

A FIREBALL FROM AN ATEN TYPE ORBIT OVER GERMANY AND SWITZERLAND

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Introduction: After Chelyabinsk February 15, 2013, and Southern Germany March 31, 2014, another fireball with a remarkably flat slope trajectory was recorded at 19:44:06UT on March 15, 2015 over Germany and Switzerland..

Observations: The analysis is based on ten photographic records and eight videos from German, Swiss and French network stations, several astronomy amateurs and dash cams together with some eye witness reports. Additionally data from the Swiss seismic network SED and an infrasonic record from a BGR station in Germany helped to clarify the fragmentation sequence.

Trajectory and dynamics: The luminous trajectory is reproduced by a model using the standard single-body algorithm [1] with modifications to allow for minimum five fragmentations during the second half of the flight. The fireball started in 96 km altitude over Northern Bavaria at 49.28°N 9.77°E when a mass in between 100 and 500 kg entered the atmosphere at 21.6 km s⁻¹, a flat slope of 13.6° and an azimuth angle of 195.2°. After a spectacular flight of more than 300 km in 18 sec the main mass vanished in about 28 km altitude close to 46.59°N 8.70°E over the Swiss high Alps.

Dark flight and strewn field: The dynamic and ablation behavior of the meteoroid is compatible with the assumption of an ordinary chondrite. The wind model used for the dark flight calculation is based on data from the sounding station in Payern, Switzerland. The strewn field for sizeable meteorites extends over more than 30 km length across several mountain ranges. Due to the long flight at rather high velocity the total meteorite mass on the ground is only a few kilograms. Meteorite recovery therefore will be a challenge, the more as several fragmentations cause a fan-like widening of the strewn field. The meteoroid's origin from an Aten type orbit, however, motivates increased search efforts.

References:

[1] Author Ceplecha, Z., Borovička, J. et al.: Meteor phenomena and bodies. In: Space Science Reviews 84, 327-471, 1998