydrologic network (A).

Lithologic setting of the delta plain of the Simeto river (B)

Presumptive stratigraphic log through the actual deltaic sequence (C)