

# Madrid meteor's cometary origins unearthed

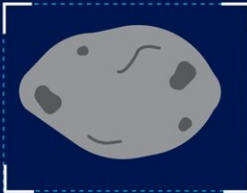
August 10 2022

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→ WHAT'S IN A NAME?

ASTEROID



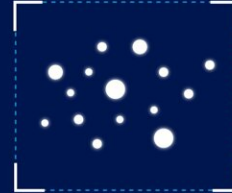
A small body of stony, carbonaceous or metallic composition in heliocentric orbit and typically originating from the main asteroid belt between Mars and Jupiter. Its size varies from a metre to hundreds of kilometres.

COMET



A small rocky and icy body in heliocentric orbit that gives off streams of dust and gas when it warms up closer to the Sun. ESA's Rosetta mission delivered Philae lander onto Comet 67P in 2014. Most comets are left over from our Solar System's formation 4.5 billion years ago.

DUST



Up to 30 t of dust – tiny particles smaller than a meteoroid and coming from comets, asteroids and even other star systems – is scooped up by Earth every day.

METEOROID



Smaller than an asteroid, ranging in size from 30 micrometers up to 1 m diameter.

NEO



Astronomers call any small body in our Solar System whose orbit brings it into proximity with Earth – such that it might impact our planet – a near-Earth object: NEO.

METEOR



The light trail in the night sky made when a dust particle or a meteoroid – typically between a fraction of a mm to a few mm in size – passes through the atmosphere. If large enough, some portion may survive to fall on land or sea as a meteorite.

SHOOTING STAR



A popular and romantic name for the term meteor.

BOLIDE



A very bright meteor, brighter than Venus, typically exploding 30-80 km high in the atmosphere (long-haul passenger jets fly at about 12 km altitude).

FIREBALL



Another term for Bolide.

METEORITE



A piece of an asteroid or meteoroid that originates in space and survives passage through the atmosphere to reach the surface of a planet, like Earth.

Just as there are a variety of small bodies traversing space, scientists have a number of different names for them. This handy infographic illustrates what's what in the fascinating world of space rocks. Credit: ESA

A fireball spotted over Madrid has had its astronomical ancestry unearthed. While it ended its days burning up in Earth's atmosphere on 31 July this year, the fragment began its life as part of Comet 169P/NEAT, responsible for the annual Alpha Capricornids meteor shower.

Meteor showers occur as Earth passes through the debris-strewn path of a comet, which as it edges closer to the sun and ices "sublimate" from solid to gas, throws off a stream of material that lingers in place. As these objects collide with Earth's atmosphere, they burn up as brilliant meteors, the brightest of which are known as fireballs.

Such showers are periodic reminders that Earth is sweeping through an environment sprinkled with ancient remnants of the early solar system. While safe, these impressive light shows offer a cautionary tale, as these many small fragments bely the larger objects they came from that once passed near Earth's orbit—and could do again.

Using footage from on-the-ground cameras across Europe, including an ESA-operated camera of the AllSky7 network in Cebreros, Spain, and cameras in the Southwestern Europe Meteor Network (SWEMN), the fireball's trajectory was calculated by SWEMN and its origins traced back in time. Entering the atmosphere at a height of 100 kilometers over Madrid and burning up at 77 kilometers above the Spanish province of Guadalajara, the icy body is thought to have been about 10 cm in size

before contact with Earth.

It is thought that the Alpha Capricornids meteor shower was created 3,500 to 5,000 years ago when half of Comet 169P/NEAT disintegrated and fell into dust. The comet itself will have formed at the same time as our solar system, around 4.6 billion years ago.

The dusty trail from this ancient [comet](#) has drifted into Earth's orbit creating infrequent but reasonably bright meteors. At its peak, only it creates only about five meteors per hour, but these are usually very bright and often become fireballs; particularly bright meteors.

As this drift continues, the shower is expected to get stronger. By the year 2220, it should be stronger than any current annual meteor shower. For now however, you can catch it in its current form until about 15 August.

Provided by European Space Agency

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