

Water and climate on Mars

-more insight thanks to the Canadian MET weather station

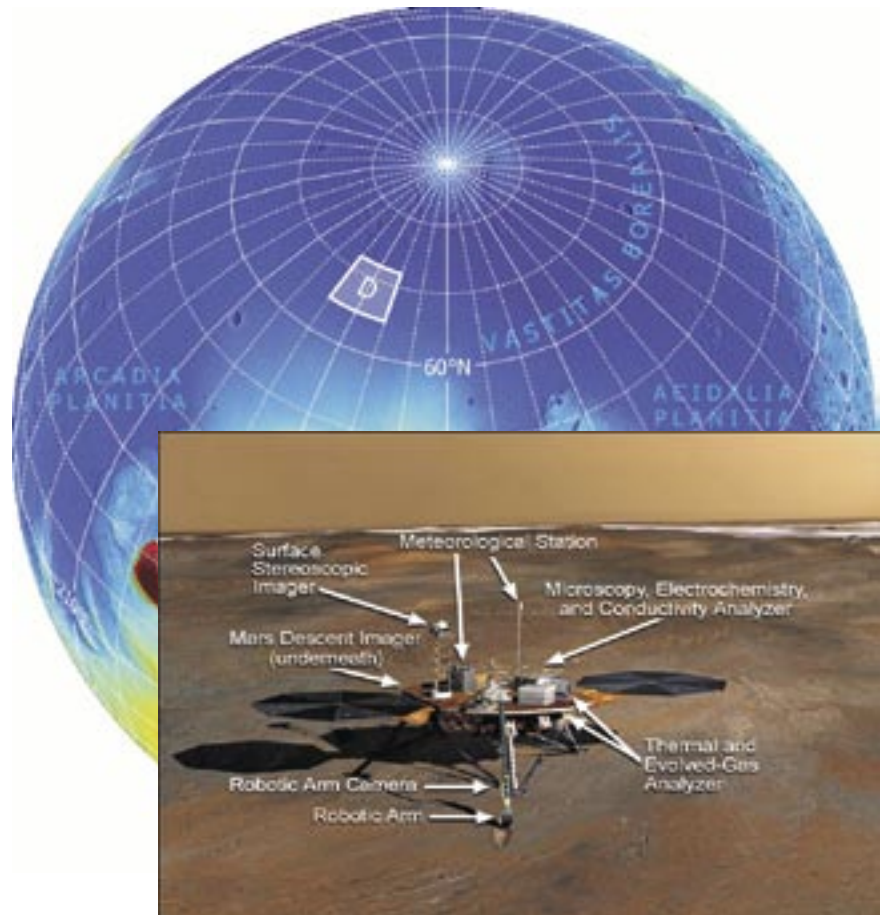
Mars has possibly the same conditions as the Earth – warm around the equator and cold around the poles. Ice caps that come and go indicate various seasons like on Earth.

However, the climate in detail has not been fully explored yet. This is about to change with regards to Phoenix, the Canadian built meteorological station with a MET station onboard, meant to become operative the summer of 2008.

After the landing in the turn of the month May/June 2008, the Canadian-built MET station onboard will daily record weather reports using temperature and pressure sensors, as well as a Light Detection and Ranging instrument (LIDAR) throughout the summer. MET will verify the current state of Mars' polar atmosphere and how water is cycled between the solid and gas phases in the Martian arctic.

Landing close to the icy north polar cap in the spring will allow the scientists to study a remarkable feature of the Martian climate, the scientists involved in the project have stated. Each spring a significant mass of water ice sublimates from the polar cap forming seasonal ice clouds, and there are lots of questions about where this water ice ends up and how stable the current ice cap is. Observing these clouds and dust storm features with the Phoenix LIDAR will provide an exciting new insight into these aspects of the climate of Mars.

The MET station's LIDAR will visualise the distribution of dust particles and measure the base of clouds at precise altitudes over the Red Planet. LIDAR technology is similar to radar, but it uses pulses of laser light instead of radio waves. The light absorbed or reflected off atmospheric molecules or particles carries



information on the location, size and nature of these elements.

Phoenix' LIDAR should be able to detect water-ice clouds up to about 10 km high. The LIDAR's ability to detect dust will also help scientists better understand the 'boundary layer' on Mars. This is a region of turbulence where most weather occurs and where chemicals are mixed and transferred between the atmosphere and the surface. The boundary layer on Mars is higher than on Earth – perhaps up to 4 or 5 km during the day because of solar heating, and less at night.

The data collected on Mars by the MET station will be interpreted with computer models similar to those used for weather forecasting and climate prediction on Earth. From the distribution of dust and ice particles, scientists will extrapolate energy flows within the polar atmosphere – and better understand Mars' climate.

If Phoenix landed on the Earth, the probe would possibly hit the Nordic countries.

Pictures: NASA

Studying these particles will also reveal information on the formation, duration, and movement of clouds, fog, and dust plumes. Understanding cloud formation and evolution, as well as movements of the lower atmosphere, are keys to better insights on the water cycle and potential life on Mars.

The Canadian weather station will be the first ever to have operated from the surface of another planet.

For more information: Canadian Space Agency, www.space.gc.ca