



## Model interpretation of cloud observations by the LIDAR on the Phoenix Mars lander

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Phoenix LIDAR observations [Whiteway et al. 2009] of clouds and precipitation in the planetary boundary layer (PBL) on Mars have been interpreted by a microphysical model for Mars ice clouds in combination with a coupled PBL-Aeolian dust model [Davy et al. 2009, Daerden et al. 2010].

The model simulates nighttime clouds and fall streaks within the PBL that are similar in structure to the LIDAR observations. Sizes of precipitating crystals grow to sizes of 30-50  $\mu\text{m}$  effective radius, comparable to ice crystals observed in precipitation from terrestrial cirrus clouds which are formed under similar meteorological conditions.

The observed regular daily pattern of water ice cloud formation and precipitation in the PBL is indicative of a diurnal process in the local water cycle in which the combination of strong daytime vertical mixing and nighttime precipitation of large ice crystals acts to confine water to the PBL [Whiteway et al. 2009]. The simulations support this interpretation. This process may contribute to the seasonal variation of atmospheric humidity.

### References

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