DOES SEISMIC SLIP DEFICITS ALONG THE VIENNA BASIN TRANSFER FAULT SYSTEM INDICATE UNDERESTIMATED SEISMIC HAZARDS?

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Current seismic hazard estimates for the Vienna Basin Tansfer Fault (VBTF), a sinistral strike-slip fault between the Eastern Alps and the Carpathians, are solely based on probabilistic analyses of historical and instrumental earthquakes. In regions with low geological deformation rates, like the Alps and their foreland, strong earthquakes may have longer recurrence times than covered by the catalogues in use. Geologically and geodetically determined deformation rates suggest 1-2 mm/yr of movement across the VBTF. In this study we use the Austrian earthquake catalogue (courtesy of ZAMG, W. Lenhardt) to calculate deformation rates from seismic moment summations in order to check for possible seismic slip deficits. Calculated rates for the generalized fault system vary from 0.1 - 0.3 mm/yr for brittle fault depths between 6 and 10 km. Splitting the fault into segments reveals significant variations of the slip velocities along strike. Segments with less than 0.02 mm/yr seismic slip contrast from segments moving at 0.2 - 0.5 mm/yr. For all segments seismic slip rates are significantly smaller than the geological strain rates. Possible reasons for this seismic slip deficit are inadequate calculation parameters, changing mechanical conditions along strike of the fault system and the usage of data covering an incomplete seismic cycle. At present state of knowledge, earthquakes larger than those previously recorded cannot be ruled out. (Paleo)seimological investigations and fault segmentation studies as well as mechanical modeling are suggested to improve the understanding of the seismogenic behavior of the VBTF.