Preliminary GPS results and static stress transfer model for the May 24, 2014 M=6.8 earthquake, North Aegean Sea[1].

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On May 24, 2014 09:25 UTC a strong, shallow earthquake occurred in the North Aegean Sea (between the islands of Lemnos and Samothraki; Fig. 1) with $M_{(NOA)}$=6.8 http://bbnet.gein.noa.gr/mt_solution/2014/140524_09_25_02.00_MTsol.html followed by thousands of aftershocks. The earthquake static displacements were recorded by several continuous global positioning system (cGPS) stations in the vicinity of the epicentre of which three are analysed in this report (LEMN, CANA, IPSA, Fig. 1). Station LEMN belongs to the National GNSS network of NOA, NOANET (Ganas et al., 2008; 2011), stations CANA and IPSA to CANDILI Observatory (Turkey).

We processed the 30-s GPS observations in precise point positioning (PPP) mode [Zumberge et al., 1997] by using JPL's GIPSY-OASIS software, considering the JPL's final products (i.e. precise ephemeris and clocks) and a cutoff angle of 10 degrees. The displacement vectors have amplitudes of a few centimeters (see Table 1) and are plotted in Fig. 1. It is evident that the horizontal displacement of the fault rupture is oriented ENE-WSW in accordance with regional kinematics (Reilinger et al., 2006; Mueller et al., 2013; Ganas et al., 2014). We also processed the station LEMN 30-s data by use of GAMIT software (Fig. 2) obtaining comparable results to GIPSY both in direction and amplitude (within 0.3 cm for North and East component).

Table 1. Static displacements of continuous GPS stations after the May 24, 2014 earthquake using GIPSY (Gi) and GAMIT (Ga). Column norm reports vector norm of horizontal components.

Station	Lat	Lon	dE (cm)	3sigma dE (cm)	dN (cm)	3sigma dN cm)	Norm (cm)
CANA	40.111	26.414	-2.63	0.92	1.52	0.71	3.04
IPSA	40.917	26.379	0.90	0.64	1.71	0.53	1.93
LEMN-Gi	39.897	25.180	-2.28	0.40	-4.73	0.34	5.25
LEMN-Ga	39.897	25.180	-1.89	0.20	-4.58	0.21	4.95

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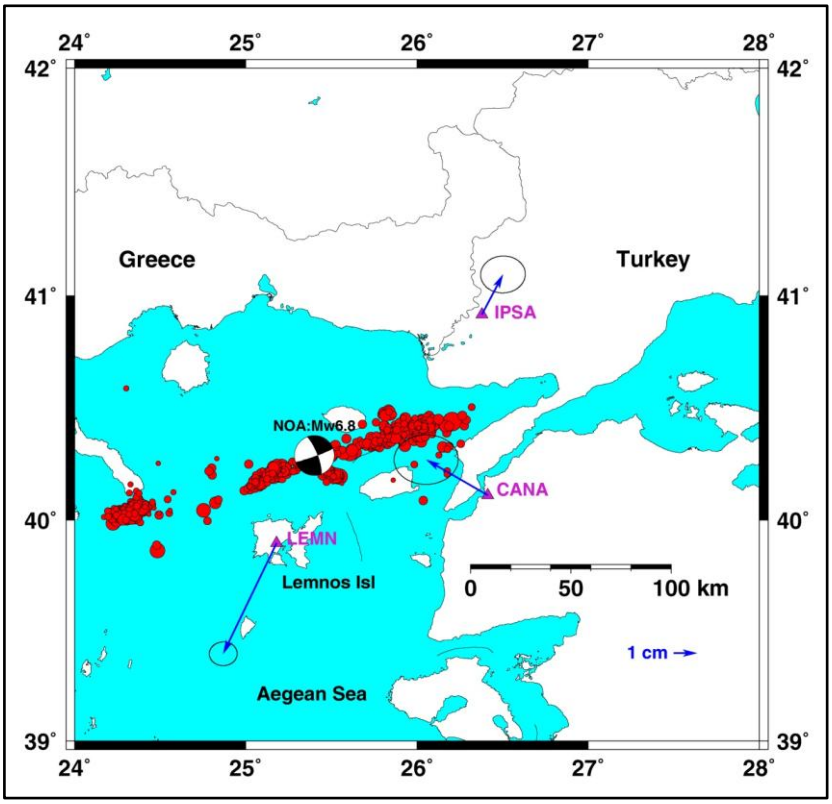

Fig. 1. Map of north Aegean Sea showing the displacement vectors of three, permanent GPS stations (solid triangles) in the north Aegean Sea. The movements are consistent with dextral strike-slip faulting. Solid red circles are aftershock epicentres from NOA catalog. Beachball indicates the NOA MT solution.

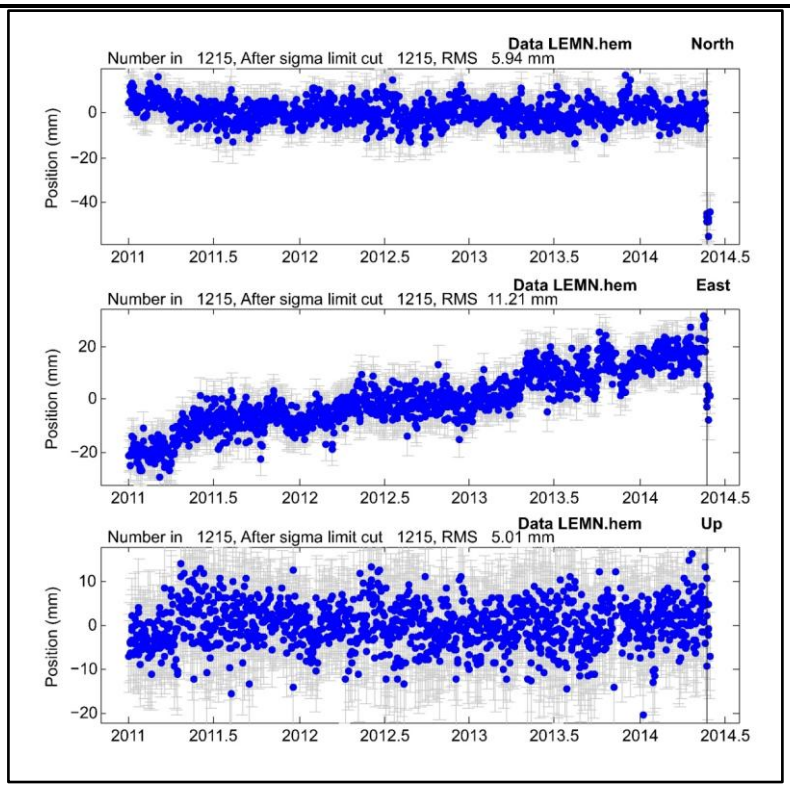

Fig. 2. Position time series (raw) of Hemus-NET station LEMN since year 2011, obtained by GAMIT software. The time of the earthquake is indicated by a vertical, grey line.

We also used the NOA MT solution to obtain the static stress transfer model for this earthquake (Fig. 3). It is seen that most of one-month aftershocks have occurred inside the loaded (reddish) lobes of Coulomb stress, indicating static triggering of seismicity. The increase of Coulomb stress in the surrounding crust is limited to about one-fault rupture length (45 km). The May 24, 2014 earthquake filled the gap along the North Aegean trough identified by Papadopoulos et al. (2002; see Fig. 2 of this paper) and Ganas et al., (2014; see Fig. 10 of that paper).

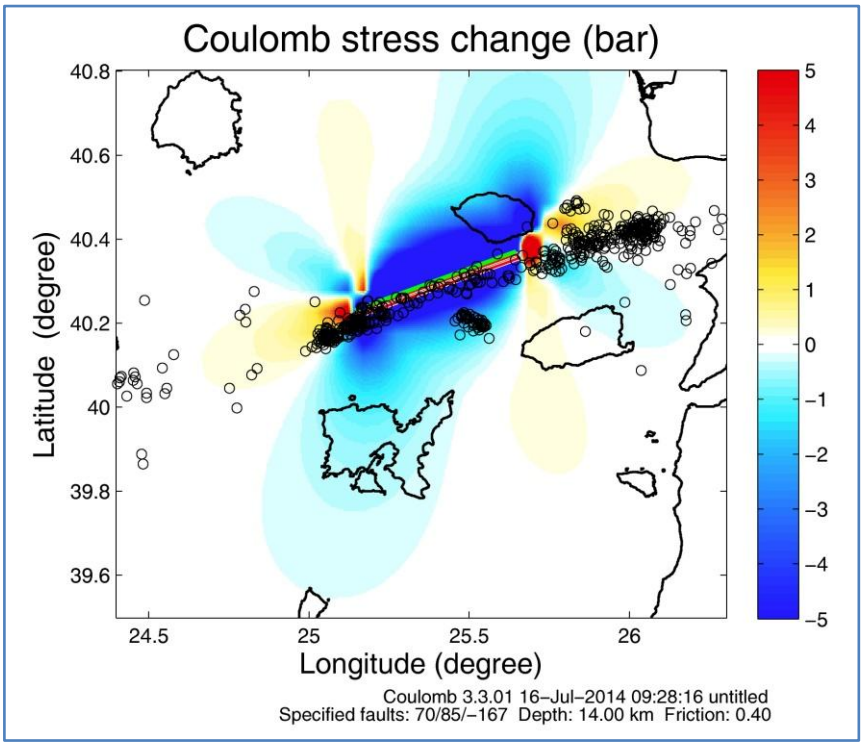

Fig. 3. Map of North Aegean Sea showing spatial distribution of Coulomb stress at 14 km depth following the May 24, 2014 M=6.8 earthquake. Receiver faults have similar kinematics to the mainshock. Vertical scale is in bar (blue areas, unloading; red areas, loading).

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