## Seismic velocity-depth relation in foreland basins: the case study of the Central Adriatic Sea

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Starting from reprocessed seismic reflection profiles (blu lines in a), deep CROP seismic data (bold black lines in a) and borehole data (dots in a) we reconstruct the TWT thickness of the Plio-Quaternary deposits in the central Adriatic sea (c).

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OWT/depth function interpolating time-depth data from boreholes. Data below the fitting curve are from boreholes with thicker PQ deposits (A region). Data above the fitting curve are from boreholes with thinner PQ deposits (B region).

> Orange and red dots locate boreholes where the OWT/depth function overestimates the TWT thickness of PQ deposits by over 20%

After retrieving time-depth data from boreholes located in the area (blue dashed squares in a), we retrieve one way time (OWT)-depth relation and validate this relation across the entire area by comparison with TWT data retrieved from seismic catalogue.







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In a final step we use the OWT/depth relation to compute Vp/depth trend of the PQ deposits within depth windows  $\leq$  100 m (a).

We find that the resulting ~700 data points range within 1500 and 3800 m/s with an average velocity value of ~2650 m/s.

If the entire depth range is considered (0-4000 m) the best interpolation is provided by the exponential fit. While, if a shallow depth range is considered (0-1500 m), the best interpolation is given by linear fit.

Finally, we locate abrupt velocity changes between 2500 and 3500 m depth that we interpret as representative of overpressured deposits, an interpretation confirmed by formation fluid pressure estimation from mud density (c).

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