The Meliata and Piemont-Ligurian rifted margins: stratigraphic record and tectonic evolution of polyphase rift systems

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The Late Permian to Late Jurassic paleogeographic evolution of the Alpine domain was strongly controlled by the formation of polyphase rift systems. If these rift systems are the result of a single, long lasting rifting event or if they are generated by two distinct rift pulses is still a matter of debate. Recent studies seem to agree on the second hypothesis, supporting two distinct rift events: one Early-Middle Triassic (Meliata s.l.) and one Early to Middle Jurassic (Piedmont-Liguria s.l.). Nevertheless major incertitude arises on the interpretations of the evolution of the former rifting, which leads to either multiple or one single, continuous ocean branch. This uncertainty is mainly due to the successive orogenic overprint related to the formation of the Alpine belt and of the Western Mediterranean domain. The aim of this work is to explore how rifting events are recorded by the stratigraphic and structural evolution using both the vast existing literature and own observations. Selected areas belonging to different paleogeographic domains in the Alpine realm (Southalpine, Briançonnais s.l. and Austroalpine) will be studied in order to define relevant time-marker levels to map and correlate the temporal and spatial evolution of rift events. With this “basinal” approach we point to major tectonic events, filtering smaller-scale tectonics and minor environmental controlling factors on sedimentation. Our final goal is to identify the “fingerprints” for major rifting events that may enable to map the location and timing of hyper-extended domains. The evaporitic successions, the onset of thick carbonate platforms, their demise or drowning, the iron-manganese hardgrounds sedimentation (that may represent a response of hydrothermal circulation associated with hyper-extension) may correspond to correlable and mappable residues of large-scale rift events. These observations, together with data of the subsidence history, exhumation of basement rocks and magmatic evolution may provide a major, well-constrained framework that can be used to compare the evolution of the Alpine domain with that of present-day rifted margins.

Stratigraphic architecture and correlation of rifting-related deposits of potential conjugate distal margins: the Ligurian Prepiedmont-Piedmont (I) and the Lower Austroalpine (CH)

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Major rifting within the Alpine domain was active since the Late Triassic and led to the exhumation of subcontinental mantle and the formation of an embryonic oceanic domain during Late Middle Jurassic time (~165Ma). The rift history is recorded in several sectors of the Alpine belt, where complete pre- to postrift successions are preserved. These successions record the evolution of different sedimentary basins, showing different architectures and sedimentary evolutions. Today they are preserved in different Alpine domains and at different structural levels in the Alpine nappe pile as a result of the Alpine collision. In this work, we focus on the sedimentary successions of different domains of the former distal rifted margins: those belonging to the Ligurian Prepiedmont and Piedmont domains, outcropping in the Ligurian Alps in Italy (European margin) and those belonging to the Lower Austroalpine exposed in the Central Alps in SE Switzerland (Err, Bernina units; Adria margin). We chose these domains because of the completeness and the correlatability of the sedimentary successions. We aim to test if, with a certain degree of approximation,