

The deep structure of Pacific oceanic crust based on legacy and new multichannel seismic reflection data in the vicinity of Oahu, Hawaiian Islands.

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The Late Cretaceous oceanic crust in the vicinity of the Hawaiian Islands is of tectonic interest since it has been deformed since the Late Miocene by volcanic loads and of petrological interest since it is a potential site for Moho drilling. We have used legacy and new multichannel seismic reflection data to determine the character of oceanic crust and the Moho in a region to the north and south of Oahu. The legacy data is based on Common Depth Point (CDP) and Constant Offset Profile (COP) data acquired onboard R/V *Robert D. Conrad* and R/V *Kana Keoki* during August/September 1982. *Conrad* was equipped with a 3.6 km long streamer and a 1864 cu. in. airgun array and *Kana Keoki* was equipped with a 1864 cu. in. array. During the COP experiment the two ships steamed on a similar heading a distance of 3.6 apart, yielding an effective aperture for reflection data of 0-7.2 km. Original field data have been reprocessed using 'state-of-the-art' seismic processing workflows and Shearwater REVEAL software. In October 2018, new deep-penetration seismic reflection data were acquired around the Hawaiian Islands onboard R/V *Marcus G. Langseth*, equipped with a 15 km long streamer and a 6600 cu. in. array. Comparisons between the legacy and new data have been informative, revealing new methods of how to process *Conrad's* legacy multichannel seismic data acquired on >30 cruises during 1975-1989. We compare here 'picks' of the top and base of the oceanic crust and sub-crustal reflectors based on the original and reprocessed *Conrad* data and examine its implications for volcano loading, mantle flow laws and the presence or absence of magmatic underplating beneath flexed oceanic crust.