



High-resolution shallow seismic imaging of the northern Apennines mountain front near Bologna, Italy: evidence for recent compressive tectonics.

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We have recently acquired and processed ~ 2 km of a high-resolution seismic reflection profile across the Bologna segment of the Northern Apennine mountain front (Italy). The profile, constrained by wells west of the Reno River valley, targets a postulate shallow blind or emergent thrust fault, the Pede-Apenninic Thrust Fault (PTF). Data show an ~ 600 m deep picture of the contact between the Apennine front and the Po river alluvial plain. A strong reflector coinciding with the basal unconformity of the 0.8 Ma Sabbie di Imola is rotated 18° towards the foreland indicating a forelimb tilt rate of ~ 30 /Ma. The units below this reflector are highly tectonized, whereas the units above the unconformity are tilted or only gently folded. All reflectors beneath the Po Plain and above the base unconformity are foreland-dipping and show clear growth relationships. Rotation of these unconformities indicate shortening and fold growing since the Early Pleistocene and higher-angle reflectors we interpret as blind thrusts and back thrusts. These compressive structures coexist with antithetic normals faults, which offset of as much as 140 m (long-term slip rates of 0.1 – 0.5 mm/yr) the late Pleistocene-Holocene deposits, and disrupt, but do not conceal the growth strata relationships. Our results can help better assess the seismic hazards these structures present to the densely populated Po foreland.