

Seismo-Volcanic Hazards in Great Ararat Region, Eastern Turkey

Authors : Mehmet Salih Bayraktutan, Emre Tokmak

Abstract : Great Ararat Volcano is the highest peak in South Caucasus Volcanic Plateau. Uplifted by Quaternary basaltic pyroclastic and lava flows. Numerous volcanic cones formed along with the tensional fractures under N-S compressional geodynamic framework. Basaltic flows have fresh surface morphology give ages of 650-680 K years. Hyperstene andesites constitute a major mass of Greater Ararat gives ages of 450-490 K years. During the early eruption period, predominately pyroclastics, cinder, lapilly-ash volcanic bombs were extruded. Third-period eruptions dominantly basaltic lava flows. Andesitic domes aligned along with the NW-SE striking fractures. Hyalo basalt and hornblende basaltic lavas are the latest lava eruptions. Hyalo-basaltic eruptions occurred via parasitic cones distributed far from the center. Parasitic cones are most common at the foot of Mount covered by recent NW flowing basaltic lava. Some of the cones are distributed on a circular pattern. One of the most hazardous disasters recorded in Eastern Turkey was July 1840 Cehennem Canyon Flood. Volcanic activities seismically triggered resulted in melting of glacier cap, mixed with ash and pyroclastics, flowed down along the Valley. Mud rich Slush urged catastrophically northwards, crossed Ars River and dammed Surmeli Basin, forming reservoir behind. Ararat volcanoes are located on NW-SE striking Agri Fault Zone. Right lateral extensional faults, along which a series of andesitic domes formed. Great Ararat, in general strato-type volcano. This huge structure, developed in two main parts with different topographic and morphological features. The large lower base covers a widespread area composed of predominantly pyroclastics, ignimbrites, agglomerates, thick pumice, perlite deposits. Approximately 1/3 of the Crest by height formed of this basement. And 2/3 of the upper part with a conic- shape composed of basaltic lava flows. The active tectonic structure consists of three different patterns. The first network is radially distributed fractures formed during the last stage of lava eruptions. The second group of active faults striking in NW direction, and continue in N30W strike, formes Igridir Fault Zone. The third set of faults, dipping in the northwest with 75-80 degrees, strikes NE- SW across the whole Mount, slicing Great Ararat into four segments. In the upper stage of Cehennem Canyon, this set cutting volcanic layers caused numerous Waterfalls, Rock Avalanches, Mud Flows along the canyon, threatens the Village of Yanidogan, at the apex of flood deposits. Great Ararat Region has high seismo-tectonic risk and by occurrence frequency and magnitude, which caused in history caused heavy disasters, at villages surrounding the Ararat Basement.

Keywords : Eastern Turkey, geohazard, great ararat volcano, seismo-tectonic features

Conference Title : ICVVSPB 2021 : International Conference on Volcanology, Volcanic Structures and Plate Boundaries

Conference Location : Paris, France

Conference Dates : October 28-29, 2021