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Ground shaking scenarios for historical earthquakes in the southeastern Alps

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In the southeastern Alps destructive earthquakes up to Mw 6 have occurred in the past and might occur in the future with a similar strenght. Knowledge of past earthquakes – based on historical research – is useful to regional governments and regional planning bodies that have to develop prevention and civil protection plans.
Some of the most relevant seismogenic sources of northeastern of Italy, western Slovenia and southern Austria, which play an important role in earthquake hazard and risk of the area, are studied in the framework of the Interreg IV A HAREIA project. In particular,
based on active fault data and historical records we produce ground shaking scenarios for the biggest known historical earthquakes.
In our scenarios the synthetic seismograms are computed using a kinematic approach for the representation of the extended source. We assume an a priori seismic moment distribution, which is a function of time and space and use geometrical dimensions of the fault, related to the estimated epicentral intensity, and focal mechanism parameters based either on recent mechanisms or active tectonics data.
The method has been tested on the Bovec 2002 event. In this case synthetic seismograms have been calculated not only on a pre-determined grid but also at some existing stations that have recorded data in order to compare real and synthetic seismograms.
The main result of this study is the calculation of the maximum peak ground velocity value computed at 1Hz (PGV1H) for all studied events at every point of the computation grid, which covers the entire area of interest.
Additionally, we have started an accurate analysis of some historical events known as the Tyrol (1572,1670 and1689), Villach (1348) and Idrija (1511) earthquakes.
For the latter we compare the intensity distribution estimated independently by other researchers with the one derived using empirical relationship from our computed PGV1H values, in order to get a first estimate of those parameter (i.e. fault mechanism, position of nucleation point, hypocentral depth) values, that produce PGV1H maps which have a roughly similar pattern as that of the observed intensity ones.