First results from an earthquake early warning system in Western Greece with special focus on the city of Patras and the Rion Antirion bridge

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Patras with almost 250.000 residents is the third largest city in Greece and it is an ideal candidate for an Earthquake Early Warning application due to its high seismic hazard, its existing research infrastructure, and the presence of critical structures such as the Rion Antirion bridge. This bridge, completed in 2004 by the GEFYRA consortium, is the world's longest multi-span cable-stayed bridge, it crosses the Gulf of Corinth near Patras linking the town of Rion on the Peloponnese to Antirion on mainland Greece. It is a very important infrastructure for the road network in central Greece since it is the only connection between Peloponnese and central Greece.

Patras is located a few hundreds of kilometres from the Hellenic Arc, where very strong and potentially damaging events occur. This distance is large enough to provide a few tens of seconds of warning time, provided that a dense seismic network exists. Under the REAKT project the Virtual Seismologist software was installed in Patras Seismological Laboratory (UPAT) as an early warning system and we present here its initial evaluation.

The software was installed in UPAT in May 2013 and is using broad band data from the Hellenic Unified Seismic Network and strong motion data from six accelerographs installed during the first year of REAKT project. During this first year of operation VS has processed a few thousand events. In general the software performs quite well in magnitude estimation (regression between officially reported magnitude and VS magnitude gives correlation coefficient equal to 0.84). The average time that VS needs to evaluate the first magnitude estimate is rather large, of the order of tens of seconds and not yet satisfactory for operational use of early warning. Results of the initial period of early warning operation in western Greece suggest that the network density needs to be enhanced by the addition of extra stations. Nevertheless the application of early warning in the area seems to be interesting and capable of reducing earthquake risk.