

A Late Miocene Magmatic Flare-up in West Sulawesi

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Miocene magmatic rocks occur throughout West Sulawesi, Indonesia, yet the detailed magmatic tempo and formation mechanism remain uncertain due to the scarcity of precise dating. In this study, we report new whole-rock geochemical and zircon U-Pb-Hf isotopic data of plutonic/volcanic rocks and river sediments. The magmatic rocks are intermediate to felsic in composition, showing high-K calc-alkaline to shoshonitic and metaluminous to weakly peraluminous signatures. Trace element concentrations and ratios, together with low negative zircon $\varepsilon_{\text{Hf}}(t)$ values (-17.0 to -0.4), suggest the underlying continental crystalline basement as the most probable magma source. Zircon U-Pb dating on 10 samples yielded weighted mean $^{206}\text{Pb}/^{238}\text{U}$ ages of 7.2–6.1 Ma that best represent the crystallization ages of host magmas. These ages are further consistent with the prominent age peaks (7.3–6.3 Ma) defined by detrital zircons ($n = 324$; 4 samples). Combining with available results, we identify a noticeable magmatic flare-up event at ca. 7–6 Ma in West Sulawesi. Considering the lack of oceanic subduction and the coincidence of incipient opening of the South Banda Basin and regional extension in eastern Indonesia in the Late Miocene, the magmatic flare-up in West Sulawesi was most likely triggered by a resumed episode of Banda slab rollback.