

# Scientists ask: ‘What’s the weather like on Mars?’

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The launch of NASA’s Mars Reconnaissance Orbiter (MRO) from Cape Canaveral in Florida on 10 August 2005 will be a tense time for scientists from Oxford, as they witness the third attempt to get their instrument to Mars onboard a NASA spacecraft.

The main aim of the MRO mission is to seek out the history of water on Mars. This will be accomplished by a suite of six science instruments, three engineering experiments and two science facility experiments. They will zoom in for extreme close up images of the Martian surface, analyse minerals, look for subsurface water, trace how much dust and water are distributed in the atmosphere and monitor the daily global weather.

UK scientists, from Oxford, Cardiff and Reading Universities are involved in the Mars Climate Sounder instrument – essentially a weather satellite for Mars. It will profile the atmosphere of Mars detecting vertical variation in temperature, dust and water vapour concentration.

Fred Taylor, Halley Professor of Atmospheric Physics at Oxford is a co-investigator on the Mars Climate Sounder. He explained why this mission means so much to his team: ‘The Mars Climate Sounder is an updated version of a previous instrument (the Pressure Modulator Infrared Radiometer) that flew to Mars on NASA’s Mars Observer and Mars Climate Orbiter missions in 1992 and 1999 respectively. Both of these missions were lost due to technical problems with the spacecraft, so this is a case of third time lucky, we hope!’

He added: ‘The instruments are based on Earth observation instruments developed at Oxford in the 1980s and early 1990s with a significant amount of the hardware being built in the UK at Oxford, in collaboration with Cardiff and Reading Universities. The goal of the experiment is to measure temperature, water vapour and dust in the Martian atmosphere with high resolution and full global coverage over at least one full seasonal cycle (two Earth years). The data will be analysed using computer models of the Martian climate, developed in a collaboration between Oxford University and Laboratoire de Meteorologie Dynamique (LMD) in Paris over the last 20 years.’

By feeding the Mars data into the model, diagnostics, and even forecasts, of the Martian climate will be able to be made – using similar methods to those used in monitoring meteorology on Earth. This information will provide a much more detailed picture of the weather systems on Mars, especially the characteristics of the dust storms, all of which will be critical research for future lander missions.

Upon reaching Mars in March 2006 MRO will undergo a six month period of “aerobraking” which will slow the spacecraft down in the Martian atmosphere taking it into a lower circular orbit for science data collection. Whilst the science operations are scheduled for two years the orbiter will be used for further data communication relay activities – up until December 2010. However, there will be enough propellant onboard to remain operational for a further five years in Mars orbit – if required to support future missions.

Source: University of Oxford

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