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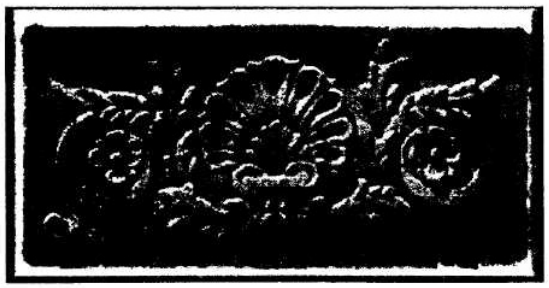
Abstracts



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2535 Dynamic Elastic Properties Evaluation of Near Surface Unconsolidated Material From Shear Wave Velocity Measurements in Heraklion Area, Crete.

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In recent years, geophysicists and engineers have become increasingly aware of evaluating the effect of soil conditions on the strong ground motion characteristics, referred usually to the competent bedrock. The accurate determination of the dynamic elastic properties requires sufficient knowledge of the direct compressional and shear wave velocities. In areas of soft-unconsolidated material, the calculation of seismic velocities and consequently of the dynamic elastic moduli, is not an easy task. A combined geophysical survey has to be carried out, including different seismic sources, as well as, special imaging techniques. This need is met by employing highly reliable geophysical techniques, like cross-hole and seismic tomography. In this project, a significant effort has been directed towards measuring the direct shear wave, although it is not the first arrival and therefore is often masked and difficult to be identified. Fourier spectra were calculated for the three-component traces and the appropriate filter parameters have been designed, in order to facilitate the shear wave's arrival picking. Both the compressional and the shear wave energy was produced by a highly efficient seismic source, operating in fluid filled boreholes. In most instances, the cross-hole technique is implemented in conjunction with seismic tomography, in order the calculated dynamic properties to be compared with the geological structure of the interwell space, provided by the tomographic imaging. Examples are drawn from the extensive survey, which has been conducted within the framework of the microzoning study of the city of Heraklion, Crete.

2157 Bedrock Structure around Faults and its Implication to Earthquake Hazard Assessment: A Case Study of the 1995 Kobe Earthquake

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Serious damage in the northern margin of the Osaka basin, broutht by the Kobe Earthquake (M7.2) of January 17, 1995, is distributed on E-W oriented belt-like zone between the mountain range and Osaka Bay. Frequency-wavenumber(f-k) and horizontal-to-vertical ratio(H/V) spectral analyses of microseisms(long-period microtremors), and 2D- and 3D- analyses of Bouguer gravity anomalies, were conducted to elucidate the subsurface structure around the eastern end of the severely damaged belt-like zone, where many faults are located.

A close relation was found between the fault-related bedrock configuration thus obtained and the distribution of earthquake damage: narrow zone of severe damage was located 1.5 to 2 km apart from the basin edge where the depth to bedrock changes abruptly by several hundreds to thousand meters. The relation was attributed to the amplification of ground motions due to the specific configuration of bedrock, that is, focusing of seismic waves and/or interference between incident S waves and surface waves secondarily generated at the basin edge.

It is pointed out, as a lesson learned from the Kobe Earthquake disaster, that investigation of fault-related 3-D bedrock configuration is an urgent issue of hazard mapping of an urban area on a sedimentary basin. For this purpose, microzonation based on comparative analysis of microseisms and Bouguer gravity anomaly is highly prospective.

2330 A Study on the Duration of Vrancea Earthquake's Ground Motions on the Territory of Moldova Republic

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For estimation the duration of Vrancea earthquake's ground motions (the reaction phase limited to the level of half of the maximum acceleration) the statistical analysis method of the envelop time function was used.

As initial data were used the records of horizontal free ground motions of 36 intermediate depth Vrancea earthquakes in magnitude's range 4.0 - 7.2 and epicentral distance 100 - 250 km (168 accelerograms were used).

Insufficiency of initial data representation permit to analyze the dependence of duration only of two factors- magnitude and epicentral distance. Evaluation of magnitude influence on duration was conducted on the basis of the statistical analysis of behavior of the envelop time functions within the limits of two large groups of magnitude (4.0 - 5.2 and 5.9 - 7.2) at determined epicentral distance.

It is established, that at transition from magnitude's interval 4.0 - 5.2 to 5.9 - 7.2 duration increased near 1.5 - 1.7 time.

According with the regional maximum probably earthquake (M=7.5) the expected maximum duration for 8 points zone of seismicity of Moldova (epicentral distance 100 - 179 km) due to be equal to 7 - 8 sec.

1717 Aftershock Deletion in Seismicity Analysis

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As one of the results of dynamic interactions between geological masses within the seismogenic zone on both space and time scale, aftershocks reflect the nonrandom feature of earthquake occurrence and cover up to a certain extent the statistical characteristics of independent event distribution. This will inevitably enhance the uncertainty of seismicity estimation and therefore affect the results of hazard assessment. So it is necessary to delete aftershocks from earthquake catalogs when conducting analysis on seismicity.

In this paper, several methods of aftershock deletion are reviewed. and a new magnitude-dependent method (G-C Method) is proposed according to the empirical relation between fault length and earthquake magnitude (Guo et al., 1979) and the time window of aftershocks given by Console et al.(1979). Moreover, using this method as well as those developed by Console et al. and by Keilis-Borok et al., aftershocks in the globe, mainland of China, Southern California and North China are removed from relative original earthquake catalogs respectively. Consequently, frequency counting and R/S analysis are performed on both the original and the revised (aftershock deleted) seismicity data. The statistical results show that the aftershock-deleted earthquake sequences in time are distributed more stationarily and independently than the original ones, but even in the former, there still exist some nonrandom factors which are implied by the Hurst Exponent $H > 0.5$ in the R/S analysis.

Finally, effectiveness testing for aftershock deletion methods and their results as well are made further discussion, which provides a possibility to give a general standard of aftershock deletion in seismicity analysis and hence may cut down the uncertainty of seismicity estimation.