Late Holocene stratigraphic record of Gunung Agung (Bali, Indonesia): an explosve basaltic andesite volcano

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Gunung Agung is a large stratovolcano that is a sacred mountain of great importance to the Balinese people. Four historic eruptions have been reported since 1808. The most recent one, in 1963 - 1964, was one of the largest explosive eruptions to occur in Indonesia in the 20th century. It extruded ca. 110 x 10^6 m^3 of lava, followed by two large explosive eruptions with devastating pyroclastic flows and lahars that claimed almost 2000 lives. Since 1964, Agung has been largely quiet. Reports have been made of probable inflation at Agung between mid-2007 and early 2009. Because of this reported inflation, we reconstructed the Holocene explosive eruptive history of Agung, enabling an assessment of the eruptive frequency and range of magnitudes and styles of eruptions. Field stratigraphic logging was complemented with ^{14}C dating on charcoal and palaeosols, and with petrological and whole-rock geochemical data to fingerprint specific deposits and to distinguish deposits from neighbouring Gunung Batur. The stratigraphy is dominated by scoria fall and valley-filling pyroclastic flow deposits of basaltic to andesitic composition. Intercalated (trachy)andesitic-to-dacitic pumice fall deposits are interpreted to originate from Batur. For Agung, we find evidence for at least 25 eruptions within the last ca. 4.5 ka. Using deposit thickness and maximum grain size of fall deposits as a first-order approximation of eruption intensity (most tephra falls are deposited on Agung's NW flank), about 1 out of 3 of eruptions is of similar and 1 out of 5 of higher intensity than the 1963 event.