

A revised age for the Ontong Java Plateau

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The Ontong Java Plateau is among the best sampled oceanic plateaus, yet a precise age has not been produced since the first samples were recovered with DSDP drilling in the 1970s. Since then, nine drill sites have recovered basement and many have had dating attempted. These published ages show a wide range of variability from as old as 126 Ma to as young as 118 Ma and each with 2σ uncertainties above 2 Ma. In addition, two suspected 'much younger' potentially rejuvenated volcanic episodes have been reported in the literature for around 90 Ma and 60 Ma, respectively. Since most of these analyses were done over 20 years ago, we decided to re-evaluate and redo this critical data set, using modern sample preparation and analytical techniques utilizing multi-collector mass spectrometry. Our results show that overall Ontong Java Plateau is younger by several Myr compared to the older data sets and some of the rejuvenated episodes may in fact prove to be part of the primary volcanic eruptive period. In our new data set we redated the same volcanic units and, in some cases the same samples, allowing us to show that the older data sets are apparently 'too old' due to pervasive recoil issues when dating groundmass that was not resolvable with older mass spectrometers. To avoid this problem, we targeted plagioclase from each of the sites and were able to separate groundmass plagioclase for $^{40}\text{Ar}/^{39}\text{Ar}$ analyses. Our data shows that Ontong Java formed between 115 and 108 Ma with low 2σ uncertainties between 0.3-0.5 Ma. This result has wide implications for hotspot reconstruction models attempting to link the Louisville mantle plume with Ontong Java. Critically, it also shows that the eruption of Ontong Java is likely later and potentially not the cause of OAE1a.