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$^{40}Ar/^{39}Ar$ ages for the northern islets of the Northern Taiwan Volcanic Zone

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The Northern Taiwan Volcanic Zone (NTVZ), consisting of the Tatun Volcano Group (TVG), the Keelung Volcano Group, Tsaolingshan, and several offshore islets, is a volcanic feature influencing North Taiwan's onshore and offshore areas. In the past three decades, extensive efforts have been made to investigate the eruption history and potential activities of the TVG as it is located around the Taipei Metropolis, home to over 7 million inhabitants. However, the detailed information on other inland and offshore volcanoes remains unclear. In this study, we dated three basaltic samples collected from the islets within the NTVZ using the $^{40}Ar/^{39}Ar$ dating method. We provide robust ages of 268 ± 19 ka for the second stage of lava flow and 119 ± 12 ka for the fourth stage of the dike from the Pengjia islet, while the age for the sample collected from the surface of Mianhua islet cannot be distinguished from 0 ka. Our novel $^{40}Ar/^{39}Ar$ age results support the field observations, indicating the eruptions in both islets are much younger than previously thought (Pengjia: ≥0.3 Ma; Mianhua: ≥0.4 Ma). Our study aims to bring together scientists, engineers, and policymakers to assess the volcanic risk that may impact the future development of this area and the surrounding region.

Keywords: geochronology; hazards; Okinawa Trough; Pengjia; Mianhua