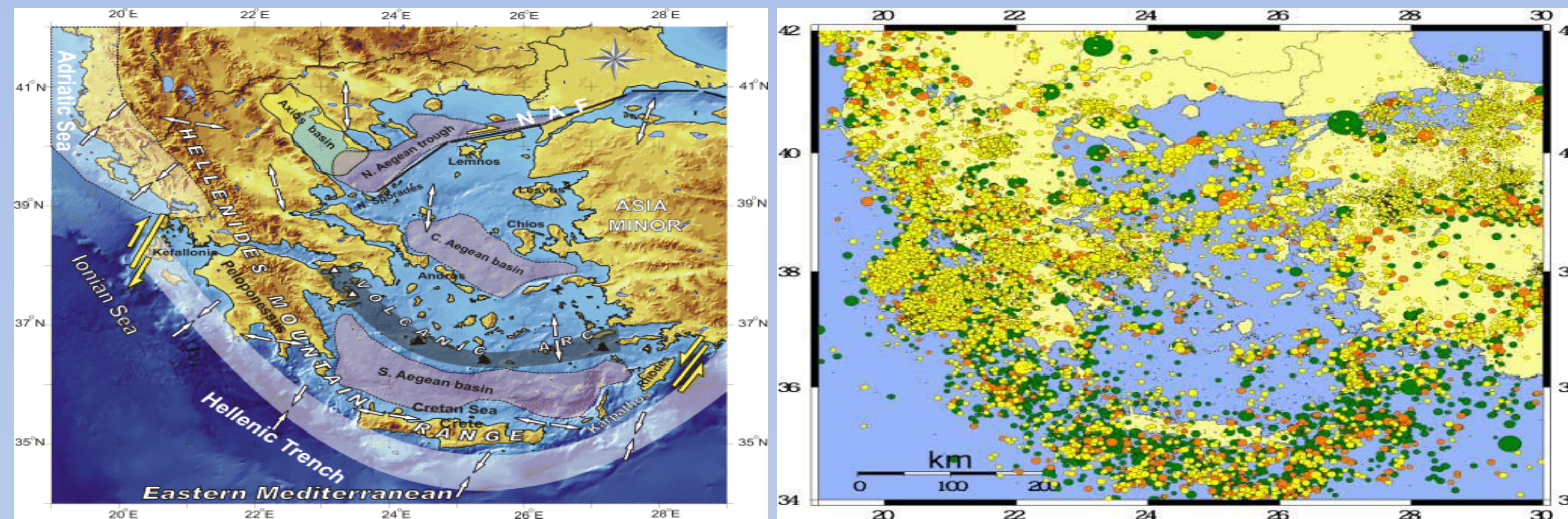


The "Hellenic Unified Seismological Network-HUSN": its implication in the accurate monitoring of the seismicity in the broader area of Aegean Sea

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Greece sits on a tectonically active plate boundary at the convergence of the Eurasian and African lithospheric plates. The compressional motion between Europe and Africa giving rise to the subduction of the eastern Mediterranean lithosphere forming the Hellenic Arc and Trench. The tectonic processes that occur in the subducting slab in the Aegean area control the distribution of both seismicity and volcanism. Due to its geodynamic context the Greece is the most seismically active region in Europe with consequent high seismic hazard. More than 60% of the European seismicity is expected to occur in this region with earthquake magnitude up to $M_w=8.2$.



Greek seismicity is monitored mainly by the Institute of Geodynamics, National Observatory of Athens (IG), one of the oldest Institutes in Greece, operating continuously since 1893. Its main task is the continuous monitoring of the seismicity of the country by installing appropriate seismological network and reporting the located earthquakes to national and international authorities. Today the initial network grew in size and extent, so that today it consists of 40 digital telemetric stations installed over the whole country plus 7 stations from international agencies cooperating with IG located in the southern Aegean and Crete.

Moreover there 3 more seismological centres: the Seismological Laboratories of the Universities of Athens, Thessaloniki and Patras.

- The Seismological Laboratory of the University of Athens belongs to the Department of Geophysics and Geothermy of the National and Kapodistrian University of Athens. The Laboratory first operated in 1929. The Laboratory operates twenty (20) stations organized in three digital telemetric networks: CORNET, VOLNET and ATHENET in the areas of the gulf of Corinth, central Greece and around Athens in an area of 100km radius.
- The Laboratory of Geophysics of the Aristotle University of Thessaloniki was established in 1976. Today, the telemetric seismological network of the Laboratory of Geophysics of the Aristotle University of Thessaloniki consists of twenty eight (28) stations. The stations are installed in northern Greece as well as in the north Aegean and Ionian sea.
- The University of Patras Seismological Laboratory (UPSL) started operating in 1990. The Patras Seismological Lab Seismic Network (PATNET) covers the wider Western Greece area and the Peloponnese. It consists of twenty one (21) stations.

More information can be found in the following web sites <http://bbnet.gein.noa.gr>, <http://dgesl.geol.noa.gr>, <http://geophysics.geo.auth.gr/ss/> and <http://seismo.geology.upatras.gr> belonging to the Institute of Geodynamics and the Seismological Laboratories of the Universities of Athens, Thessaloniki and Patras respectively.

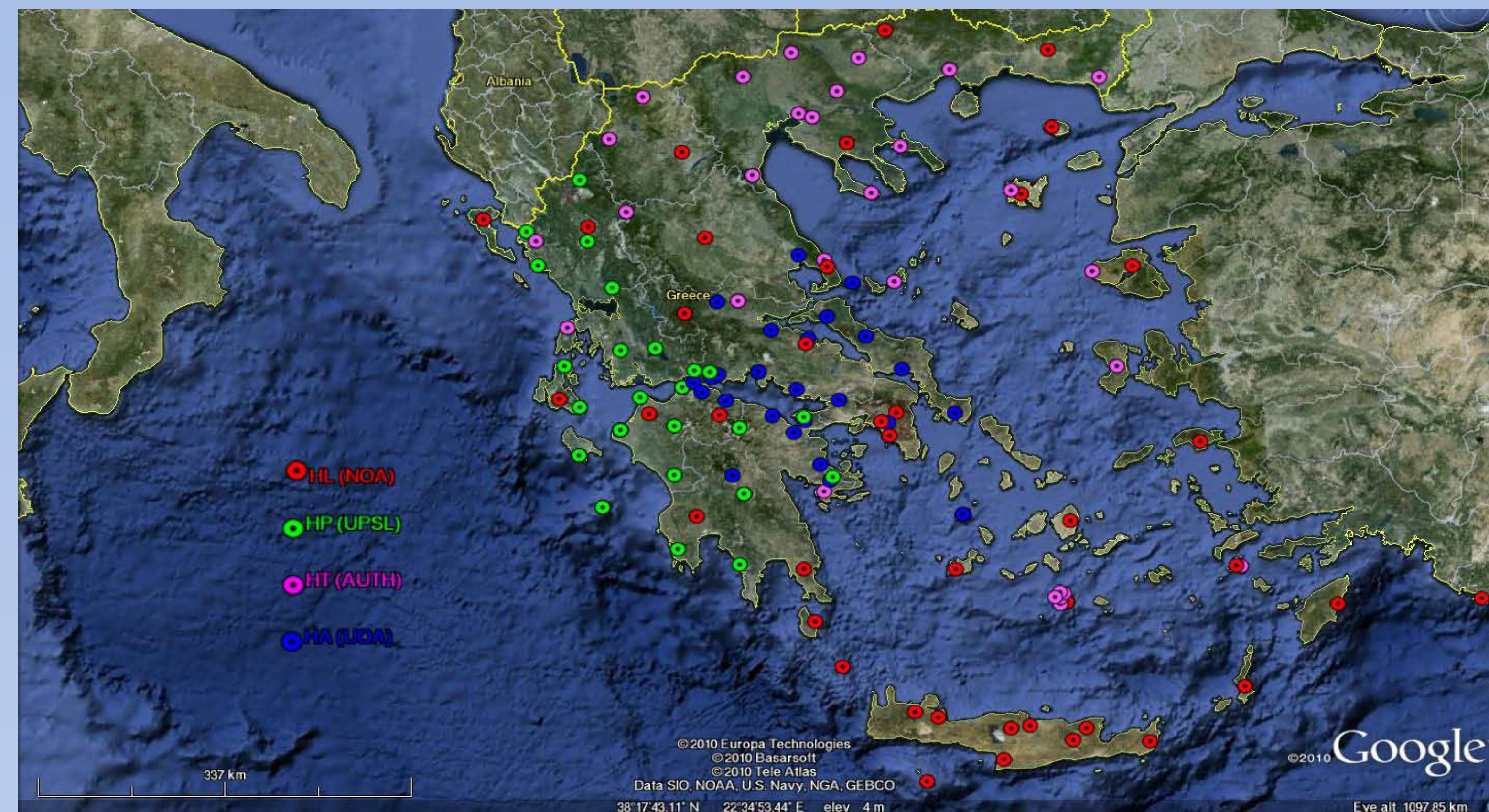
By the beginning of 2005, a national project was launched, named: "Hellenic Unified Seismological Network-HUSN", financed by the Ministry of Development (EPAN 4.5) that intended to unify the Seismological networks of the Greek Institutions, which by the end of 2007, began to give the first results.

This project made possible the successful interconnection of the seismological networks of the four Institutions for more detailed and precise recording of the seismic activity of the broader area of Greece, the unified calculation of seismic parameters, the publication of common announcements of the occurrence of strong earthquakes, the compilation of a national bulletin of earthquakes and more generally the qualitative upgrading of seismological data and seismological research. Basic action of the project is the upgrade of the seismological institutions, their unification with common software and the support of IG-NOA as main coordinating institution. Two parallel Seismic Monitoring Systems operate at IG and are under continuous testing and upgrades: **SeisComp3** and **Earthworm - Response HYDRA**.

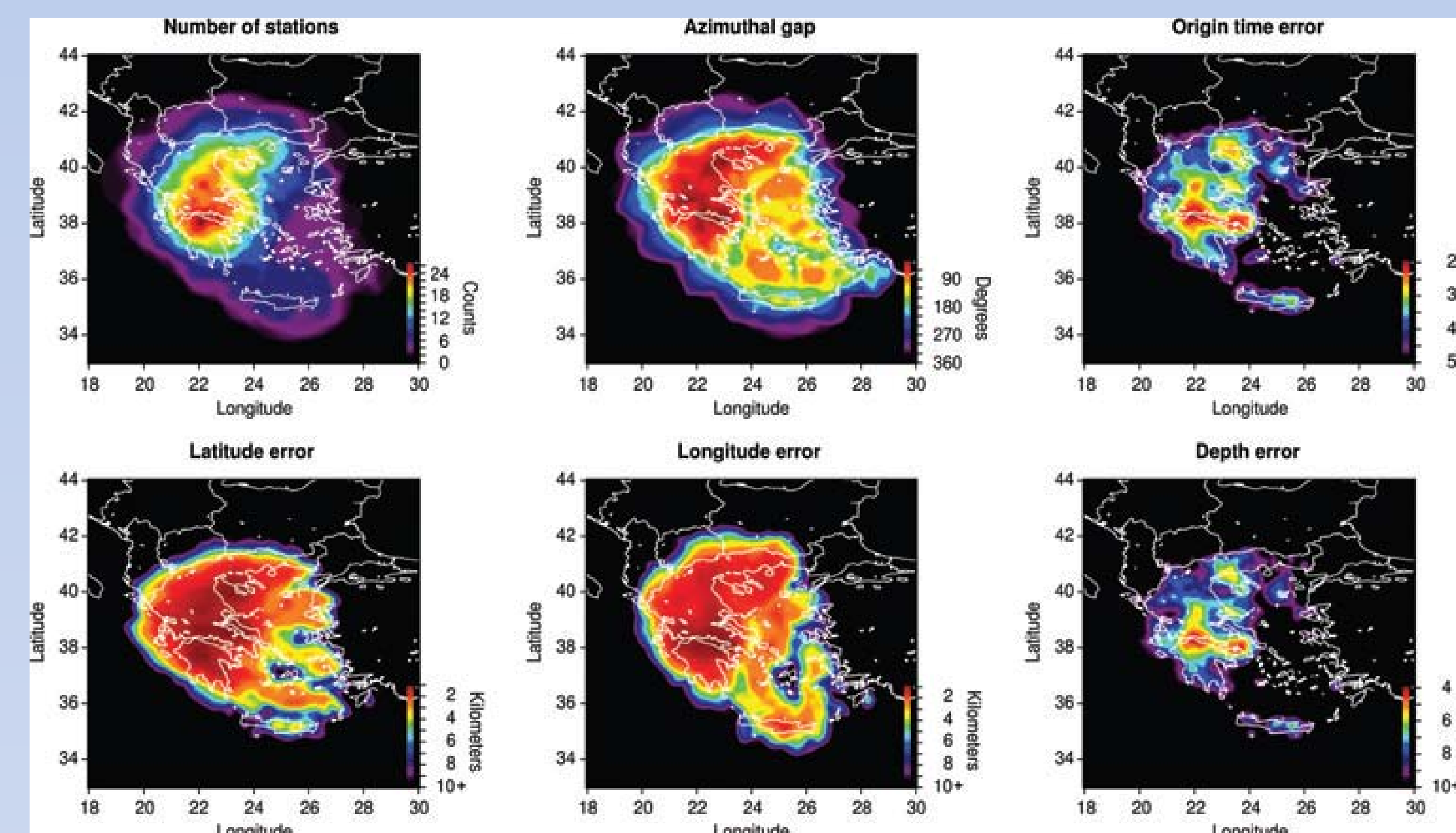
In this way it created the conditions for:

- direct, detailed and more reliable information for the state and public,
- common observations of the seismicity and exchange of all available elements between the institutions
- collection of data for research and possibility of their direct disposal in the scientific community and - more precisely a detailed study of the seismicity of the country.

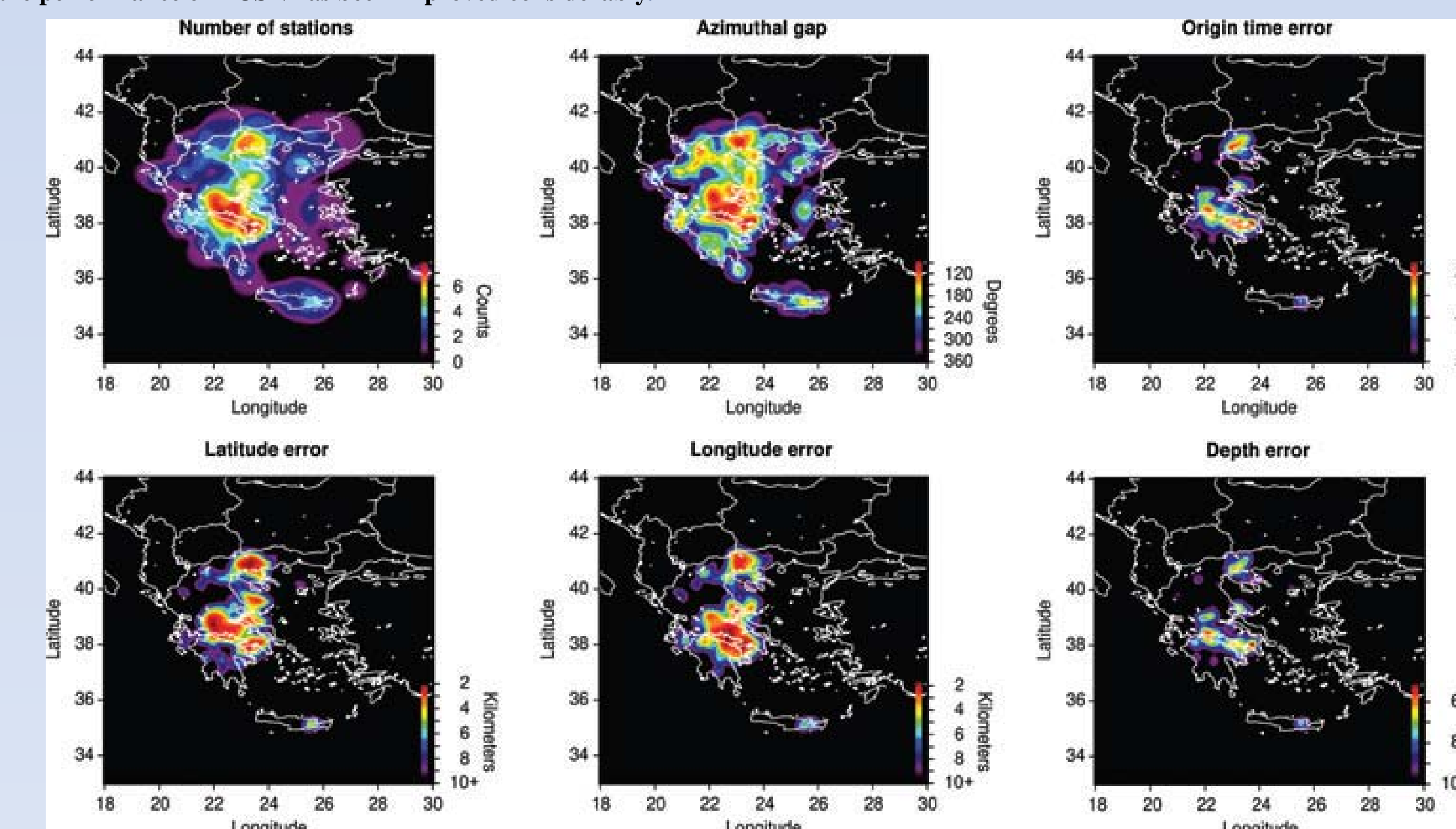
All the signals, from the agreed stations of the partners, are collected by the IG in its central facilities at Thessio and are retransmitted to them. Every partner receives signals from the rest of the partners. This procedure is taking place in real time. At present, 122 digital signals from broad-band instruments are gathered by IG, from which 41 belong to IG, 23 to Athens, 23 to Thessaloniki and 22 to Patras seismological laboratories. Additionally, 13 waveforms from stations belonging to international agencies, (Geofon and MEDNET) and neighboring countries cooperating with IG are also used. The data are analyzed routinely in detail by the staff of IG, producing a daily report of the located earthquakes in the broader area of Greece, while every month a monthly bulletin is produced containing earthquakes with $M \geq 1.5$. The earthquake listings are distributed regularly all over the world to several Seismological centres and Universities, as well as to different Organizations and Libraries. Information and products are given at the website: www.gein.noa.gr while additional information about HUSN is given at: <http://bbnet.gein.noa.gr>.



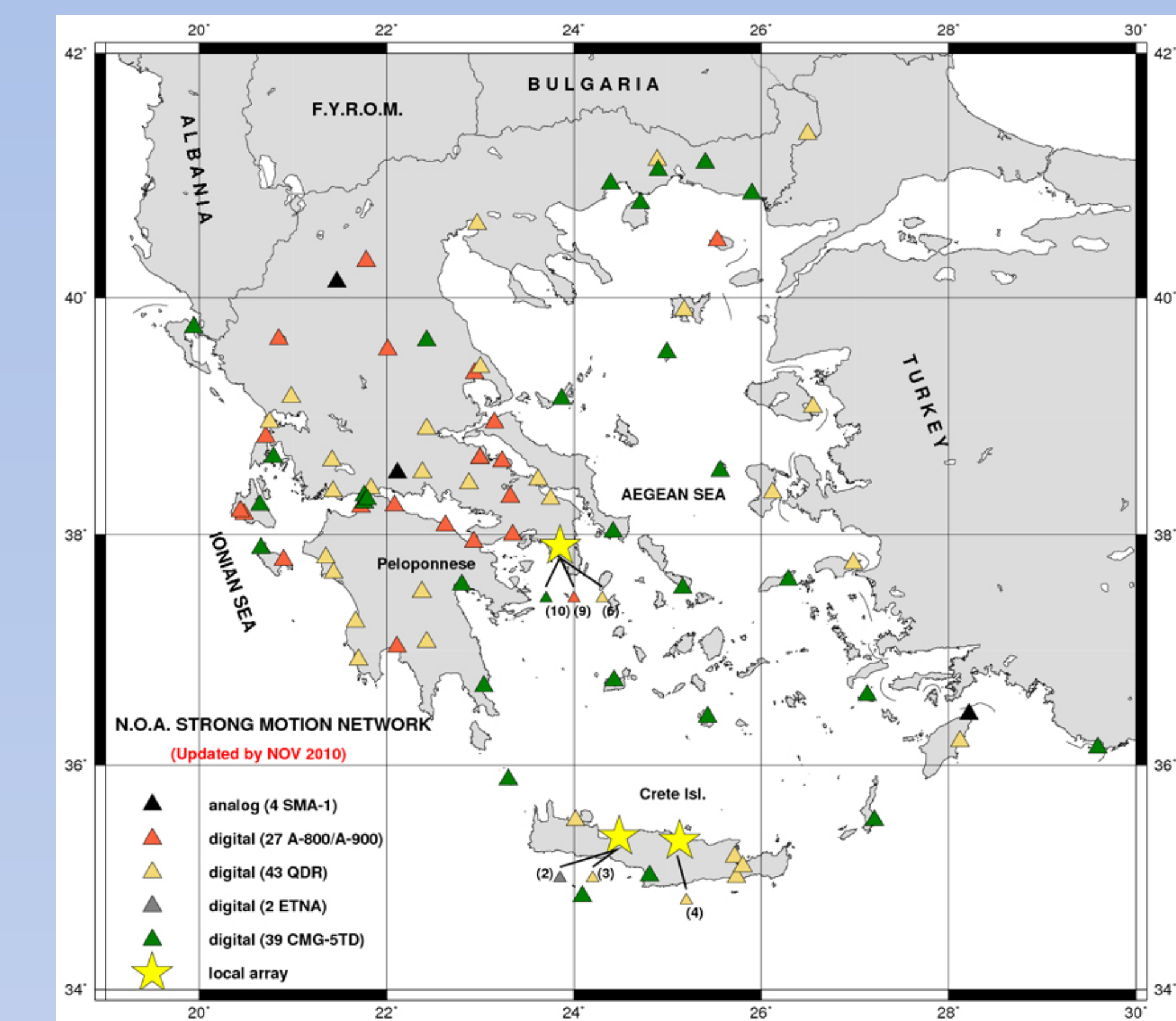
The configuration of HUSN network as it is today. HL(NOA), HP(UPSL), HT(AUTH) and HA(UOA) stand for the Institute of Geodynamics and the Universities of Patras, Thessaloniki and Athens respectively.



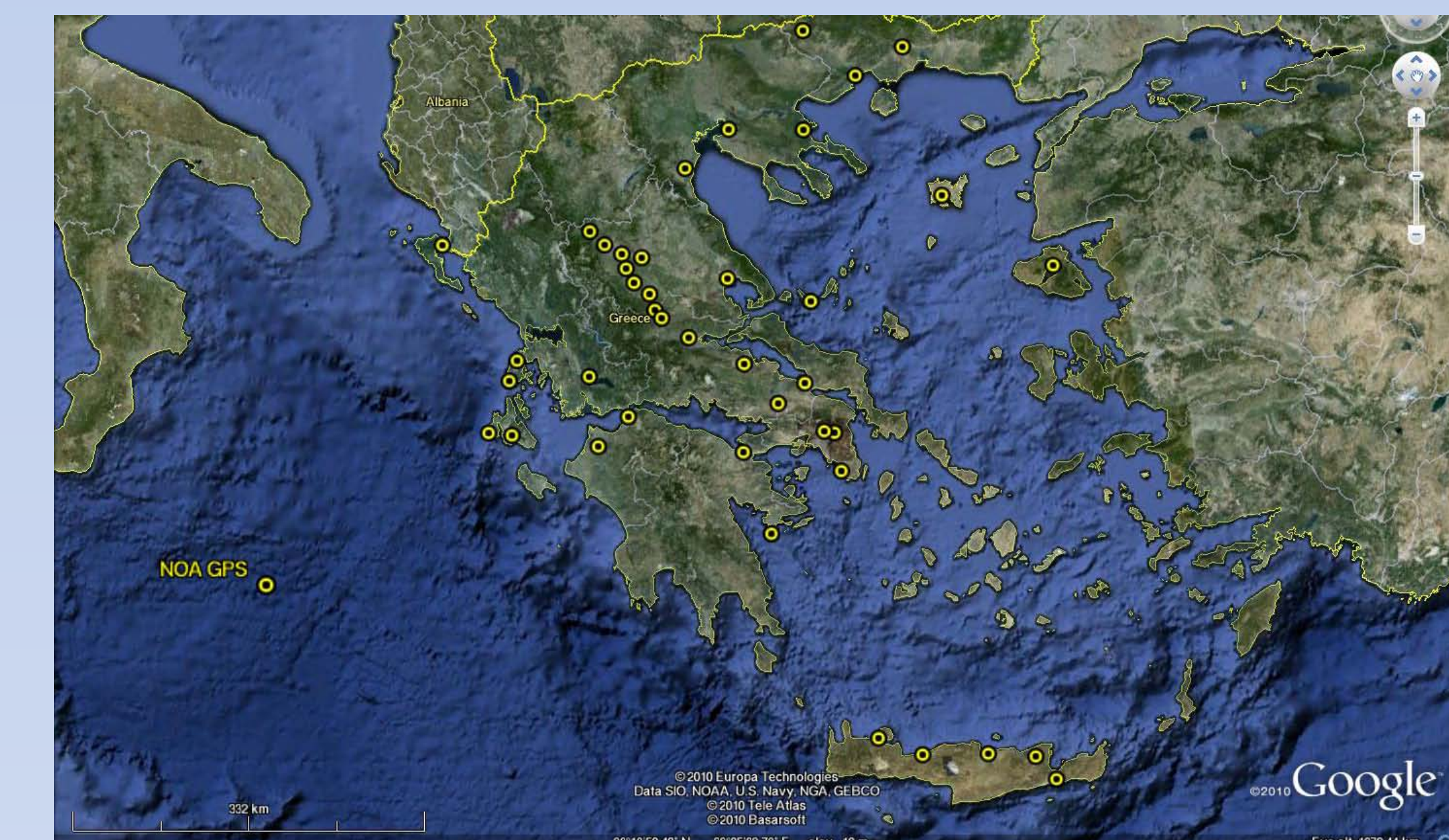
SNES (Seismic Network Evaluation through Simulation method) maps for $M_L = 2$ (above) and 2.5 (below), $H = 10$ km and confidence level of 95%. (D'Alessandro A., Papanastassiou D. and Baskoutas I. (2011). Hellenic Unified Seismological Network: an evaluation of its performance through SNES method. Geophys. J. Int. doi: 10.1111/j.1365-246X.2011.05018.x. This work has been performed when the network was consisted by 88 stations. Now the performance of HUSN has been improved considerably.



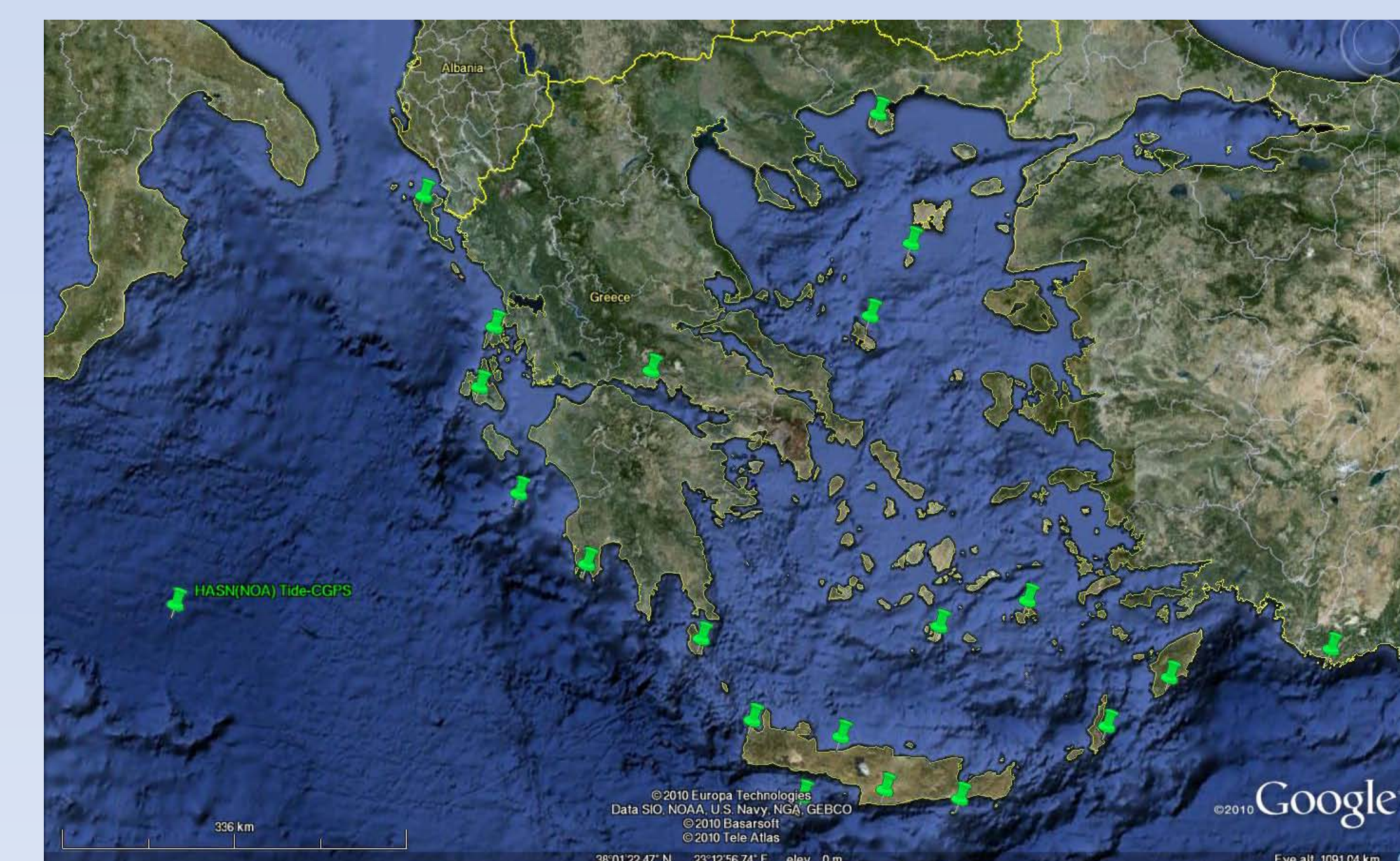
OTHER OPERATING NETWORKS BY THE INSTITUTE OF GEODYNAMICS



STRONG MOTION NETWORK



GPS NETWORK



PLANNED TIDE GAUGE STATIONS