

### METEORITE FALLS OBSERVED BY THE DESERT FIREBALL NETWORK: AN UPDATE.

P. A. Bland<sup>1,2,3</sup>, P. Spurný<sup>4</sup>, L. Shrbený<sup>1,4</sup>, M. C. Towner<sup>1</sup>, A. W. R. Bevan<sup>5</sup>, J. Borovička<sup>4</sup>, T. P. McClafferty<sup>6</sup>, D. Vaughan<sup>7</sup>.  
<sup>1</sup>IARC, Dept. Earth Sci. & Eng., Imperial College London, SW7 2AZ, UK. Email: [p.a.bland@imperial.ac.uk](mailto:p.a.bland@imperial.ac.uk). <sup>2</sup>IARC, Dept. Mineralogy, Natural History Museum, London SW7 5BD, UK. <sup>3</sup>Dept. Applied Geol., Curtin University of Technology, GPO Box U1987, Perth WA 6845, Australia. <sup>4</sup>Astronomical Institute of the Academy of Sciences, Fričova 298, CZ-251 65 Ondřejov Observatory, Czech Republic. <sup>5</sup>Dept. Earth and Planet. Sci., Western Australian Museum, Locked Bag 49 Welshpool DC, WA 6986, Australia. <sup>6</sup>Office of Research and Development, Curtin University of Technology, GPO Box U1987, Perth, WA 6845, Australia. <sup>7</sup>PO BOX 187, Nedlands, Perth, WA 6909, Australia.

**Introduction:** The Desert Fireball Network (DFN) is a world-leading facility that is designed to provide a dataset of fundamental importance to planetary scientists: context information for numbers of meteorite samples, through precise determination of their orbits. Construction of a trial network comprising four fireball observatories was completed in December 2007. Our first search was mounted in October 2008. We recovered the meteorite (Bunburra Rockhole) within 100m of the predicted fall position, on the first day of the search. The paper describing the fireball event and the meteorite appeared in *Science* in 2009 [1]. Consortium studies are ongoing [2-9].

The network has been operating successfully to date, and has observed many incoming fireballs, and a number of additional falls. With the recovery of Bunburra Rockhole we have achieved the major milestone for this initial phase of the project. Having shown the potential of the DFN concept, our near-term goal now is expansion from a trial facility to a full network.

**Results and Discussion:** Here we describe highlights to date, including the predicted crop of unrecovered meteorite falls. Until DFN operation we had reliable (e.g. photographic or TV observation) meteor/fireball data only for the northern hemisphere. All observations were carried out by networks with central latitudes of ~45-55°, so they could not observe below declinations of -45°. Thus far we have observed ~550 fireballs. Double/multi-station fireballs - for which precise atmospheric trajectories and orbits can be determined - number ~150. These are the first orbits for southern hemisphere fireballs. In addition, it appears very likely that we have discovered a new active meteor shower.

Of the multi-station events, we consider that 11 produced meteorites on the ground. Four of these are probable falls (10's-100 g); five are certain falls (>100's g). One of these had initial mass ~20 tons. It may have been cometary, but unfortunately it terminated over the Southern Ocean. One certain fall, and two probable falls, are unrecovered and in searchable country. Two additional recent events are almost certain falls in searchable areas (data are still being reduced). Fieldwork funding has been difficult to obtain, but searches for these will occur later in 2010.

**References:** [1] Bland P.A. et al. 2009. *Science* **325**: 1525-1527. [2] Bland P.A. et al. 2009. Abstract #1664. 40th *LPSC*. [3] Spurný P. et al. 2009. Abstract #1498. 40th *LPSC*. [4] Bland P.A. et al. 2009. *MAPS* **44**: A34. [5] Meier M.M.M. et al. 2009. *MAPS* **44**: A138. [6] Welten K.C. et al. 2009. *MAPS* **44**: A216. [7] Benedix G.K. et al. 2010. Abstract #1438. 41<sup>st</sup> *LPSC*. [8] Towner M.C. et al. 2010. Abstract #1758. 41<sup>st</sup> *LPSC*. [9] Spivak-Birndorf L.J. 2010. Abstract #2274. 41<sup>st</sup> *LPSC*.