Photograph of the Month

Cooling joints in obsidian

Sample of slightly wind-ablated obsidian fragment illustrating interesting cooling joint geometries and features determined by the original shape of a molten glass sphere. Sample is 10 cm across. Photograph Ben Goscombe, Adelaide ©Ben Goscombe.

Curvi-planar cooling joints step to wider spacing towards the centre, away from the margins of this sample. Increasing joint spacing towards the core of the block is due to slower cooling rates away from the margins. Joint spacing in the 2 mm wide chilled margin zone is 1–2 mm, increasing to cm-scale spacing only 1 cm into the block. The two preserved chilled margins show fine hexagonal joint patterns.

The curvi-planar joint planes propagated inwards orthogonal to the preserved chilled margins, and through successive curved steps remain near orthogonal to the contracting cooling front. Joint planes propagated in from different parts of the spherical margin surface, converging towards each other, meeting and giving complex three-dimensional, curvi-blocky joint-bound sub-domains in the centre. Convergence of joint planes, with increasing spacing, towards the centre of the block indicates an original sphere shaped block of molten glass. This relict fragment of the original obsidian sphere contains two complete and two partial radiating branches that approximate the axes of a tetrahedron.

The sample is from 8 to 10 Ma old sub-glacial acid extrusives at Mount Hrafntinnusker within the east branch of the mid-Atlantic rift in SE Iceland.

Please send comments to jsg@uni-mainz.de.

B.D. Goscombe
Integrated Terrane Analysis Consultant (ITAC),
School of Earth and Environmental Sciences,
Adelaide University, Adelaide 5005, Australia
E-mail address: ben.goscombe@adelaide.edu.au,
URL: http://www.terraneanalysis.com.au

Available online 4 March 2008