Visitors from deep space

by Paul O'Neill, Education Support Officer

If you had a space ship and were able to travel to the outer solar system you would eventually reach the Kuiper Belt and eventually the Oort Cloud. Out here the sun appears as just another star against the blackness of space; it produces little light and no heat, but you are still inside the Solar System. This part of space is not entirely empty. Objects made of ice and rock dust drift about.

Occasionally as a result of some force one of these blocks of dusty ice starts to fall towards the inner Solar System. As the object moves closer to the Sun it accelerates and eventually the radiation from the Sun begins to warm parts of the ice. Of course if you heat up ice it will eventually begin to melt. In space there is no air pressure, the space between the planets is a vacuum, therefore as the ice melts it doesn't turn to liquid but instead it immediately becomes a gas. The ice block has now acquired a kind of atmosphere. The gas is often blown away from the chunk of ice by the solar wind (a stream of charged particles and radiation emanating from the Sun). The dirty ice ball has developed a tail (or two). This tail contains ionised gas and dust. We call this a comet.

"Comet Holmes was lost between 1906 and 1964"

It is impossible to predict when a new comet might come from the Oort Cloud but some comets as they enter into the inner solar system are perturbed by the gravitational pull of Jupiter and get themselves into periodic orbits. This means the comet after passing close to the Sun doesn't fly off again to the outer reaches of the Solar System, never to return, but instead returns after a certain period. If we can calculate the orbit of such a comet we can then predict where and when it might appear in the sky. The orbital period for such comets can vary from a few years to a human lifetime or more. One such comet is called Comet Holmes; comets are usually named after their discoverers. On the night of November 6 1892 Mr. E. Holmes of London happened to point his telescope to a part of the sky near the Andromeda Galaxy and found an object that had a bright nucleus surrounded by a fuzzy cloud. This new comet was shown to have a period of around seven years. Comet Holmes was lost after the 1906 apparition. It was again picked up in 1964, it had a magnitude of about 19 (this is extremely faint and would require a powerful telescope to see). Comet Holmes has been observed at every return since 1964. The comet was due to return this year.

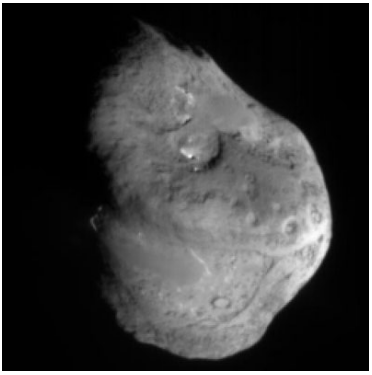

Image Credit: NASA

Comet close-up This image shows the view from the Deep Impact mission of comet 9P/Tempel 1's nucleus. The nucleus is about 14km long and 4 km wide.

In early October it was very faint – as expected. But then on the 24th October it suddenly brightened by a factor of over half a million. Exactly why the comet should brighten by so much is unknown. One possible explanation is that a layer of ice was exposed and as this melted the comet emitted large amounts of gas and dust. The gas and dust reflects sunlight back towards us – meaning the comet, as seen from the Earth,

suddenly brightened.

I first saw the comet on Oct. 25th 2007. it was easily visible to the naked eye but at that time it didn't look like any comet I'd ever seen before; it looked like a bright new star had suddenly appeared in the constellation of Perseus – more like a nova than a comet. By early November the comet was beginning to look more like a comet, i.e. it appeared fuzzy and extended but still had no tail. Unfortunately because of the position of the Earth and the comet we can't really get a good view of any tail that does develop. By the evening of November 8 the comet was still visible to the naked eye but now appeared as a faint extended fuzzy disc of light.

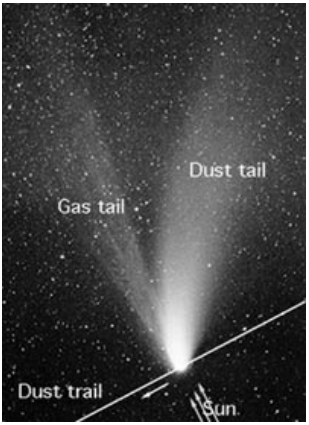

Image Credit: NASA

Tails of the comets Many comets display both a gas and a dust tail.