

South Polar Layered deposits and Climatic change on Mars

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It is known to good correlation between the insolation change and some paleoclimate index provided from the ice core of the earth south pole. On Mars, north polar layered deposits (NPLD) has exposed layer sequences in cliffs and troughs. It is thought that there is correlation between insolation change and the change of the brightness of exposed NPLD, but the study that used South Polar Layered Deposits (SPLD) for is not done. Therefore I looked for the stripe on cliffs that it was thought to be exposed SPLD. Then, comparison between insolation change and the stripe estimated the accumulation rate.

The south pole insolation in the past 1Myr on Mars were calculated from the north pole insolation, the eccentricity of revolution and the solar longitude at perihelion. The slope that was steeper than circumference around (87S, 8E) were derived from optics image by Mars Orbiter Camera (MOC) of Mars Global Surveyor and the elevation map by Mars Orbiter Laser Altimeter (MOLA). In this slope, light and shade structure were identified to corresponding the vertical structure of SPLD.

Insolation on Mars south pole and SPLD showed good correlation, especially in the insolation of 330-690kyr ago. The accumulation rate at this SPLD is 2.2m/10kyr. It's amount is half of the NPLD. In addition, it became clear that, for the past 1Myr, the accumulation rate of the Mars SPLD increased to 5.4m/10kyr from 1.3m/10kyr.