

Catching comet's particles in the earth's atmosphere

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Abstract

How to catch cometary particles by using balloons and to make this method steady and reliable. Why are the comet particles interesting? The nature of a comet is full of puzzles; many researchers think that comets may give keys to the origin of the Solar System and origin of life on the Earth.

The project is intended to catch cometary particles in the atmosphere by using balloons. The investigation is based upon knowledge that the Earth crosses the comet's tails during the year. One can catch these particles at different altitudes in the atmosphere. So, we will be able to gradually advance in the ability to launch balloons from low to high altitudes and try to catch particles from different comet tails. The maximum altitude that we have to reach is 40 km. Both methods - distance observation and cometary samples from mission Stardust testify to the presence of organic components in comet's particles. It would be useful to know more details about this organic matter for astrobiology; besides, the factor poses danger to the Earth. Moreover, it is important to prove that it is possible to get fundamental scientific results at low cost.

In the last 5 years launching balloons has become popular and for the movement looks like hackers' one – as most of them occur without launch permission to airspace. The popularity of ballooning is caused by low cost of balloon, GPS unit, video recording unit. Once one uses smartphone, one has a light solution with GPS, video, picture and control function in one unit. The price of balloon itself begins from \$50; it depends on maximum altitude, payload weight and material. Many university teams realized balloon launching and reached even stratosphere at an altitude of 33 km. But most of them take only video and picture. Meanwhile, it is possible to carry out scientific experiments by ballooning, for example to collect comet particles.

There is advanced experience at the moment on mineral, chemical and isotopic analysis techniques and data of the comet's dust after successful landing of Stardust capsule with samples in 2006.

Besides, we may use perfect material to catch particles in the atmosphere, which was used by cosmic missions such as Stardust and Japanese Hayabusa. As to balloon launches, we could use Indian Space Research Organization experience that launched a balloon to stratosphere in 2009 and successfully caught particles with organics at an altitude of 42 km.

The main aim of the project is to catch cometary particles by using balloons and to make this method steady and reliable. Why are the comet particles interesting? The nature of a comet is full of puzzles; many researchers think that comets may give keys to the origin of the Solar System and origin of life on the Earth.