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A lacustrine system controlled by a fault propagation fold in the Sant'Arcangelo Basin

(South-Apennines - Italy)

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The Pliocene to Pleistocene satellite Sant'Arcangelo Basin is located back to the front of the south Apennines thrust belt (in southern Italy). The Apennines represent an east-verging accretionary wedge composed of deformed Mesozoic and Tertiary units. The Sant'Arcangelo Basin was interpreted in different ways from different researchers. It is considered as: a piggyback basin; a pull apart basin; a depression associated to basin magmatic intrusion or mantle bulging at the front of the chain; part of the thrust top basin succession passively folded.

The Sant'Arcangelo Basin in-fill, up to 5 km in thickness, is made up of four depositional sequences, late Pliocene to middle Pleistocene in age. Each sequence is bounded by unconformities, some of which are progressive in origin; every sequence shows evidence of synsedimentary tectonics (i.e. growth faults or folds).

In particular, the development of the third sequence has been controlled by the growth of a fault propagation fold (the Alianello anticline), which split the basin into two parts: in the eastern part, marine sedimentation continued until the middle Pleistocene

(Sauro Cycle), while the western part remained isolated and a lacustrine system developed (San Lorenzo Cycle). Folding was propbably induced by a backthrust linked to a deep structure. Furthermore, transpressive tectonics cannot be excluded.

The N150-140 trending Alianello growth fold was active during the early and middle Pleistocene (large Gephyrocapsa-P. lacunosa zones). Also biochronological and magnetostratigraphic data indicate that the lacustrine system, composed of over 500 meters thick silty claystones and conglomerates, began its evolution in the early Pleistocene, while syntectonic sedimentation during the Alianello anticline's growth is documented by the progressive unconformity which characterises the onlap of the lacustrine deposits onto the flank of the fold. Moreover, the thickness both of some guide-beds and of the whole succession progressively decreases moving toward the fold hinge.

The lacustrine system ceased to exist in the middle Pleistocene.