



Decoupling of lithospheric plates along the Hellenic subduction zone and repeat times of large earthquakes

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The subduction zone along the Hellenic arc is the most active in the entire Mediterranean region producing shallow, interplate and intermediate-depth earthquakes with magnitudes of instrumental earthquakes up to about 7.2. Very large, possibly interplate, historical earthquakes assigning magnitudes up to about 8.0 occurred in 365 and 1303 in the western and eastern segments of the Hellenic arc, respectively. Such earthquakes produced also large tsunamis which propagated up to remote places of the eastern Mediterranean basin. The generation of large earthquakes and their repeat times depend on the degree of lithospheric decoupling. We quantify the degree of decoupling as the ratio of aseismic slip rate over the plate motion rate; where aseismic slip rate equals plate motion rate minus seismic slip rate. From the lateral and vertical distribution of modern seismicity, along with large scale morphotectonic features, we determined a number of main segments along the plate interface in the Hellenic arc and calculated the degree of decoupling in each one of these segments by using an updated historical earthquake catalog and GPS data to calculate the seismic slip rate and the plate motion rate. The degree of decoupling is then used as a measure of the seismic potential accumulated as well as to control if it is consistent with the historical seismicity rate with profound forecasting consequences.