

The contractional history of the Lagonegro basin units in the High Agri Valley (Lucania, Southern Italy)

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In the southern Apennines of peninsular Italy, the role of rift basin architecture during thrust belt accretion has long been recognised owing to the complex relationships existing among the major structural and paleogeographic elements of the Apulian continental margin. Detailed geo-structural studies carried out in the few years in the High Agri Valley, allowed us to define the geometry and architecture of different paleotectonic (mesozoic) domains characterizing the Apulian margin. The investigated domains consist of two peritidal carbonate units (known as the internal Apenninic and the external Apulian Platforms) and of rock units derived from an intervening pelagic basin (the Lagonegro Basin). The latter are made of a deformed pelagic succession showing variable stratigraphic characters, mainly for what concerns facies and thickness variations. The Lagonegro units are completely detached from their original substratum and are incorporated into a major thrust sheet underlying the shallow-water carbonates of the internal Apenninic Platform domain. The allochthonous units (including peritidal carbonate platform-pelagic basin assemblage) tectonically overlie the shallow-water carbonates of the Apulian Platform domain, which consist of Mesozoic-Tertiary, 6–7 km thick, shallow-water carbonates stratigraphically overlain by upper Messinian and/or Pliocene terrigenous marine deposits. The Apulian carbonates constitute the so-called “buried Apulian belt” (e.g., Cello et al. 1989), which characterizes the subsurface structure of this sector of the Southern Apennines.

Detailed geological mapping (at the scale of 1:10,000) and structural analysis of key-areas within the Lucanian Apennines show that deformation within the Mesozoic Lagonegro Basin units was initiated by buckle folding around (present-day) roughly N–S trending axes. All the major antiforms exposed in the area, irre-

spective of the type of succession involved, are cored by the incompetent Lower–Middle Triassic Monte Facito Formation, constituting the basal unit of the syn-rift sequence. This implies that a common decollement level, located within the Monte Facito Formation, must exist for all the juxtaposed units characterizing the different types of the Lagonegro Basin successions belonging to specific rifted domains. The activation of this major decollement level was most probably controlled by early reactivations (i.e., ‘inversion’) of some of the basement faults influencing the depositional environments of the different Lagonegro successions; these features are also thought to favour the contractional deformation of the Lagonegro units which was accommodated mostly by buckling of the syn-rift strata comprised between synsedimentary faults representing major mechanical interfaces. All the structures above appear to be truncated by the tectonically overlying Apenninic Platform carbonates, as shown by the occurrence of both up- and down-section thrust trajectories in the footwall rocks of the Lagonegro units, and by the occurrence of local younger-on-older thrust relationships. This observation suggests that early shortening of the Lagonegro Basin succession preceded the emplacement of the Apenninic Platform units and took place in the foreland, at some distance from the active thrust front. Further deformation of the Lagonegro units, leading to variable degrees of modification and distortion of preexisting structures, was associated with major basement-cover decoupling and emplacement of the peritidal carbonate platform-pelagic basin assemblage as a single tectonic unit, onto the foreland carbonates of the Apulian Platform.

Cello, G., Martini, N., Paltrinieri, W., & Tortorici, L. (1989): Structural styles in the frontal zones of the southern Apennines, Italy: an example from the Molise district. Tectonics, 8, 753–768.