



## **Seismic hazard assessment of the cultural heritage sites: A case study in Cappadocia (Turkey)**

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Turkey is one of the most seismically active regions in the world. Major earthquakes with the potential of threatening life and property occur frequently here. In the last decade, over 50,000 residents lost their lives, commonly as a result of building failures in seismic events.

The Cappadocia region is one of the most important touristic sites in Turkey. At the same time, the region has been included to the World Heritage List by UNESCO at 1985 due to its natural, historical and cultural values. The region is undesirably affected by several environmental conditions, which are subjected in many previous studies. But, there are limited studies about the seismic evaluation of the region. Some of the important historical and cultural heritage sites are: Goreme Open Air Museum, Uchisar Castle, Ortahisar Castle, Derinkuyu Underground City and Ihlara Valley. According to seismic hazard zonation map published by the Ministry of Reconstruction and Settlement these heritage sites fall in Zone III, Zone IV and Zone V. This map show peak ground acceleration or 10 percent probability of exceedance in 50 years for bedrock.

In this connection, seismic hazard assessment of these heritage sites has to be evaluated. In this study, seismic hazard calculations are performed both deterministic and probabilistic approaches with local site conditions. A catalog of historical and instrumental earthquakes is prepared and used in this study. The seismic sources have been identified for seismic hazard assessment based on geological, seismological and geophysical information. Peak Ground Acceleration (PGA) at bed rock level is calculated for different seismic sources using available attenuation relationship formula applicable to Turkey. The result of the present study reveals that the seismic hazard at these sites is closely matching with the Seismic Zonation map published by the Ministry of Reconstruction and Settlement.

**Keywords:** Seismic Hazard Assessment, Probabilistic Approach, Deterministic Approach, Historical Heritage, Cappadocia.