



A possible volcanic hazard risk deduced from recent activity of the Gölcük volcano, SW Turkey

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The Gölcük volcano is located in the southern part of Kirka-Afyon-Isparta volcanic province (SW Turkey) within the Isparta-Angle belongs to the post-collisional alkali potassic-ultrapotassic magmatism. The entire explosive activity of Gölcük volcano during Pleistocene resulted in three main volcanic formations and is disconnected from the older (Pliocene) volcanism. The first volcanic period started with a major explosive regional event at 206.1 ± 9.8 ka and lasted about 50.000 years after with at least 6 explosive episodes relatively spaced in time. Tephriphonolitic lava flows, domes and dykes of second volcanic cycle occurred between 115 ± 3 ka and 62 ± 2 ka with probably some tephras deposit at the bottom of the tuff-ring. The tuff-ring formed from 72.7 ± 4.7 ka to 24 ± 2 ka as last cycle with ending by trachytic dome extrusions. The periodicity of eruptive events indicate that the volcano is at rest and will activate in the feature.

The morphological structure of the Gölcük area shows that the major valleys between Gölcük and Isparta drain and dip to the province capital of Isparta with 250.000 inhabitants. In the case of a new eruptive volcanic activity in the Gölcük area, the pyroclastic materials might flow through these major valleys opened on the northern flank of the Gölcük volcano mostly.

Recent shallow earthquake activities (3-5 km) around Gölcük volcano, especially in the western side of Isparta depression area bounded by Kayıköy fault, may be the signal of a magmatic activity within a possible magma chamber underneath the region. On the other hand, gas outlets take place in the area between Kayıköy fault and Burdur fault zone which may be related to the possible magma chamber activities. In the case of existence of magma chamber structure by (i) evaluation of recent earthquake activities, (ii) analyses of gas outlets, and (iii) geophysical studies related to shallow to deep seated structures, a necessary monitoring system should be installed for the prediction of volcanic activity.