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The western Aeolian Islands volcanoes (South Tyrrhenian Sea): highlight on their eruptive history based on K-Ar dating.

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The Aeolian Islands volcanoes are located in southern Tyrrhenian Sea on the northern continental margin of the Calabro-Peloritan basement. The Stromboli, Panarea and Vulcano volcanoes of the half eastern sector are well studied as they are still active and they represent high volcanic hazard. While stratigraphic studies were carried out on volcanoes of the western sector, radiometric ages are lacking to well understand their eruptive history. Therefore, new geochronological and geochemical data were obtained for Alicudi, Filicudi, Salina and Lipari western volcanoes. The aim is to establish a complete time framework of the volcanism and to study possible time-related variations of magma compositions. The 37 new ages were obtained using K-Ar Cassignol-Gillot technique that is suitable for dating Quaternary volcanic rocks. The new geochemical data consist of whole rock major and trace elements analysis on dated samples. Our new sets of data give evidence that the Aeolian Islands are young volcanoes emplaced within the last 300 ka. The oldest products outcrop at Filicudi, Salina and Lipari. Te first emerged activity of Alicudi volcano occurred 120 ka ago. While quiescence activity of at least 50 ka is recognized at Filicudi and Lipari, and potentially at Salina, the volcanic activity of Alicudi would have been relatively continuous. These whole volcanoes were active within the last 30 ka which has to be considered for volcanic hazard assessment. At the scale of each volcano, the degree of differentiation increase roughly through time, except at Filicudi where the ultimate products correspond to mafic magma. At the scale of the archipelago, this process increases from western Alicudi and Filicudi volcanoes, where andesitic magmas are the most evolved magmas, to central Salina and Lipari volcanoes, where rhyolitic magmas are emitted during explosive eruption. Moreover, pulses of magmatic activity would have occurred around 30-40 and 110-120 ka when the four volcanoes were probably active simultaneously.