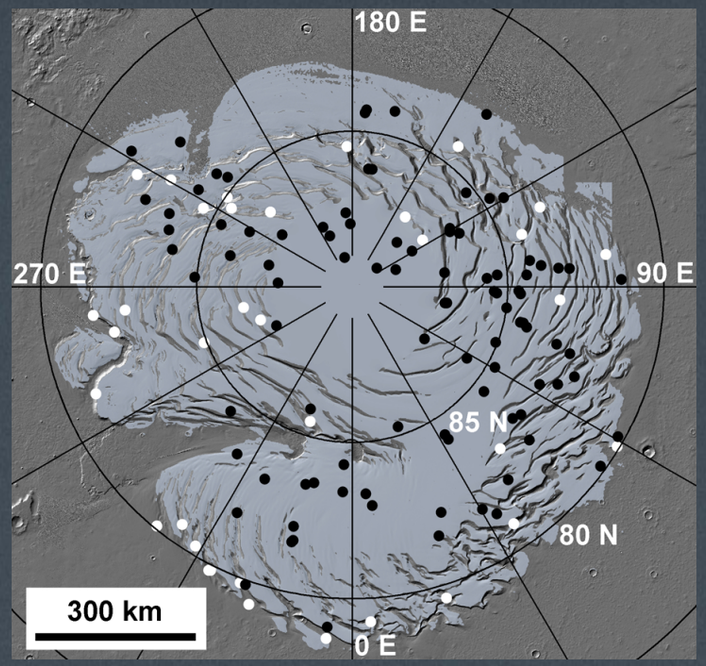
Crater Population and Resurfacing of the Martian North Polar Layered Deposits



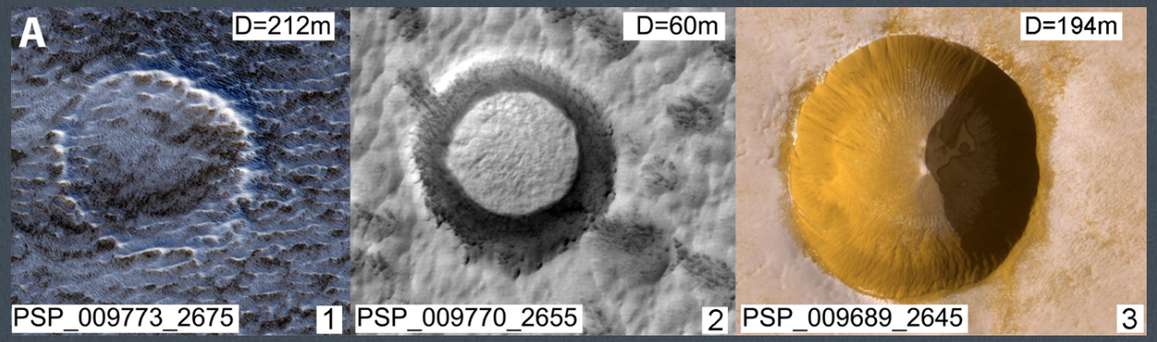
- Present-day accumulation in the north polar layered deposits (NPLD) is thought to occur via deposition on the north polar residual cap (NRC).

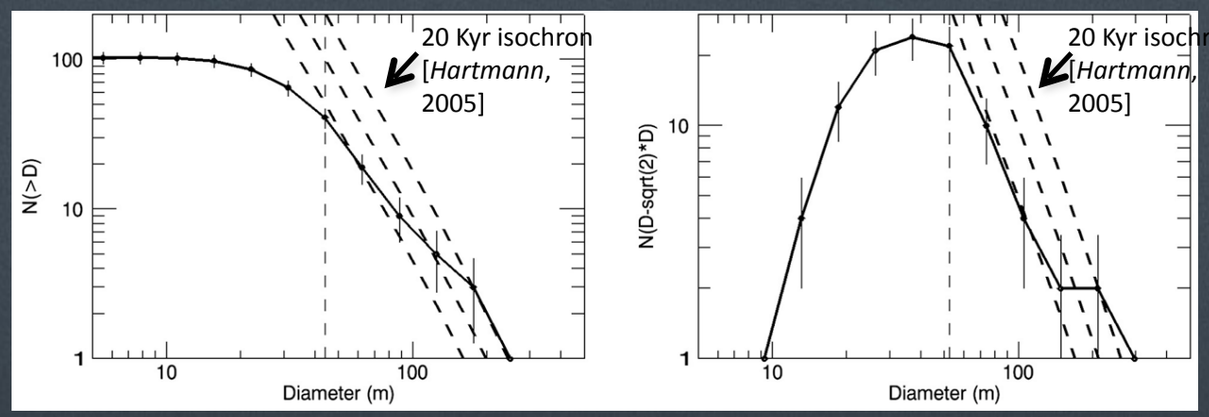
- Understanding current mass balance in relation to current climate would provide insight into the climatic record of the NPLD.

- ~132 craters have been identified on the NPLD (black and white dots), 97 of which are located within a region defined to represent recent accumulation (black dots).

- HiRISE images reveal a morphological sequence of crater degradation that provides a qualitative understanding of processes involved in crater removal.

- Temporal and spatial distribution of crater degradation is interpreted to be close to uniform.





Cumulative size-frequency distribution

Differential size-frequency distribution

- Through comparison of the size-frequency distribution of these craters with the expected production function, the craters are interpreted to be an equilibrium population with a crater of diameter D meters having a lifetime of $\sim 30.75D^{1.14}$ years.

- Accumulation rates within these craters are estimated at $7.2D^{-0.14}$ mm/year, which corresponds to values of ~3-4 mm/year, and are much higher than rates thought to apply to the surrounding flat terrain.

- Current crater population is estimated to have accumulated in the last ~20,000 years (kyr) or less.

HIRISE

THE UNIVERSITY OF ARIZONA