DEPARTMENT OF
GEOLOGY & GEOPHYSICS

UNIVERSITY OF CALGARY

Southern Alberta Fireball, October 14, 2001
Summary by Dr. Alan Hildebrand, October 16, 2001

The October 14, 2001, 14:22-23 MDT fireball turns out to be impressive. The fireball was seen from Medicine Hat (almost at the Saskatchewan border) to the Vancouver area - a known range of ~800 km. This on a somewhat cloudy day so that some areas, such as Edmonton, were blanked out entirely. It was a bright daylight event, and was observed through thin clouds in some places. Duration of ~5 seconds.

Alan Dyer at the Calgary Science Centre fielded over 200 calls before his machine filled up, and this has made for a busy day for the two of us coupled with media activity.

A dust trail of various descriptions, but likely extended and rather thin/broken; its character and the fragmentation behaviour as currently known indicate a stoney object of ordinary chondrite strength. The fireball was observed to split into two or three before the terminal burst. No photographs of the dust clouds as yet, but we are requesting them through the media. This dust trail lasted (variously described) 30 seconds to five minutes before dissipating. Rather spectacular anomalous sounds were widely described even amongst the minor interviewing that I have done (this may be the most prolific anomalous sound producer that I have investigated as yet although statistics are poor). The terminal burst explosion was surprisingly widely heard; we do not know the full extent of it yet, but it was loudly audible more than 100 km from the terminal burst position. Infrasound generation is also indicated by a report of walls pulsating. The terminal burst was loud enough to activate the automatic doors (triggered by pressure plates) at the Lake Louise Inn.

All these factors indicate an object in the 1 to 10 tonne range; if towards the upper end of this mass range, statistically this is be expected to be the largest object to enter over Canada during the year 2001. The ground shaking in the immediate vicinity is second hand reported to have been spectacular; no seismic records are currently thought to be available as the nearest stations are rather distant (John Cassidy at the Pacific Geoscience Center kindly checked). Given the magnitude of the terminal burst not much material may be expected to survive; Peter Brown (University of Western Ontario) has not done an orbit solution as yet (he is travelling), but we believe that the trajectory geometry indicates a relatively fast intersection.

Some extraordinary eye witness accounts come from persons who were climbing in the vicinity. Imagine being on top of a 3,000 m peak and seeing such a large fireball and then hearing the sound. The trajectory has proved relatively stubborn to reconstruct with conflicting reports, but appears to have been from the SSW or SW towards the north with a relatively shallow elevation angle of ~20 degrees. The fireball passed just west of Lake Louise ending to the north a bit east of Mount Willingdon (3873 m) in the neighbourhood of the boundary between Banff National Park and the Bighorn Wildland Provincial Recreational Area. This position is still uncertain by ~20 km, but looks pretty good compared to what we started the day with. Meteorites, if any, will have fallen in the bush. Satellite and infrasound records are being sought. A variety of organizations were contacted across the two provinces by hundreds to thousands of witnesses to investigate a plane crash, etc. The extent to which the fireball was seen may be extrapolated from one of the faculty (out of 36) in Geology and

Geophysics at the University of Calgary having seen it; another 2 of this number heard the explosion. A Sunday afternoon with decent weather had a lot of people outside (though the fireball was bright enough to also be seen through windows).

For more information, or to add your observations, please contact Dr. Alan Hildebrand, University of Calgary, (403) 220-2291.

Related Sites:

- MIAC: Meteorites and Impacts Advisory Committee main page
- MIAC: Fireball Reporting
- Prairie Meteorite Search Project
- The Canadian Meteorite Catalogue

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