



Bruyères le Châtel, March 29 2010

A contribution to the setting-up of tsunami warning systems in the Mediterranean

Tsunami warning systems require robust data transmission. This was illustrated on May 21st 2003 when submarine cables were damaged following the Boumerdes (Algeria) M6.8 earthquake impeding phone and Internet connection between Maghreb and Europe. Satellite data transmissions are then required to ensure a permanent wide area coverage communication in case of large, damaging earthquakes in the Mediterranean. This is essential for effective, timely and robust tsunami warnings.

The main objective of this project is to make available in real time and in a robust way waveform data from the recently installed broadband seismological stations operated by the Institut National de la Météorologie (INM) of Tunisia to the European and Maghrebian seismological observatories and the global research community. It contributes to the implementation of effective tsunami warning systems in the Mediterranean region by offering key real time data which are missing today for the monitoring of Central and Western Mediterranean basins.

The project was funded by the JRC (Joint Research Centre of the European Commission) and led by the EMSC. It benefited from an initial project initiated in 2006 by the EMSC between the INM and the *Principauté de Monaco* with the scientific support of GeoAzur (Nice). Three stations were installed with broad-band sensor and modern data transmission to the INM. Depending on the local conditions real time data transmission are based on VSAT (satellite) link and/or leased lines.

In collaboration with INM, GFZ in Germany makes the Tunisian data available in real-time in the NEAMTWS (North East Atlantic and Mediterranean Region Tsunami Warning System) framework and within its GITEWS project, following the existing ORFEUS standards. The data are transmitted from the INM to GFZ through the specific VSAT system set-up by GFZ for its GEOFON network. A 1.8m VSAT antenna (and related hardware) was installed on the roof of the INM. At the time of the installation, 2 of the 3 Tunisian broadband stations were transmitted. The third station, in Tataouine is being finalised and should be transmitted soon.

The maintenance on the Tunisian side is ensured by the active participation of the INM staff and a win-win strategy which is at the heart of the project. On the one hand, the INM makes its national data available in real time as a Tunisian contribution for the setting-up of tsunami warning system in the Mediterranean region. On the other hand, their capacity for real time automatic earthquake monitoring is boosted by the implementation of the SeisComp3 software and the integration in the real time processing of data from stations from Malta, Sardinia, and Europe. This virtual monitoring network provides an excellent coverage for Central Mediterranean basin and beyond.

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This new capacity was illustrated on March 10 only a couple of hours after the software implementation through the rapid and accurate location of a M4.8 in Serbia. The INM staff underwent a 2-days training to master the new equipment and software. QWIDS/EIDS was also implemented for rapid and robust INM contributions to the EMSC Real Time Earthquake Information services and improve its visibility.

The implementation took place in Tunis from March 8 to March 12 2010. It involved 6 scientists from GFZ, GEMPA, GeoAzur and EMSC, as well as ten staff from the INM.

Finally, we would like to underline the strong support and the satisfaction expressed by our partners, the direction and staff of the INM and its Ministry of trusteeship, the Ministry of Transport through the Minister M. Abderrahim Zouari. After our audience with the Minister, an additional presentation was organised on his initiative to inform all the potential beneficiaries of the improved earthquake monitoring within the Ministry. The press coverage was rapid and efficient.

In summary, the project has been successful in making available in real time waveform data from stations of the Tunisian national network. This is a significant and unique achievement in Northern Africa. This was realised in close collaboration with our partner in Tunisia, the INM, which gains an efficient real time automatic earthquake monitoring system. This newly available data have already been integrated in several real-time monitoring systems: at GeoAzur (France), GFZ (Germany), INGV (Italy), LDG (France), University of Malta, and there are ongoing discussions with the CRAAG (Algeria).

We already plan to organise a regional meeting in Tunis early 2011 to maintain the dynamic of collaboration and explore the possibilities to extend it to other countries in Northern Africa.

Scientific partners:

EMSC www.emsc-csem.org
GeoAzur <http://geoazur.oca.eu/>
GFZ <http://geofon.gfz-potsdam.de/geofon>
INM <http://www.meteo.tn/default.html>

Funding from:

JRC <http://ec.europa.eu/dgs/jrc/index.cfm>

Information on the joint project between INM and the *Principauté de Monaco*

<http://www.cooperation-monaco.gouv.mc>

Accueil > Coopération bilatérale > Tunisie > Environnement "risque sismique"

SeisComp3 implementation at INM performed by:

GEMPA: <http://www.gempa.de/en/>

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