

Last 100 kyr volcanic activity on Mauritius Island (Indian Ocean) revealed by new Cassinol-Gillot unspiked K-Ar ages

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We present here new K-Ar ages extending the volcanic history of Mauritius Island to the Holocene. Mauritius volcanism is associated with the activity of the Reunion hot-spot, the magmatism of which produced the Deccan Traps across the KT boundary and continues up to present on Réunion Island. Three main volcanic stages have been described in Mauritius (Baxter, 1975). The Older Series, corresponding to the shield building stage, started before 8.9 Ma and lasted until about 4.7 Ma (Moore et al., 2011). Following a 1.2 Myr hiatus, volcanism resumed from 3.5 to 1.9 Ma with the Intermediate Series. After a second hiatus, a rejuvenated stage, or Younger Series, started at about 0.7 Ma (McDougall and Chamalaun, 1969), but with a poorly constrained lower bound. Given the occurrence of uneroded, and yet undated strombolian cones in Mauritius, it is important to better constrain the latest activity of this island in order to assess its volcanic hazard. The importance of dating the end of this stage is also enhanced by the fact that most of the surface of Mauritius is covered by the Younger Series lavas.

We focus here on the last 100 ka interval which lacked precise age controls with only a few whole-rock and groundmass ⁴⁰Ar/³⁹Ar plateau ages available (Moore et al., 2011), ranging from 121 ± 64 to 40 ± 48 ka (uncertainties here are 1s). Our six new Cassinol-Gillot unspiked K-Ar ages obtained on plagioclase or groundmass range from 113 ± 9 to 14 ± 4 ka, with much lower uncertainties than previous ages available. This can be explained by the low K₂O content (from 0.202 to 0.513%) and the relatively high CaO content (about 10%) of basalts from the Younger Series, making the interfering isotopes correction for irradiated samples dated with ⁴⁰Ar/³⁹Ar an additional source of uncertainties.

Our results, with ages as young as 14 ± 4 ka, demonstrate that near-Holocene volcanism is present in Mauritius Island. Our second youngest age at 45 ± 7 ka implies that the latest activity occurred after a ~30 kyr rest, with the consequence that Mauritius volcanism may resume at any time.