

TNA2 Report 2011

Facility AU-MSL dusty wind tunnel

One TNA2 experimental visit was performed in 2011 to the AU-MSL facility. The visit took place in the period 6/6/2011 – 10/6/2011 and the activity will be summarized below. The requested duration of the experiment was 5 days, the actual duration was 5 days.

Experiment Title; Optical and mechanical CO₂ ice properties
Leader; Ganna Portyankina
Co- investigator; Klaus-Michael Aye

This investigation involved the formation of CO₂ ice under Mars simulation conditions in order to resolve speculation as to the optical properties of the seasonal Martian polar CO₂ ice. The existence of highly transparent CO₂ ice layer in Martian polar areas has been debated for a long time (e.g. the Kieffer model). It is required by diverse models of polar activity, however it was not indisputably confirmed by the observations. Our aim is to constrain the conditions suitable for the formation and preservation of the transparent (translucent) CO₂ layer.

In this experimental series we successfully produced (mm thick) transparent CO₂ ice layers under conditions similar to those at the surface of the polar regions of Mars (temperature ranges from 140K to 170K) and pressures around 10mbar. There were also observed several (non-transparent) crystalline phases within the temperature and pressure ranges investigated and in fact the stable range of the transparent CO₂ layer phase was seen to limited. The data collected is now being analysed and prepared for publication.

J.P. Merrison, AU-MSL