

## **NE Lau 2010b (KM1024) Expedition Summary**

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Cruise KM1024 aboard the *RV Kilo Moana* in Dec 2010 was a short (7 day), targeted cruise that focused almost entirely on bottom sampling of volcanic landforms in the NE Lau basin via dredging . Water column properties (temperature, pressure, optical backscatter, and oxidation reduction potential) were measured during each dredge with a PMEL MAPR (Miniature Autonomous Plume Recorder). Small amounts of mapping and CTD work were conducted as well. It was the second expedition for our group to the NE Lau Basin in 2010, continuing exploration of the region and building directly upon observations made during a May 2010 cruise (KM1008) and two earlier *R/V Thompson* cruises, TN227 (Nov 2008) and TN234 (May 2009). The goal of KM1024 was to retrieve rock samples from as many of the apparently active and recently active volcanic features in the area as possible for shore-based petrologic and rock geochronologic studies. Twenty five of twenty seven planned dredges were executed over 4.5 days, each recovering rock samples, nearly all of them fresh and relatively young.

Among our multiple discoveries are (a) that the Mata volcanoes all appear to be composed primarily of boninite or boninite-like lithologies; (b) that the deep lava flow field is a fresh, young feature comprised of very glassy, sparsely phyrlic, very similar appearing lavas with the texture and appearance of basaltic andesite; and (c) confirmation of very fresh lavas at a suspected recent eruption site north of Tafu seamount on the NELSC. The observations on this cruise add to the discoveries of the earlier expeditions to collectively show that the NE Lau Basin is a very active and volcanically diverse terrain having complex tectonics and a high number and density of active volcanic sites, all of which are ripe for continued exploration and discovery.

One thing is clear at the end of this cruise: there is much that remains to be learned about the NE Lau basin, which appears to host a very large number and range of volcanically active landforms and associated hydrothermal sites. On the basis of this cruise, we may now be looking at the new type-locality for boninite volcanism, which opens up all sorts of possibilities for understanding the early evolution of arc terrains and for discovery related to the types of hydrothermal systems it produces and the ecology of those vent sites. In addition, we have only just begun to unravel how the complex and very active terrain in this region has evolved, and what it implies for submarine volcanism and hydrothermal activity at other arcs around the globe.