



Sedimentological and geochronological evidences of anthropogenic impacts on river basins in the Northern Latium coastal area (Italy)

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In this work we aimed to compare sedimentological and geochronological data from three sediment core samples (MIG50, MRT50, and GRT50) taken in the Northern Latium (Italy) coastal area, at -50 m depth, to data regarding rainfall, river flows and the land use in the three most important hydrographic basins (Mignone, Marta and Fiora) and in the coastal area.

Different trends of sediment mass accumulation rate (MAR) are detected in the three cores: a strongly increasing trend was identified in MIG50 and MRT50 cores while GRT50 doesn't show significant variation.

Data from the sedimentological analysis of GRT50 core identify a progressive decrease in the sandy component, which declined from about 30% to the current level of 7% over the last 36 years, while MRT50 and MIG50 cores (mainly composed by pelitic fraction > 95%) showed slight variations of textural ratio between silt and clay.

According to the general decrease of pluviometric trend observed in Italy, related to teleconnection pattern tendency (NAO), the statistical analysis of rain identified significant decrease only in the Fiora river basin, whereas in the other two locations the decrease was not as significant.

Regarding the Fiora river flow, a significant decreasing trend of average flow is detected, while the flood regime remained unaffected over the past 30 years.

The analysis of the land use shows that the human activities are increased of 6-10% over the available time steps (1990 – 2006) in Fiora and Mignone river basins, while the Marta river basin has a strong human impact since 1990 highlighting more than 80% of artificial soil covering. The largest variation is observed on the Fiora basin (10%) where the anthropic activities have expanded to an area of about 85 Km².

Moreover, in the last ten years a large beach nourishment in 2004 (570000 m³) and dredging activities in the early second half of 2000s (1000000 m³ moved) were performed in Marina di Tarquinia beach and in front of the Torrevaldaliga coal-fired power plant respectively.

The land use change and human intervention on the riverbeds, detected on the Fiora river basin over the last 30 years, could have produced the textural variation observed in the GRT50 core sample, while the absence of the flood regime variation justify the observed MAR values.

The results of this work revealed that variations caused by the working of fluvial processes have affected the water runoff of the Fiora river, and that the consequent decrease in sand production was testified by the recession of beaches in the coastal area between Tarquinia and Montalto di Castro which led to the nourishment that affected the MAR evolution in the coastal area. The changes observed in the MAR of MRT50 and MIG50 show temporal agreement with the beach nourishment and the dredging activities respectively.