Zircon U-Pb and Hf isotopic constraints on the petrogenesis of volcanogenic rocks from the Coastal Range, eastern Taiwan

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The Coastal Range, eastern Taiwan that represents the northernmost part of the Luzon arc is composed of volcanic and sedimentary sequences. Our study reports new zircon U-Pb age and Hf isotopic data of selected volcanogenic rocks from a cross section in Tungho area, the southern Coastal Range. The results are as follows: (1) two andesite samples yielded zircon U-Pb ages at 7.7±0.3 Ma and 7.8±0.3 Ma, with identical $\varepsilon_{Hf}(T)$ values from +24 to +13; (2) an epiclastic sample yielded two age peaks at 8.4±0.4 Ma and 4.2±0.3 Ma, with $\varepsilon_{Hf}(T)$ values from +20 to +12, corresponding to the ages and Hf isotopic ratios obtained from magmatic zircons in associated volcanic rocks, and thus sourcing mainly from the arc volcanics of the Coastal Range; (3) two samples from tuffaceous layers in the lower and upper parts of the Plio-Pleistocene Paliwan Formation yielded ages at 1.7±0.2 and 1.6±0.1 Ma, respectively, which are the youngest volcanic ages obtained so far from the Coastal Range; their low $\varepsilon_{Hf}(T)$ values (-17 to +8) and high U contents (205 to 1239 ppm), however, suggesting that the tuffaceous layers derived most likely from eruptions in the Lutao islet, off SE Taiwan. The above data allow us to conclude that the volcanism in the Coastal Range was active at ~8 Ma and terminated at ~4.2 Ma, while the Paliwan Formation in Tungho was deposited largely at ~1.7 Ma when the volcanogenic sequences started receiving ash material from Lutao eruptions.