

**Title:** CO<sub>2</sub> Sublimation and Wind Patterns on Mars

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**Abstract:** In Martian winters, the poles get covered by a layer of transparent CO<sub>2</sub> ice. In spring, sunlight causes substrate under the ice to heat up which sublimates CO<sub>2</sub> under the ice. The accumulating gas eventually causes the ice above it to rupture and the gas and substrate mixture spews out like a geyser and settles back down on the surface. The shape, size, and alignment of the deposits on the surface as viewed by the HiRISE (High Resolution Imaging Science Experiment) camera, which is onboard Mars Reconnaissance Orbiter, are related to physical processes like sublimation, weather, and wind on Mars. The jet deposits are identified by citizen scientists on a website called Planet Four. Users of the website are shown sections of HiRISE images and asked to mark different surface features with different tools. The markings are averaged, filtered, and sorted to ensure that the data accurately represents the images. By analyzing trends in the change of different characteristics of these surface features over time, like length and area of markings and total coverage of a region, we conclude that different regions on Mars have different sublimation processes and varying wind patterns, with some wind patterns appearing on an inter-regional scale. We also conclude that wind and weather patterns generally repeat from year to year, and that sediment deposits affect local weather as well.