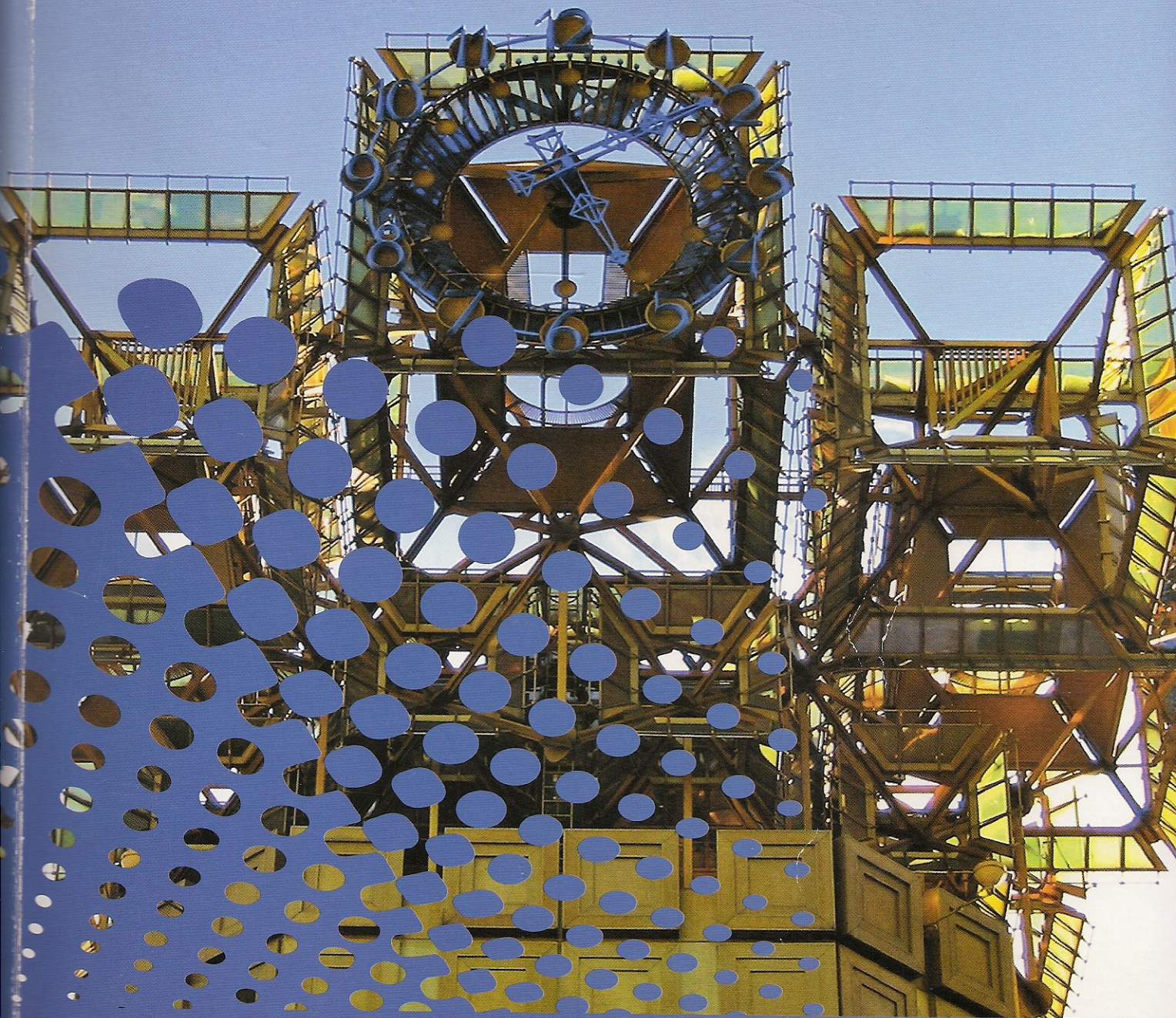


Seismology without boundaries



BOOK OF ABSTRACTS

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RSE1: P005

RECENT SIGNIFICANT EARTHQUAKES IN WESTERN GREECE

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Western Greece is characterized by the highest seismicity of the Greek territory, since it is dominated by a complex seismotectonic regime which results in intense deformation. The northern part of the Ionian Sea is dominated by a continental collision zone, while the southern is characterized by the subduction of the Eastern Mediterranean oceanic lithosphere beneath the Aegean continental lithosphere. The Cephalonia Transform Fault Zone (CTF), related to right-lateral strike-slip focal mechanisms, constitutes a transition zone between these regions.

In April and May 2006 four events ($5.3 \leq M_w \leq 5.7$) occurred south of Zakynthos island and on its SE part. The source parameters of these events were determined using body-wave modeling and revealed reverse faulting for all cases. An area of approximately 300km² was activated, as indicated by the hypocentral distribution of the dense aftershock sequence, consisting of more than 3500 events. As it was revealed by the aftershock distribution along seismic cross-sections, two nearly antithetical faults were activated. Stress transfer was calculated by Coulomb Stress Analysis and positive lobes were obtained, related to the observed seismicity increase towards NNW-SSE.

Two years after the Zakynthos seismic sequence, on 8 June 2008, a large ($M_w=6.4$) event occurred about 22 km E-NE of Andravida town at Western Peloponnese. Source parameters of the mainshock and of the strongest aftershocks were obtained using teleseismic body-wave modeling and regional modeling, respectively. Focal mechanisms of most events indicated strike slip type faulting. A tomography study was performed, consisting of the inversion of both V_p and V_s and of V_p and the V_p/V_s ratio, by inverting first arrival times of the Andravida aftershock sequence. Events were relocated using a double-difference algorithm that takes into account the waveform similarity, estimated by cross-correlation. The rupture plane is the one that strikes in

NE-SW direction, as indicated by both the aftershock hypocentral distribution and the calculated slip. A synthetic peak ground velocity (PGV) ShakeMap was calculated using the slip model, determined by the waveform inversion. It was revealed that, apart from the broader epicentral area, there was another region, north of the mainshock epicenter, with significant PGV values verified by the damage distribution. This fact is strongly related to source directivity towards NE.

RSE1: P006

FREE-OSCILLATIONS OF RECENT GIANT EARTHQUAKES: RESPONSE MODELING OF SOURCE SOLUTIONS

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The March 11, 2011 Tohoku earthquake together with 2004 Sumatra-Andaman and 2010 Maule are the three largest earthquakes recorded during the last decade. Such giant events generate clear signals and offer possibilities to study source processes in a broad frequency range.

Our numerical method based on spatial discretization with high-accuracy pseudospectral schemes allows us to formulate the problem of free oscillations of the sphere as a standard matrix eigenvalue problem. Taking into account a spherical Earth model with corrections due to the rotation and the Coriolis force and also attenuation of the normal modes, we are able to evaluate long-time synthetic accelerograms directly comparable with the observations. Summing the normal modes up to high degrees can also provide the regional co-seismic static response to source models.

We have analyzed the data registered by the superconducting gravimeter OSG-050 and the borehole broadband seismometer CMG-3TD, both located at the Geodetic Observatory Pecny (GOPE), Czech Republic. Our analysis confirmed that the early estimates of the M_w magnitude from surface waves for the 2010 Maule and 2011 Tohoku earthquakes are in a good agreement with the values derived from the longest-period normal-modes records.