

When the Sky Falls: Performing Initial Assessments of Bright Atmospheric Events

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ABSTRACT

The 2013 Chelyabinsk super bolide was the first “significant” impact event to occur in the age of social media and 24 hour news. Scientists, used to taking many days or weeks to analyze fireball events, were hard pressed to meet the immediate demands (within hours) for answers from the media, general public, and government officials. Fulfilling these requests forced many researchers to exploit information available from various internet sources - videos were downloaded from sites like Youtube, geolocated via Google Street View, and quickly analyzed with improvised software; Twitter and Facebook were scoured for

eyewitness accounts of the fireball and reports of meteorites. These data, combined with infrasound analyses, enabled a fairly accurate description of the Chelyabinsk event to be formed within a few hours; in particular, any relationship to 2012 DA14 (which passed near Earth later that same day) was eliminated. Results of these analyses were quickly disseminated to members of the NEO community for press conferences and media interviews. Despite a few minor glitches, the rapid initial assessment of Chelyabinsk was a triumph, permitting the timely conveyance of accurate information to the public and the incorporation of social media into fireball analyses.

Beginning in 2008, the NASA Meteoroid Environments Office, working in cooperation with Western's Meteor Physics Group, developed processes and software that permit quick characterization - mass, trajectory, and orbital properties - of fireball events. These tools include automated monitoring of Twitter to establish the time of events (the first tweet is usually no more than a few seconds after the fireball), mining of Youtube and all sky camera web archives to locate videos suitable for analyses, use of Google Earth and Street View to geolocate the video locations, and software to determine the fireball trajectory and object orbital parameters, including generation of animations suitable for popular media and presentations. This presentation will give a short description of the characterization procedure and show applications of the tools, which have become vital to answering the question of "What was that bright light in the sky?" in the post-Chelyabinsk, 24/7 news world.