

# The Shocking Size of Comet McNaught

April 13 2010, by Anita Heward

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Comet McNaught viewed over the Pacific in 2007. Credit: Sebastian Deiries/ESO

(PhysOrg.com) -- British scientists have identified a new candidate for the biggest comet measured to date. Dr Geraint Jones of UCL's Mullard Space Science Laboratory presented the results at the RAS National Astronomy Meeting in Glasgow. Instead of using the length of the tail to measure the scale of the comet, the group have used data from the ESA/NASA Ulysses spacecraft to gauge the size of the region of space disturbed by the comet's presence.

Analysis of magnetometer data shows evidence of a [shockwave](#) surrounding the [comet](#) created when ionized gas emitted from the comet's nucleus interacts with fast-flowing particles in the [solar wind](#), causing the wind to slow down abruptly.

In January and February 2007, Comet C/2006 P1 McNaught became the brightest comet visible from Earth for 40 years. Serendipitously, Ulysses made an unexpected crossing of Comet McNaught's tail during this time, one of three unplanned encounters with comet tails during the 19-year mission. The other encounters included Comet Hyakutake in 1996, the current record-holder for the comet with the longest tail.

Ulysses encountered McNaught's tail of ionized gas at a distance downstream of the comet's nucleus more than 1.5 times the distance between the Earth and the Sun. This is far beyond the spectacular dust tail that was visible from Earth in 2007.

Dr Jones said, "It's very difficult to observe Comet McNaught's plasma tail in comparison with the dust tail, so we can't really estimate how long it might be. What we can say is that Ulysses took just 2.5 days to traverse the shocked solar wind surrounding Comet Hyakutake, compared to an incredible 18 days in shocked wind surrounding Comet McNaught. This shows that the comet was not only spectacular from the ground; it was a truly immense obstacle to the solar wind."

A comparison with crossing times for other comet encounters demonstrates the huge scale of Comet McNaught. The Giotto spacecraft's encounter with Comet Grigg-Skjellerup in 1992 took less than half an hour from one shock crossing to another; to cross the shocked region at Comet Halley took a few hours.

"The scale of an active comet depends on the level of outgassing rather than the size of the nucleus," Dr Jones added. "Comet nuclei aren't necessarily active over their entire surfaces, and all we can say is that McNaught's level of gas production was higher than that of Hyakutake."

Candidate shock features had been found in Ulysses magnetometer data from the Hyakutake encounter in 1996 but their identification was

tentative, especially so far downstream from the comet's head. The discovery of similar features at McNaught suggests that this interpretation is correct.

Provided by Royal Astronomical Society

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