

## **Submarine Eruption, Transport and Deposition of a Young, Thick, Coarse, Pumice Breccia at Yali, Eastern Aegean, Greece**

S R Allen; J. McPhie (Centre for Ore Deposit Research, University of Tasmania, GPO Box 252-79, Hobart, Tasmania 7001, Australia, fax 0061-3-6226 7662, Sharon.Allen@utas.edu.au; J.McPhie@utas.edu.au)

A Quaternary submarine pumice breccia has been uplifted and is exposed in the southern part of Yali island in the eastern Aegean, Greece. The pumice breccia is more than 150 m thick. It comprises moderately to well-sorted, thin-to-thick beds of loose pumice clasts that are poor in fine matrix and include only rare dense juvenile and basement lithic clasts. The dominant pumice type is white aphyric rhyolite with only subordinate grey and speckled porphyritic dacitic and rhyolitic varieties. The pumice clasts range from poorly to highly vesicular. Vesicles are dominantly tubes or are elongate.

Larger pumice clasts are cobbles and boulders (64 mm-1.5 m). They are prismatic with quenched margins and internal polyhedral joints. In comparison, the smaller pumice clasts are polyhedral, angular to subrounded, blocky pebbles and granules. These smaller clasts lack quenched margins and have sharp curvilinear surfaces that cross-cut vesicle boundaries. We interpret the larger pumice clasts to be the products of spalling and explosive fragmentation of a small extrusion of submarine pumiceous lava. The smaller pumice clasts were generated by a combination of (1) passive and explosive disintegration of the larger pumice clasts, and (2) phreatomagmatic explosions. Phreatomagmatic explosions also generated a minor component of non- or poorly vesicular juvenile and basement-derived lithic clasts.

The Yali pumice breccia includes four major facies: cobble-boulder, pebble, mixed cobble-dominant and mixed pebble-dominant. The cobble-boulder facies occurs in well-sorted, massive, tabular beds of large pumice clasts up to 3 m thick that lack both lithic clasts and fine matrix. This facies has textural and lithological features consistent with deposition of large pumice clasts by means of water-settling from suspension. The three remaining facies are comparatively less well-sorted (although still fines poor) and include rare lithic clasts. They exhibit massive, or internally diffusely stratified, wedging, 0.1-2 m thick beds of coarser grained (medium pebble to cobble) pumice clasts that onlap or are separated by wedge-shaped, thinner (<0.1 m) beds of finer grained (fine pebble to granule) pumice clasts. The grain size and sorting of the pebble facies resemble those of fallout but the bedforms suggest resedimentation by submarine gravity flows (modified grain flows?) of waterlogged, cohesionless pumice. The mixed facies probably resulted from downslope resedimentation of unstable pebble and cobble-boulder facies simultaneously with the settling of large pumice clasts from suspension, and incorporated into, the active gravity flows.