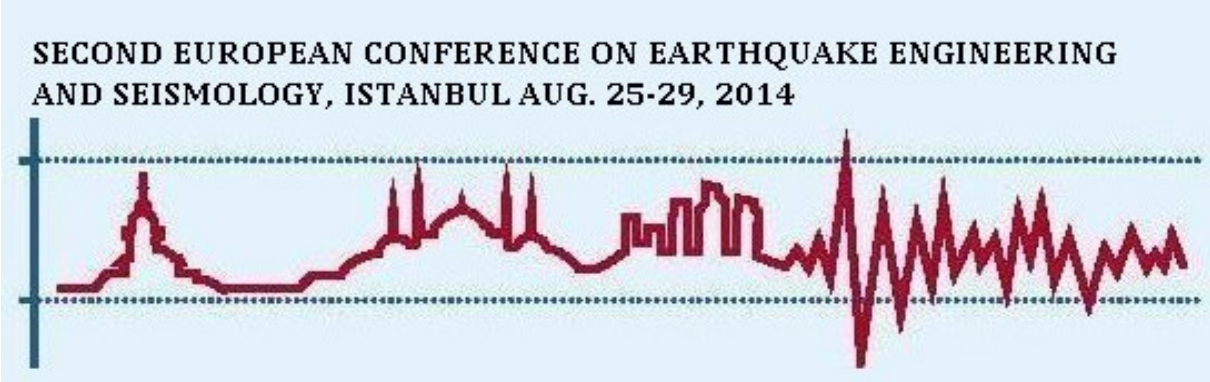

2014 STATE-OF-THE-ART OF THE OGS NORTHEASTERN ITALY SEISMIC NETWORK

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The Centro di Ricerche Sismologiche (CRS, Seismological Research Centre) of the Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS, Italian National Institute for Oceanography and Experimental Geophysics) in Udine (Italy) after the strong earthquake of magnitude M=6.4 occurred in 1976 in the Italian Friuli-Venezia Giulia region, started to operate the North-eastern Italy Seismic Network: it currently consists of 18 very sensitive broad band and 20 simpler short period seismic stations, most of them equipped also with strong motion accelerometers, all tele-metered to and acquired in real time at the OGS-CRS data centre in Udine. Real time data exchange agreements in place with other Italian, Slovenian, Austrian and Swiss seismological institutes lead to a total number of about 100 seismic stations acquired in real time, which makes the OGS the reference institute for seismic monitoring of North-eastern Italy (Priolo et al., 2005, Bragato et al., 2011, Bragato et al., 2013, Saraò et al., 2010 and Pesaresi et al., 2011). Recent developments in running the OGS North-eastern Italy Seismic Network will be here illustrated.

One of the key points for the OGS-CRS was the start of usage of social media like Facebook (Figure 1 left) and Twitter to publish CRS activities and results achieved (including live feeds of earthquake locations with magnitude estimates). This helped in warning communication to the population, and more: it has been since then a direct line with the public for news on earthquakes, on the seismic network, on OGS-CRS public actions and events and last but not least, a channel for OGS-CRS to respond directly to public questions. In addition, the use of social media proved to relieve much of the internet traffic versus the official CRS Real Time Seismology site (RTS, Figure 1 right) and promotes viral distribution of information. The RTS site in the last year was implemented with new functions: as an example it is now possible to make researches of earthquakes in the past OGS bulletins back to 1977, and in the pages of the event, view the past seismicity nearby the event.

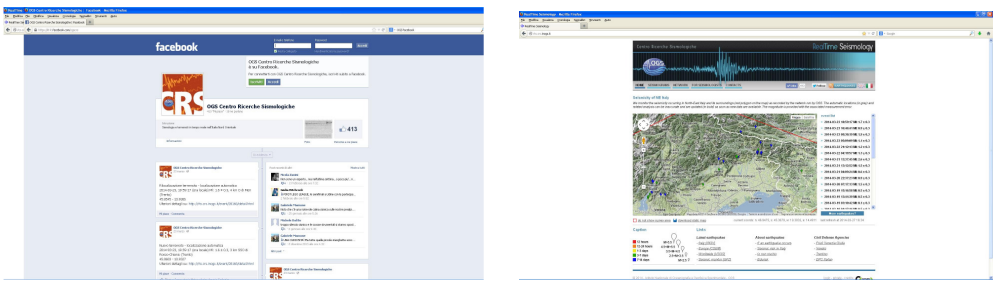

Figure 1. OGS-CRS FaceBook page (left) and Real Time Seismology (RTS) page (right)

Figure 2 shows the data links of the OGS-CRS seismic network to the central data centre in Udine. Yellow links are dedicated spread-spectrum 5GHz radio links, orange links are GPRS/UMTS

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mobile internet links, green links are dedicated satellite links. In red are shown the recent improvements, i.e. automatic switching links on different routes in case of single data link failure to increase global data acquisition robustness.

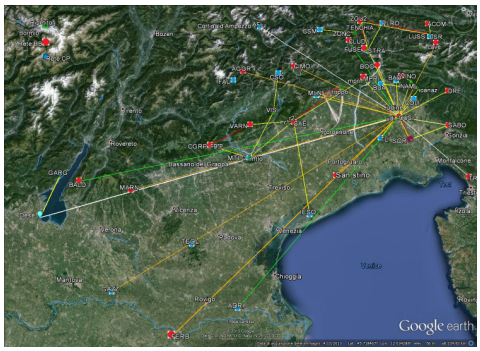

Figure 2. Map of OGS-CRS seismic network data links

In the last year OGS-CRS continued to upgrade its short period seismic stations to broad band. Last ones were Bernadia (BOO, top left in Figure 3) and Caneva (CAE, top right in Figure 3) stations, both upgraded with Quanterra Q330 24 bit seismic acquisition units (bottom left in Figure 3) and Nanometrics Trillium 120 seconds compact broad band seismometers (bottom right in Figure 3).

Figure 3. stations upgrades: top left: BOO station, top right CAE station, bottom left Quanterra Q330 acquisition system, bottom right Nanometric Trillium 120 compact broad band seismometer

A special improvement in the OGS seismic network was the new borehole seismic station of San Stino di Livenza (STIN, Figure 4). It uses a 10 second borehole seismometer and data acquisition unit from the Italian SARA. Borehole seismic stations are needed to overcome high level of seismic noise in sites in alluvial basins like Ferrara (Pesaresi et al., 2013).

Figure 4. STIN borehole seismic station, SARA borehole seismometer in front bottom right

Other network management improvements include a watchdog for automatic pinging and alarm restart of station devices (LanRestarter, left in Figure 5) and a web tool for station devices State-Of-Health (SOH) monitoring (WebOrbstat, right in Figure 5) like power supply voltage and data latency.

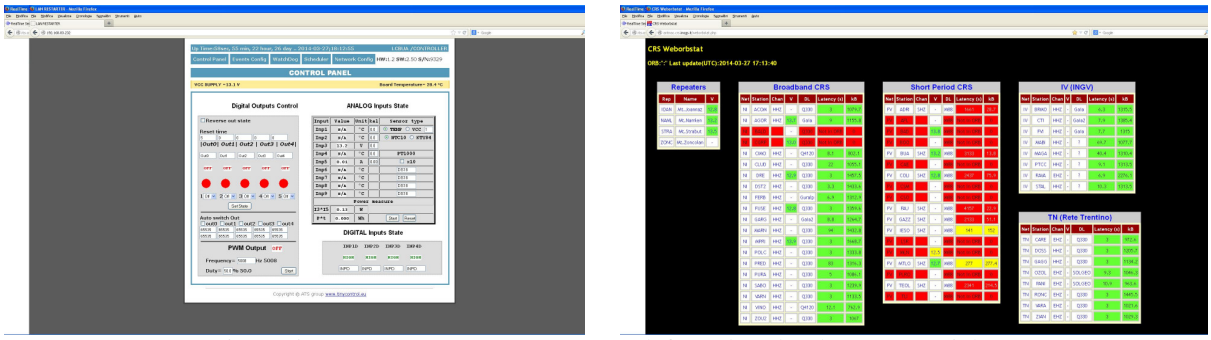

Figure 5. OGS-CRS LanRestarter page (left) and WebOrbstat page (right)

Finally, for robustness data acquisition has been fully duplicated in two geographically different sites, at OGS-CRS headquarters in Udine and at Friuli-Venezia Giulia Regional Civil Defense headquarters in Palmanova (UD).

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