SEISMICITY CHANGES IN POLYPHYTO DAM AREA (NW GREECE)

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The three reservoirs of Aliakmonas river (NW Greece), i.e. Polyphyto which is the second greater reservoir in Greece, Sfikia and Asomata, are located downstream of each other. The basement of these reservoirs belongs to the Pelagonian geotectonic zone which consists of Pre-Alpine and Alpine formations, such as gneisses and schists, covered by carbonate rocks and flysch. The Vourinos massif, mainly characterized by ophiolites, overlies over the previous formations. The main faults that dominate the broader Polyphyto reservoir area are: a) a 70 km long fault zone which consists of several subparallel faults with an ENE-WSW to NE-SW direction, parallel to the Polyphyto artificial lake, b) the Chromio-Vari, Pontini-Pilori and Feli faults located SW of the edge of the Polyphyto lake, striking in a E-W direction and c) the Vegoritis-Ptolemais fault system with a NE-SW direction.

Within the framework of the present study, possible seismicity changes after the impoundment of the Polyphyto Dam, in January 1974, are investigated. In the period 1900-1973 only four events with Ms≥4.0 occurred within distances up to 50km from the Dam, according to the Makropoulos et al. (2012) instrumental catalogue. However, during the period 1974-1994, before the occurrence of the unforeseen Ms=6.5 Kozani-Grevena, on 13 May 1995, 15 earthquakes with 4.0≤Ms≤5.4 were observed.

The reliable estimation of seismic hazard parameters, such as the peak ground acceleration (PGA), is important for earthquake resistant planning and risk mitigation. In the present study, PGA values are calculated, with a 90% probability of no exceedance in 50 years, for the broader Polyphyto Dam region, using the extreme values method and the 1st asymptote approach. The latter is performed for three time periods, in order to examine the effect of the Dam to the seismic hazard of the region. The first covers the time span 1900-1973, before the impoundment of the Dam in 1974, the second the period 1900-1994, before the occurrence of the 1995 Kozani Earthquake, and the third the whole instrumental period. The comparison of the results obtained by the analysis, indicates an increase of the PGA values after the impoundment in the whole region, with the exception of the vicinity of the NE edge of the Dam. Before the occurrence of the 1995 event, its epicentral region also exhibited higher PGA values. The largest increase is observed SE of the Dam, where the highest PGA values are obtained for both the second and the third period (200 and 225cm/sec^2, respectively). The observed increase of both the number of earthquakes and of PGA values may be attributed to the impoundment of the Polyphyto Dam.