



Coastal processes around volcanic islands - dendritic lava flows, landslides and terraces around the central Azores islands

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Surveying around volcanic ocean islands with sonars has recovered important information on giant landslides, faults and primary volcanic features, but efforts so far have largely been unable to image shallow water coastal areas because of vessel safety. Here we report surveying with a Reson 8160 multibeam sonar aboard a shallow draft research vessel, R/V Arquipelago, which enabled us to survey to <10 m water depth around the coasts of Faial, Pico and São Jorge islands of the Azores. The data cover coasts that have been growing volcanically, some during historical times. Where the coast has a finite abrasion shelf, the new data show that lava reaching the shore can breach the surf zone and develop a variety of submarine lava structures on the shelf. Many are dendritic in plan-view and some with transverse ribbing similar to pahoehoe flows on land but with much larger scale. A variety of divergent flow paths are clearly indicated in the data. Some flows cross the shelf and descend the upper slope beyond the shelf break, providing evidence that a component of growth of the submarine island can include subaerially-originating lava as inferred from sulphur contents in submarine lava dredged from around Hawai'i. Where the abrasion shelf is very narrow or absent, the upper slope of the island contains abundant shallow landslides in the new unstable and steep volcanic material. The data show a variety of other interesting features, such as terraces, volcanic cones, collapse structures, tumuli, faults associated with the Azores plate boundary and sedimentary bedforms produced by interaction of oceanic currents with the island topography and from turbidity currents descending island slopes.