## Planet Four: Studying the Seasonal Processes on the Polar Regions of Mars



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Each Winter 30% of Mars' atmosphere freezes out at the poles to form a seasonal ice cap



At the South Pole of Mars, the seasonal carbon dioxide ice cap is directly exposed to the atmosphere and thaws in the Spring and Summer

# Mars Reconnaissance Orbiter with the HiRISE camera



# HiRISE images show dark fans and blotches on the South Pole in Spring and Early Summer



Image credit: NASA/JPL/University of Arizona





Image credit: NASA/JPL/University of Arizona

# HiRISE images capture dark fans & blotches on the South Pole in Spring & Summer



Image credit: NASA/JPL/University of Arizona

## Spider Time Lapse

#### Spring



Hansen & McEwen, 2007



The Sun heats and sublimates the base of the carbon dioxide ice sheet. The carbon dioxide gas is trapped below

Kieffer et al., 2006

Carbon dioxide geysers bring dust and dirt to the ice sheet surface. Local winds blow the particles into dark fans



Image credit: Arizona State University/Ron Miller



Over many seasons, carbon dioxide gas trapped below the ice over carves in the ground dendrite-like channels dubbed 'spiders' and araneiform terrain

# Spider Time Lapse

#### Spring



Hansen & McEwen, 2007

Translucent CO2 ice slab



The Sun heats and sublimates the base of the carbon dioxide ice sheet. The carbon dioxide gas is trapped below

Kieffer et al. , 2006



Carbon dioxide gas breaks out

in geysers

# Wind

#### No Wind



Image credit: NASA/JPL/University of Arizona

These seasonal features can help us create a surface wind map of the South Pole



Animation Credit: Anya Portyankina

Image credit: NASA/JPL/University of Arizona

We want to understand how these seasonal blotches and fans evolve over time and change from different regions on the South Pole.

#### How does the South Pole change from Winter to Winter?



Image credit: NASA/JPL/University of Arizona

A global dust storm occurred on Mars between the two winters - how does this impact the number and size of seasonal fans and blotches?

#### **Planet Four**



#### http://www.planetfour.org?lang=zh\_tw

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