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A new database on subduction seismicity at the global scale

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In the framework of the EURYI Project 'Convergent margins and seismogenesis: defining the risk of great earthquakes by using statistical data and modelling', a global collection of recent intraslab seismicity has been performed. Based on EHB hypocenter and CMT Harvard catalogues, the hypocenters, nodal planes and seismic moments of worldwide subduction-related earthquakes were extracted for the period 1976 - 2007. Data were collected for centroid depths between sea level and 700 km and for magnitude Mw $\geq$ 5.5. For each subduction zone, a set of trench-normal transects were constructed choosing a 120km width of the cross-section on each side of a vertical plane and a spacing of 1 degree along the trench. For each of the 505 resulting transects, the whole subduction seismogenic zone was mapped as focal mechanisms projected on to a vertical plane after their faulting type classification according to the Aki–Richards convention. Transect by transect, fist the seismicity that can be considered not related to the subduction process under investigation was removed, then was selected the upper plate seismicity (i.e. earthquakes generated within the upper plate as a result of the subduction process). After deletion from the so obtained event subset of the interplate seismicity as identified in the framework of this project by Heuret et al. (2011), we can be reasonably confident that the remaining seismicity can be related to the subducting plate. Among these earthquakes we then selected the intermediate and deep depth seismicity. The upper limit of the intermediate depth seismicity is generally fixed at 70 km depth in order to avoid possible mixing with interplate seismicity. The ranking of intermediate depth and deep seismicity was in most of cases referred to earthquakes with focal depth between 70-300 km and with depth exceeding 300 km, respectively. Outer-rise seismicity was also selected. Following Heuret et al. (2011), the 505 transects were merged into 62 larger segments that were ideally homogeneous in terms of their seismogenic zone characteristics.
Comparisons between main seismic parameters (e.g. cumulated seismic moment, P- and T-axes distributions, spatial and temporal distribution of largest magnitudes) with relation to both the different categories selected and the different segments have been performed in order to obtain a snapshot on the general behaviour of global subduction-related seismicity.