

Mélanges and broken formations in the exhumed Miocene-Pliocene outer accretionary wedge of the Central-Southern Apennines (Italy)

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The Apennines of Central-Southern Italy result from convergence between the European plate and the westward-subducted Adriatic lithosphere. From the Oligocene to early Pleistocene, shortening at the collisional margin involved progressive folding and thrusting of Mesozoic-Tertiary units and of late Miocene-late Pliocene clastic successions deposited in the eastward-migrating Adriatic foredeep.

The new *Geological-Structural Map of Central-Southern Apennines, Italy* at scale 1:100,000 (Vezzani et al., 2010, GSA Special Paper 469) completes two decades of field research on the stratigraphy, geometry, and structure of the Apennine fold-and-thrust belt. In particular, this geological map embraces a representative portion of the outer accretionary wedge of the Central-Southern Apennines. This is marked by a 10-15 kilometers wide belt of chaotic units (Mts. Frentani *mélange*) that thrust over the undeformed late Pliocene-early Pleistocene foredeep succession. The Mts. Frentani *mélange* incorporates the outermost and deepest thrust sheets of the Molise Units and is tectonically imbricated with blocks of Messinian evaporites and early-middle Pliocene sandy-conglomeratic deposits, ranging in size from decimeters-to-hundreds of meters.

Two different types of chaotic units are defined on the basis of their geometric and stratigraphic position, internal organization, and nature of the bounding surfaces:

(1) Tectono-sedimentary *mélange* corresponding to the late Cretaceous-middle Miocene Argille Scagliose (Varicoloured Scaly Clays) of the Sicilide Units. It consists of a block-in-matrix arrangement with blocks of Mesozoic and Cenozoic limestones, calcarenites, greenish-grey calcilutites, cherty limestones, quartzarenites, and manganiferous black limestones, ranging in size from decimeters-to-hundreds of meters. The blocks are randomly distributed within a varicoloured mainly brecciated matrix, locally overprinted by a pervasive scaly cleavage.

The chaotic arrangement of this *mélange* suggests that its emplacement and deformation is consistent with (i) slope and debris avalanches at the external frontal thrusts that produced mass-transport deposits during tectonic deformation, and (ii) folding and thrusting that overprinted the previously formed sedimentary *mélange*.

(2) Broken formations corresponding to the late Oligocene-early Miocene Flysch Rosso of the Molise Units. It consists of alternating red marly claystones and grey-green-red marls characterized by a structurally ordered block-in-matrix fabric. In the matrix a pervasive scaly fabric is present and often associated to mesoscale S-C shear zones. In spite of an intense stratal disruption that led locally to a block-in-matrix fabric, the original stratigraphy can still be recognized. Tectonic shearing acting at the base of the thrust sheets was probably the main factor in disrupting the originally coherent succession.

Finally, we present a comparative analysis of these two types of chaotic units developed in different geometric and stratigraphic positions with respect to the wedge front. They are characterized by different block-in-matrix arrangements that are consistent with their tectonic setting of formation reflecting the Miocene-Pliocene tectono-stratigraphic evolution of the accretionary wedge of Central-Southern Apennines.