MASON GULLY: THE SECOND METEORITE RECOVERED BY THE DESERT FIREBALL NETWORK.

M. C. Towner[1], P. A. Bland[1] , P. Spurný[2], G. K. Benedix[3], K. Dyl[1] , R. C. Greenwood[4], J. Gibson[4], I. A. Franchi[4], L. Shrbený[2], A. W. R. Bevan[5], and D.. Vaughan[6]. [1]IARC, Dept Earth Sci. & Eng., Imperial College London, SW7 2AZ, UK. Email: m.towner@imperial.ac.uk. [2]Astronomical Institute of the Academy of Sciences, Fričova 298, CZ-251 65 Ondřejov Observatory, Czech Republic. [3]IARC, Department of Mineralogy, Natural History Museum, London SW7 5BD, UK. [4]PSSRI, Open University, Walton Hall, Milton Keynes MK7 6AA, UK. [5]Department of Earth and Planetary Sciences, Western Australian Museum, Locked Bag 49 Welshpool DC, WA 6986, Australia. [6]PO BOX 187, Nedlands, Perth, WA 6909, Australia.

Introduction: Mason Gully (MG) is the second meteorite recovered using data obtained by the Desert Fireball Network (DFN) project [1,2]. MG has been classified as an H5 ordinary chondrite, with minimal weathering, due to its short terrestrial exposure age in an area of low precipitation.

Recovery: Analysis of the camera images gave orbital information [3], and a prediction of the fall position to an area of 2–3 km^2. Searching was carried out on foot, by a team of six people, over 12 days in November 2010. The meteorite was recovered within 150 m of the predicted fall site. We have now undertaken 4 field campaigns, and recovered meteorites on 2 of them: a 50% success rate, validating the concept of a network based in the Australian outback.

Physical Characteristics: MG has a mass of 24.54 grams. The stone is ~3cm in long dimension, and 50% fusion crusted. Individual pyroxene, olivine, and feldspar crystals are visible on the broken surface, with no evidence of alteration of silicates. Some rust patches around metal grains on original broken surfaces. Although the meteorite appears to have high porosity (based on observations of sawn surfaces), metal in the interior shows no sign of alteration. Fusion crust is black and fresh. We compared alteration of MG crust, broken surfaces, and interior, to a recent H chondrite fall (recovered <3 weeks later with no rain between fall and recovery). In contrast, MG experienced 23 cm of rain between fall and recovery. MG was less weathered. The overall level of alteration was consistent with a 7 month residence time in the desert [4].

Petrography: The meteorite has a typical petrologic type 5 texture, with discernible, but not distinct chondrules. Chondrule types include barred olivine and radiating pyroxene. Minerals are heterogeneously distributed. Modal mineralogy (in vol%) is: olivine (33%); orthopyroxene (38%); clinopyroxene (5%); plagioclase (8%); metal (11%); sulphide (5%); minor components around 1%.

Mineral compositions and geochemistry: Mineral compositions as determined by EMP: olivine, Fa19.2±0.6; low-Ca pyroxene, Fs16.4±0.4Wo1.4±0.3; chromite (Fe/Fe+Mg = 0.84; Cr/Cr+Al = 0.86). Oxygen isotopes: $\delta 17O = 3.04$; $\delta 18O = 4.42$; $\Delta 17O = 0.74$ (all in per mil).

References: [1] Bland P.A. et al. 2009. Abstract #1664. 40th LPSC, www.desertfireballnetwork.org. [2] Spurný P. et al. 2009. Abstract #1498. 40th LPSC. [3] Spurný P. et al. 2011. *Meteorit. Planet. Sci.* 46 (this conference). [4] Bland P. A., Berry F. J. and Pillinger C. T. 1998. *Meteoritics & Planetary Science* 33:127-129.