



## **INFRASOUND FROM THE SEPTEMBER 24 2002 VITIM (SIBERIAN) FIREBALL**

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On 24 September 2002, sensors aboard US Department Of Defence satellites detected the impact of a fireball at 16.49 UT near Bodaibo in Siberia (58.21 N, 113.46 E). Eyewitnesses described the fireball as a large bright star streaking across the sky, ending in bright flash and loud explosive noise. Ground shaking detonations were felt at a large distance (tens of kilometers). An array of microbarographs operated at Polar Geophysical Institute (PGI), Apatity (67.3 N, 33.3 E) recorded a pressure impulse with an amplitude of 45 dyn/cm<sup>2</sup> on September 24, 2002 at 22.20 UT, at a distance about of 4000 km from a fireball detection. The PGI microbarograph array consists of three spatially placed infrasound detectors for measurements of atmospheric waves in the frequency band of 0.0001 - 1 Hz. The computer-aided system permits to get information with a frequency of five times per second. The time interval between the bolide observation and the detection of pressure impulse is consistent with an acoustic travel time from the location of fireball impact. Estimates were made of both the local infrasound velocity and the direction of arrival of the signal. These values are in agreement with the travel velocity and the south azimuth. Estimates of the fireball mass from the radiated energy value agree with mass estimates calculated from the blast wave theory. These results seem to suppose the propagation of the infrasound signal from the Vitim fireball through atmospheric acoustic wave guide.

According to Brown et al. (Nature, V420, 294, 2002) estimations the Earth is hit on average annually by the Vitim-like meteorite. Collisions of large asteroids with our planet result in dramatic impacts that can lead to the Earth magnetic field reversals.

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