Mars Express   PFS   CO2-ice cloud

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Observation of CO2-ice cloud in the Martian mesosphere by using PFS onboard Mars Express

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Martian climate is unique in that main constituent of atmosphere, CO2 condenses and becomes cloud. Many instrument has tried to observed cloud before, but it was difficult to clearly judge whether observed cloud was made of CO2 or not. However OMEGA, visible and near-infrared imaging spectrometer onboard Mars Express, provided the first spectroscopic identification of a cloud as being composed of CO2. Spectral feature of CO2-ice cloud is characteristic : emission peak at 4.26micron because of scattering of photon. CO2 cloud has been observed in near-equator at high altitude (60-100km). Radiative transfer model showed that emission peak shifted toward longer wavelength when effective radius got larger and that emission peak could be seen more clearly with ten times higher spectral resolution (Montmessin et al,2007). Then, we tried to observe CO2-ice cloud using PFS, infrared fourier spectrometer onboard Mars Express. Its spectral resolution is about ten times higher than that of OMEGA. At first, we checked the data for 34 orbit where OMEGA observed CO2-ice cloud and found clear emission peak at 4.25micron for 13 orbit. We checked both OMEGA data and PFS data, and confirmed that emission peak appears only when cloud was in the view of PFS, so we can say this signal is real. We found other spaectral feature : double peak at 4.25micron and 4.28micron. It is possible that this type of spectral feature shows different cloud feature. We are checking all the orbit and trying to expand event list, and we wll try Radiative Transfer Model and discuss the relation between effective rudius of cloud particle and the position of emission peak.