



Kos-Nisyros-Yalı Volcanic System: Need for a New Risk Analyses in the Area?

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Kos-Nisyros-Yalı volcanic system is the easternmost volcanic field of the South Aegean Active Volcanic Arc. Emplacement of the Kos Plateau Tuff (KPT) ignimbrite, dated at 161 ka BP, was due to the most powerful explosive eruption along the arc during Quaternary. Rhyolitic KPT ignimbrite deposits are found on Greek islands, as well as Datça and Bodrum Peninsulas of Turkish mainland. Emergence of the Nisyros volcano postdates the KPT eruption, and has two eruptive periods as cone-building and caldera-forming activity. Yalı islet hosts the youngest of products of this volcanic system.

Nisyros is considered an active volcano owing to recent hydrothermal explosions, shallow earthquakes and high-enthalpy geothermal system. Despite the increasing number of studies on the volcanological and petrological evolution of Nisyros over the past decade, there is no consensus on the stratigraphy, distribution, age and of the tephra. It is believed that only limited Nisyros proximal tephra deposit exists on land due to caldera collapse events in the proximal area, and deposition in marine environment in distal settings. Some studies claimed that the Nisyros tephra was not deposited on land or neighbouring islands, either due to the erosion of the tephra, or non-deposition due to weak eruptions.

The age of the KPT ignimbrite was well constrained by Ar-Ar method. However, the age of the Nisyros tephra is problematic, due to the use of different methods for geochronology (^{14}C , O isotope, K-Ar, fission track), and distal marine tephra for stratigraphy and correlation. There are also studies suggesting that the Nisyros tephra covered larger distances than expected (300 km to the north), and deposition of possible Nisyros Kyra subunits in Chalki island and Datça, and on the KPT ignimbrite in Tilos and Pachia islands. Considering the differences in chronologic methods, distribution and use of marine distal tephra, proximal and distal correlation of Nisyros tephra was not accomplished successfully upto date, and the identification of onland deposited tephra becomes more important.

In this study we aim to present the observations from our preliminary studies on the Kos-Nisyros tephra on Turkish mainland, and discuss the distribution and field characteristics with regard to previous studies in the region. For instance, maximum lithic clast size we observed for Bodrum and Datça KPT deposits exceeds 50cm, as opposed to 20 cm measured in the previous studies. Moreover, we observed possible Nisyros tephra (Kyra sub-unit) consisting of normal and banded pumice fall and surge deposited on KPT ignimbrite in several locations in Datça Peninsula. Therefore it can be argued that the distribution of Kos-Nisyros tephra, at least on the Turkish mainland, should be reevaluated and risk assessment for these events should be reconsidered accordingly.

Keywords: Aegean Volcanic Arc, Kos-Nisyros-Yalı system, ignimbrite, pumice fall, Datça, Bodrum, Turkey