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## **A possible volcanic hazard risk of the Gölcük volcano (Isparta), SW Turkey**

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The Gölcük volcano is located in the southern part of the Kirka-Afyon-Isparta volcanic province within the Isparta Angle which forms the North pointing cusp and belongs to the post-collisional alkali potassic-ultrapotassic magmatism in connection with tectonic structures resulting from the main alpine orogenic phases of the Helleno-Tauric belt. The entire activity of the Gölcük volcano took place during Pleistocene and is disconnected from the older volcanism in Pliocene age (6 Ma). As a first volcanic cycle, it might be considered as a new volcanic period starting with a major explosive regional event at  $206,1 \pm 9,8$  ka and lasting 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  $115 \pm 3$  ka and  $62 \pm 2$  ka with probably some tephra deposits at the bottom of the tuff-ring. As last volcanic cycle, the tuff-ring formed from  $72,7 \pm 4,7$  ka to  $24 \pm 2$  ka with ending by trachytic dome intrusions. Moreover, average disequilibrium-corrected (U-Th)/He zircon ages are  $14,1 \pm 0,5$  and  $12,9 \pm 0,4$  ka. The both ages are indistinguishable within analytical uncertainties suggested these both lavas erupted quasi simultaneously. The periodicity of eruptive events indicate that the volcano is at rest and will activate in near future.

The morphological structure of the Gölcük area shows that the major valleys between Gölcük and Isparta drain and dip to the provincial capital of Isparta with 200.000 inhabitants. In case of a volcanic eruption in the Gölcük area, the pyroclastic materials flow through these major valleys opened on the northern flank of the Gölcük volcano mostly. Moreover, the pyroclastics distributing in a large area between Gölcük and Isparta consist of poorly welded materials.

Recent shallow earthquake activities (up to 5 km) around Gölcük volcano, especially at Kayıköy fault in the NE, point to a volcanic origin associated with a possible magma chamber rather than the tectonic origin. In relation, it is assumed that there might be a link between the gas outlets in the area between Kayıköy fault and Burdur fault zone and a possible magma chamber. To protect the 250.000 inhabitants of provincial capital Isparta from volcanic hazards by the Gölcük volcano, a monitoring system for the prediction of volcanic activity can be installed by measurements of seismic activities, gas contents and hydrogeochemical parameters.

