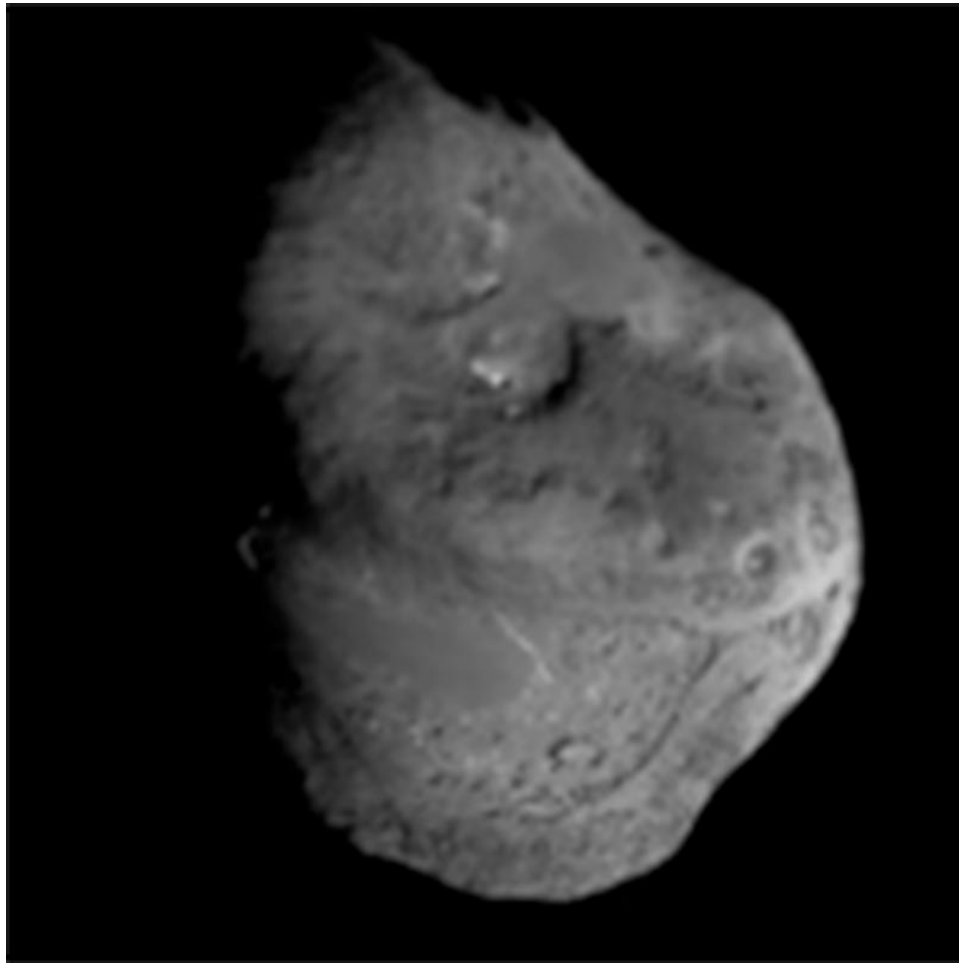


9.13: Comet Characteristics

Comets are composed of Carbon dioxide (CO₂), water ices, silicates, and organic material. The materials at the surface of the comet are of a talc-like fineness, as seen up close on Comet Tempel-1. Comets are the sources for the majority of our meteor shower “material;” the fine dust comets leave behind like bread crumbs as they orbit the sun.

The comet’s **nucleus** is the solid, core structure of a comet. The **coma** or **head** is the fuzzy haze that surrounds the comet’s nucleus. The **tail** may be made of gas, dust, or both. The **coma** and **tail** are what we see from Earth. The sizes of comet nucleus have been observed up to around 30 kilometers or 20 miles in diameter. When a comet gets close to the sun, they begin to heat up and outgas, making for the coma and sometimes a tail.



Tempel-1 cometPublic Domain | Image courtesy of NASA.

The behavior of comets is often unpredictable, due to their interactions with the sun, and other solar system dynamics. Comets, which have made numerous passages around the sun, appear to produce less dust and gas, thus less-impressive tails. Often first-time inner solar system comets can break up when passing near the sun, which was the unfortunate fate of Comet ISON in 2013.

The **true nucleus** of a comet has been seen six times: Halley (1986), Borrelly (2001), Wild-2 (2004), Tempel-1 (2004 and 2005), Hartley-2 (2010), and Churyumov-Gerasimenko (2014). If all goes according to plan, the European Space Agency’s Rosetta spacecraft will release a lander, called Philae, in November 2014. Philae will land on Comet Churyumov-Gerasimenko, providing us with a wealth of data.

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