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VILNIUS GEDIMINAS TECHNICAL UNIVERSITY

PROGRAM AND ABSTRACT BOOK

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find that this value of the stress drop is quite sensitive to the a and b values of the regional Gutenberg-Richter relation, rather than the assumed maximum magnitude.

OBSERVING CO-SEISMIC DISPLACEMENTS USING 1-HZ DATA FROM A NETWORK OF REFERENCE STATIONS: A COMPARISON OF DIFFERENT DATA PROCESSING METHODS

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GPS data recorded at 1 Hz at stations of the Hellenic Positioning System (HEPOS) are being processed to detect co-seismic displacements. Two different data processing methods are tested: geodetic relative positioning in kinematic mode and Precise Point Positioning (PPP). A strong earthquake (Mw=6.4) occurred in western Greece near Andravida on 8 June 2008 is used to compare the two approaches. Co-seismic coordinate variations of up to 69 mm (peak to peak) and coordinate rates of up to 45 mm/s have been estimated.

For baselines ranging between 67 and 118 km in length the two tested methods were found to be equivalent regarding their ability to detect horizontal displacements, whereas PPP proved to be more sensitive in detecting vertical displacements. For the effective estimation of the arrival time of the surface seismic waves at a station we propose the computation of station velocities. Furthermore, station velocities proved to be suitable for the determination of the duration of the dynamic displacements at a station.

Keywords: Co-seismic displacements; 1-Hz GPS data; Precise Point Positioning; HEPOS.

APPLICATION OF GNSS OBSERVATION RESULTS TO DETERMINATION OF THE GROUND DEFORMATIONS

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Global Navigation Satellite Systems play a principal role in understanding the movements of the Earth's surface. Permanent observation stations record GNSS data. After collecting and processing the data provides precise information on the continuous changes of the GNSS station positions.

The GNSS observations of both Latvian permanent networks – EUPOS®-Riga and LatPos, have been collected for a period of 6 years – from 2008 to 2013. Bernese GPS Software Version 5.0 has been used to obtain daily network solutions with the data of reference stations from EUREF Permanent Network (EPN) and the input data sets from International GNSS Service's (IGS) data bases.

Using post-processing computation results the research on Earth's surface horizontal and vertical movements of the territory of Latvia has been performed. An approximate model of local ground deformations has been derived. Research results show that obtained station velocities correspond with the information on Latvian tectonic faults.

The subdaily coordinate changes of EUPOS®-Riga and LatPos stations have been studied as well. For this purpose, Bernese GPS Software was applied in kinematic mode for 45-day observation period. The post-processing kinematic results with additional information of possible influences on the data quality of some stations allowed to detect multipath effect and signal noise affected by the impact of weather conditions. With the view of continuing geodynamic studies in Latvia using global data, a project of automated multifunctional optical tracking device is under construction in the Institute of Geodesy and Geoinformation of the University of Latvia. It will be based on Alt-Alt type mount and will have three configurable optical channels; two of them are high-class optical systems with 16" apertures. Optical systems can be configured with different sensors, including CCD matrix for astrometric imaging and fast high sensitivity detectors for SLR operations. The digital image channel can be used for near-space object detection and for accurate real-time positioning system calibration. The device will be capable of SLR observations of GNSS satellites, offering a number of possibilities to improve GNSS data accuracy.

Session 3

ETRS89: PRESENT AND FUTURE

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MAINTENANCE AND DENSIFICATION OF THE ITALIAN GNSS NETWORK

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The Rete Dinamica Nazionale (RDN) of Istituto Geografico Militare (IGMI) consists of 100 permanent stations uniformily distributed in the national territory. The RDN was adjusted at epoch 2008.0 in the ETRF2000 frame and approved as class B network at the 2009 EUREF Symposium. It includes 28 EPN stations, of which 10 are also IGS sites. Because of interplate motions of some mm/yr relative to the ETRF2000 frame, it is necessary to recompute the network periodically. Within the project CISIS – NSPR, the University of Bologna, Politecnico of Milano and University of Padova, in conjunction with IGMI and CISIS, recompute periodically the RDN, with densifications. We report on the reprocessing (repro2) of the RDN in the time frame 2008-2013, with addition of several stations to a total of ca 400 sites. Precise and consistent coordinates are necessary in support of RTK regional networks, cadastral surveying as well as monitoring of regional deformations in seismic areas.

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