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Anomalous upper mantle structure imaged beneath the Alpine orogen

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We use forward modelling approach to construct P-wave velocity field in 2-D geometry beneath the Alps and the surrounding areas. The source of data are seismograms as well as P-wave phases reported in seismological bulletins for natural seismic events with epicenters located at distances appropriate for the seismic rays to probe upper mantle discontinuities below the regions of our interest. The events we take into account are clustered within the circles of a radius smaller than 80 km which justifies our approach of bringing together data from different events (our assumption is that the rays follow almost the same path between the source and the chosen station).
The consistency of the models for different azimuths is guaranteed by common mean velocity distributions and the depths of modeled discontinuities at joint-lines.
The most characteristic feature of our models is the existence of high velocity zone (with P-wave velocities of about 9 km/s) below the Alpine orogen at depths of about 300 km. That zone is characteristic for the models proposed for different direction of prospection and is absent below the surrounding 'colder' Variscan upper mantle regimes.
Another feature which tells apart seismic regimes below the Alpine and Variscans orogens is the thickness of low-velocity zone. LVZ is considerably thicker below the Alps (with its top emerging up to 90 km and the bottom deepening down to 240 km).
The deepest imaged part of the mantle is the so-called '410-km' discontinuity which in our models is not located at the same depth. Its depth changes from 390 km to 430 km depending on the region.