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Retrieval of profiles of Mars atmospheric temperature, dust and water ice from Mars Climate Sounder measurements

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Mars Climate Sounder (MCS) is a mid- and far-infrared thermal emission radiometer on board the Mars Reconnaissance Orbiter (MRO). Since September 2006, MCS has been taking measurements of the Martian surface and atmosphere in limb and nadir geometry. With its 8 infrared and one visible channel, MCS measures vertical profiles of atmospheric temperature, water vapor, dust and condensates from 0 to 80 km altitude with a vertical resolution of ˜5 km. Here we present first results of simultaneous profile retrievals of temperature, dust and water ice. We describe the algorithm which is based on a modified Chahine method, and discuss changes of temperature, dust and ice with latitude, altitude and season. Preliminary results show the dust confined to the lower part of the atmosphere, with cloud layers likely to occur above the dust, and reveal tidal signatures in the temperature profiles.