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Synsedimentary structural control of pliocene turbidites in a foreland basin, Marchean Apennine, Italy

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This work discusses the synsedimentary structural control affecting the pliocenic turbidites deposited in an elongate foreland basin formed in front of the growing Northern Apennines orogenic wedge. Several Pliocene marine foreland basin outcrops along the Apennine Chain. The sedimentary basin of Montecalvo-in-Foglia is located on the Pedeapennine margin, shows a synclinal structure and was formed on an active thrust. This basin is one of the better preserved cases in the Apennine chain, which originated and evolved during the later compressive tectonic phases from Late Miocene to Early Pliocene. It was completely filled by terrigenous sequence deposited during the Pliocene between 4.2-2.9 My. The stratigraphic succession records the progressive closure of the Apennine foredeep basin due to the NE propagation of thrust fronts. The foreland basin of Montecalvo-in-Foglia, confined by two adjacent thrusts systems, is characterized by two turbidite systems: one deposited during periods of highstand of sea-level, with low sedimentation rates and muddy deposits: the other, very coarse-grained with high sedimentation rates, was deposited during periods of lowstand of sea-level. High frequency tectonic uplift "events" within a short interval of time, about 1.3 My are thought to be responsible for relative sea-level lowstand. The coarseness and volume of the turbidite units appear to be related both to eustatic sea-level and/or to regional tectonism. Both factors combine to create the basic framework within which turbidite bodies were deposited. Turbidite systems reflect an alternation of thrust activity and quiescence. The regional distribution of facies and facies associations, and the orogenic trends, shows that the foreland basin was narrow, elongated (NW-SE) and confined within the Peri-Adriatic foredeep. It was characterized by an internal margin with continuous syn-sedimentary tectonic activity (slumps, cannibalistic input, allochthonous Ligurian sheets have been identified). Nevertheless, the coarse-grained turbidite facies are seen to be the result of the collapse of the shelf as well as the interaction between tectonic uplift, tilting of the depositional surfaces, and eustatic sea-level fall. The rapid sea-level fluctuations in the Pliocene probably contributed to the changes in sedimentation style, and to a significant increase in the volume of turbidity currents. It is concluded the causes of cyclicity in the coarse-grained turbidite sequence are complex. They include factors both internal and external to the sedimentary setting, such as subsidence and tectonic uplift, relative sea-level variation, climate changes during the Pliocene and global astronomical cycles.

Biography

Nicola Capuano is a Professor of Geology, Regional Geology and Sedimentology at University of Urbino, Italy. His research areas include geological and structural surveys of the Marches North, study lithostratigraphic and sedimentology of syn-orogenic basins, sedimentological analysis of the Messinian evaporite deposits of the Marche-Romagna. His other fields of interest are correlation and nomenclature of lithostratigraphic and tectonic units of the members of the Marnoso-Arenacea outcropping in the Marche and Romagna sector, and tectonic and sedimentary evolution of the Apennine foredeep turbidite deposits.

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