

Bathymetry of seamounts, knolls and petit spot monogenetic volcanoes

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On the western Pacific Plate most seamounts formed during the Cretaceous period in the so-called West Pacific Seamount Province (WPSP). However, two new groups of knolls were recently discovered during multibeam surveys on the northwestern Pacific Plate. One group consists of circular knolls that are flat-topped in shape and correspond to eruptive ages of approximately 75 Ma. The other group consists of irregularly-shaped knolls, also called petit spot volcanoes, that are young (0 to 8.5 Ma) and found on the outer-rise systems of the subducting Pacific plate. Acoustic reflective data, which are simultaneously obtained with bathymetric data, are a most powerful tool to distinguish the petit spots from the Cretaceous edifices. The sizes of the irregularly-shaped petit spot volcanoes are several orders of magnitude less than the Cretaceous seamounts and circular knolls, yet they appear to be ubiquitous on the ocean floor, in particular, where incipient melts in the asthenosphere can be squeezed out by tectonic forces.