This Supplementary Material (3 of 6) accompanies the article:

Fox, J. M., Watson, S. J., Falloon, T. J., Carey, R. J., Whittaker, J. M., Spain, E. A., Duncan, R. A., Arculus, R. J. and Coffin, M. F. (2025) “Volcanic landslide post Last Glacial Maximum at sub-Antarctic Heard Island, southern Indian Ocean ”, *Volcanica*, 8(1), pp. 31–50. doi: 10.30909/vol.08.01.3150.

Fox et al. (2025) should be cited if these materials are used independently of the article.

J. M. Fox1,2, S. J. Watson3,4, T. J. Falloon5, R. J. Carey5,J.M.Whittaker, E. A. Spain3, R. A. Duncan6, R. J. Arculus7, and M.F. Coffin1,8,9

1Institute for Marine and Antarctic Studies, University of Tasmania, Hobart, Australia

2National Museum of Nature and Science, Tsukuba, Japan

3National Institute of Water and Atmospheric Research, Wellington, New Zealand

4 Institute of Marine Science, University of Auckland, Auckland, New Zealand

5Centre for Ore Deposits and Earth Science, University of Tasmania, Hobart, Australia

6College of Earth, Ocean, and Atmospheric Sciences, Oregon State University, Corvallis, OR 97331, USA

7Research School of Earth Sciences, Australian National University, Canberra, Australia

8School of Earth and Climate Sciences, University of Maine, Orono, ME 04469, USA,

9Geology & Geophysics, Woods Hole Oceanographic Institution, Woods Hole, MA 02543, USA.

Corresponding author: jodi.fox@utas.edu.au

S3 Oregon State University Argon Geochronology Lab - Analytical Technique

40Ar/39Ar incremental heating age determinations are performed at Oregon State University on a multi-collector ARGUS-VI mass spectrometer with 5 Faraday collectors (all fitted with 1012 Ohm resistors) and 1 ion-counting CuBe electron multiplier (located in a position next to the lowest mass Faraday collector). This allows simultaneous measurement of all argon isotopes, with mass 36 on the multiplier and masses 37 through 40 on the four adjacent Faradays. This configuration provides the advantages of running in a full multi-collector mode while measuring the lowest peak (on mass 36) on the highly sensitive electron multiplier (which has an extremely low dark-noise and a very high peak/noise ratio). Procedure blanks and air shots are measured daily to correct for system contributions and mass discrimination.

Following irradiation in the CLICIT position in the Oregon State University TRIGA nuclear reactor, and decay of short-lived radionuclides, we analyse the standard sanidines (FCT-NM-Fish Canyon Tuff sanidine neutron flux monitors) to create a neutron flux gradient (J-curve) for the age calculations. We calculate individual sample J-values (0.2-0.3% uncertainties, 1σ) by parabolic fitting of the measured flux gradient against irradiation height. We load irradiated samples into Cu-planchettes in an ultra-high vacuum sample chamber and incrementally heat by scanning a defocused 25W CO2 laser beam in preset patterns across the sample, in order to release the argon evenly in increasing power steps (up to 22% full power for basaltic groundmass) to fusion. After heating, reactive gases are removed using an SAES Zr-Al ST101 getter operated at 400°C for ~10 minutes and two SAES Fe-V-Zr ST172 getters operated at 200°C and room temperature, respectively.