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Slab retreat and active shortening along the central-northern Apennines

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A reinterpretation of the available geophysical and geological data reveals that the south-eastward prolongation of the Apennines thrust front in the Adriatic Sea is most likely located on the north-eastern side of the Mid-Adriatic Ridge. Active shortening associated with the Apennines front in the Po Plain and in the central Adriatic Sea (north of the Tremiti lineament) is documented by GPS data and instrumental seismicity. Moreover, available focal mechanisms and other present-day stress data indicate a compressional stress field. Rates of tectonic uplift have been evaluated for one of the active thrust-related fold recognised in the Po Plain subsurface by analysing and correcting for compaction high resolution stratigraphic data. The resulting rates of tectonic uplift decrease during the Quaternary. However, a tectonic uplift rate of about 0.16 mm/a can still be recognised during the last 125 ka. The distribution of the Quaternary deposits and of the SW- or W-ward increasing dip of the foreland monocline in the Po Plain and in the central-northern Adriatic Sea strongly suggests a Quaternary-Present flexural retreat of the subducting lithosphere in these domains. As a consequence, a significant part of the long term natural component of the subsidence of Venice (about 0.7-1.0 mm/a) has been related to the north-eastward retreat of the Adriatic subduction. These evidences suggest that the flexural retreat of the subducting Adriatic lithosphere and the related frontal accretion of the Apennines prism are still active processes in both the Po Plain and the Adriatic domain (north of the Tremiti lineament).