The geodetic signature of the Jan 26, 2014 earthquake onshore Cephalonia, Greece[1].

A. Ganas, F. Cannavò, PJ. González and G. Drakatos

Athanassios Ganas, NOA, aganas@noa.gr

Flavio Cannavò, INGV-Catania, flavio.cannavo@ct.ingv.it

Pablo J. González, University of Western Ontario, pabloj.glez@gmail.com

George Drakatos, NOA, g.drakat@noa.gr

On January 26, 2014 13:55 UTC Cephalonia was struck by a strong, shallow earthquake of local magnitude M_L (NOA) = 5.8. The earthquake produced severe and widespread damage, mainly to old houses in the region of Paliki Pensinsula, west Cephalonia. The earthquake dynamic displacement was recorded by the continuous global positioning system (cGPS) station VLSM, at Valsamata village about 10 km to the east of the epicentre. The station was operating with a sampling frequency of 1 Hz, and it belongs to the National GNSS scientific network of NOA: NOANET (Ganas et al., 2011). At the same time the sampling frequency of VLSM was set to 5 Hz (on the ring-buffer), thus recording the coseismic displacements produced by the Jan 26, 2014, earthquake at higher frequency.

The final geodetic solutions, in the ITRF08 reference system, are obtained by processing the high rate data (5 Hz) in PPP (Precise Point Positioning) with IGS rapid ephemeris. The average standard deviation associated to the horizontal components is 0.022 m. The obtained time series are then filtered with a second-order, zero-phase Butterworth filter with a cut-off frequency of 0.0625 Hz to split the high-frequency transients (see figure HR-VLSM-HF) from the low frequency displacements (see figure HR-VLSM-LF). The main motion of the antenna is due to the S-wave. It seems that the main displacement is oriented SSW-NNE in accordance with regional kinematics (shortening at N258◦E; Ganas et al., 2013) Our analysis shows that the low-frequency time series contains mainly artifacts (noise), as no real displacement seems related to the earthquake. The geodetic solutions will be improved by applying a sidereal filter (at least a day before and after the 26 are needed), and of course after the final ephemeris become available by IGS.

The 5-Hz-sampling displacements for the Cephalonia 2014 earthquake might represent important recordings to investigate coseismic contributions at frequencies higher than 1 Hz with GPS. This is the first contribution of NOANET to GNSS seismology.

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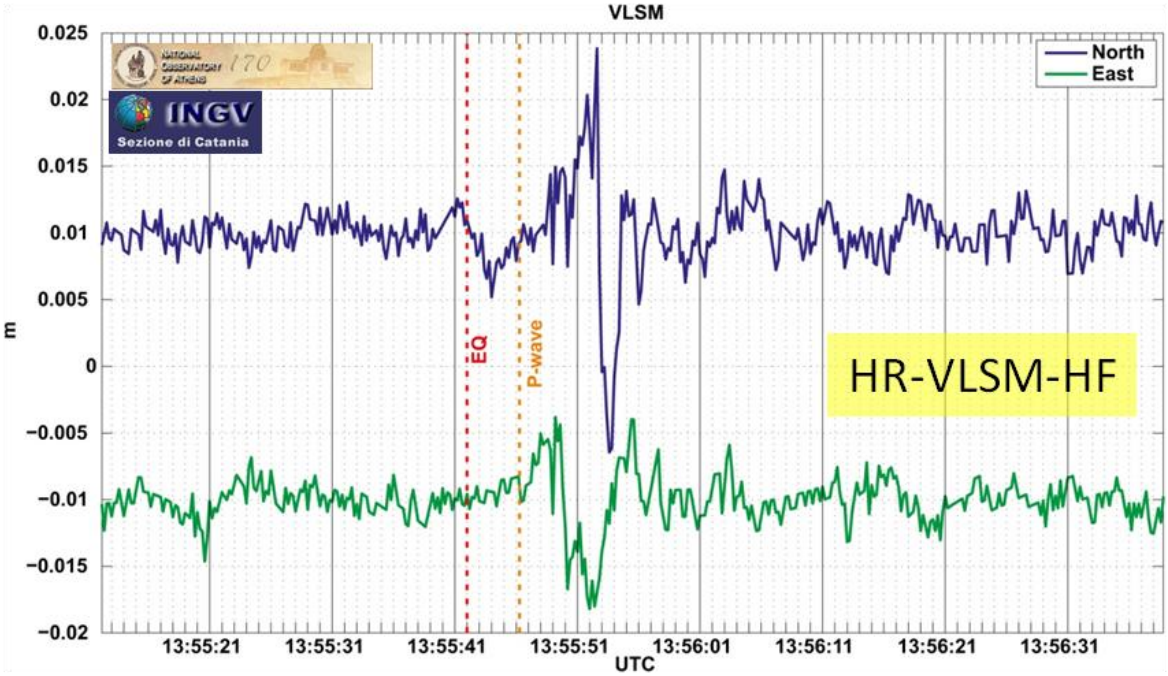

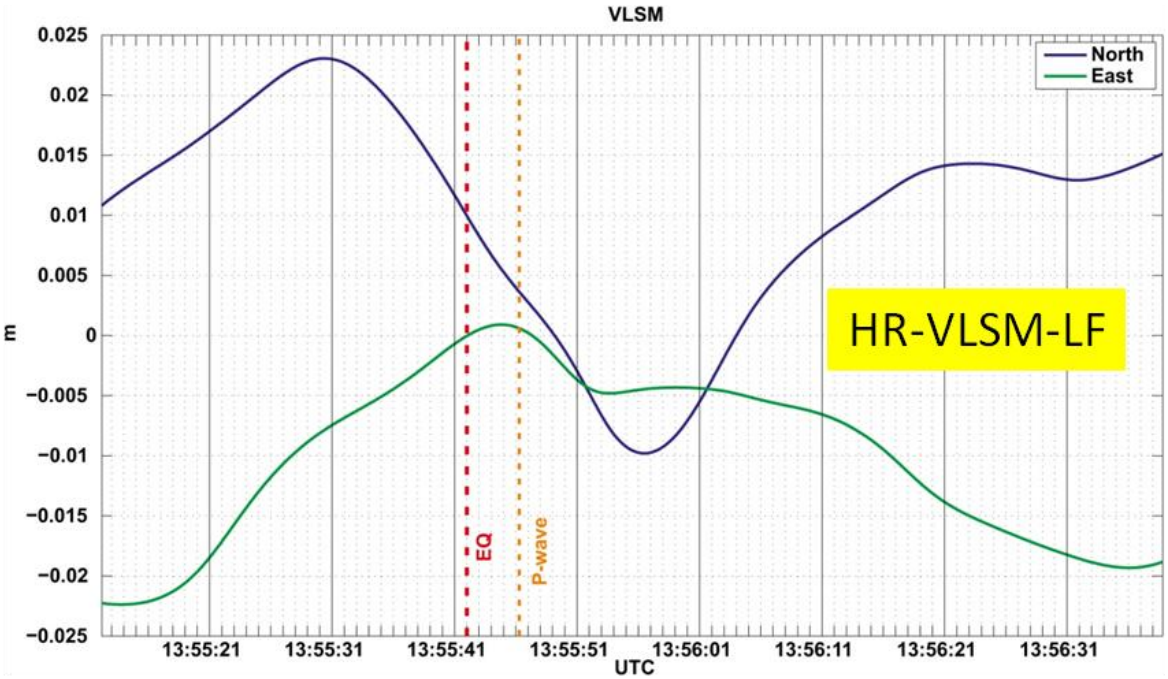

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References

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