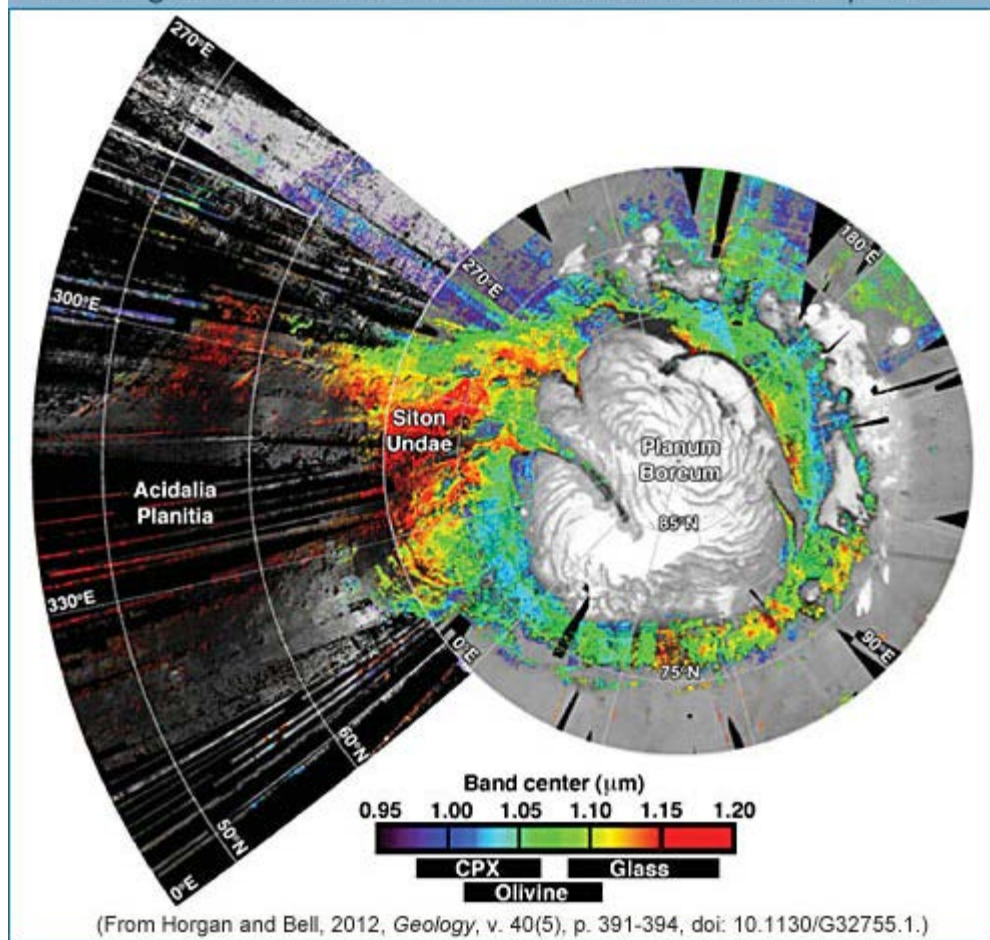


Weathered Glass on Mars

Glass-rich sediments in the northern lowlands of Mars have gained more attention lately because of the implications for widespread explosive volcanism and late-stage surface alteration by water.

Finding Weathered Glass on Mars with OMEGA Spectra



The sediments (not to be confused with the planet's ubiquitous blankets of windblown dust) are the focus of work by Briony Horgan and Jim Bell (Arizona State University) to better constrain the composition and origin of these deposits that cover 10 million square kilometers northward of 45°N.

Appearing conspicuously dark in visible light (because of their low *albedo*) these lowland deposits have been identified in most of the north polar sand sea, in Acidalia Planitia, and in Utopia Planitia. Yet, unlike other low-albedo areas on the planet, most of the northern lowlands have *not* been interpreted as typical Martian *basalt*. What set these areas apart in previous studies were mid-infrared spectral signatures of some kind of poorly crystalline, high-silica phase. These signatures were variously explained as

volcanic glass (e.g. obsidian) or secondary alteration products such as opal or silica coatings.

Horgan and Bell looked at the northern lowlands in a different light with data from the OMEGA spectrometer on the European Space Agency's Mars Express spacecraft. OMEGA operates in the visible and infrared regions to produce mineralogical maps of the Martian surface. Based on their analyses of OMEGA data plus comparisons with rover and other orbital data, lab studies, and terrestrial analogs, Horgan and Bell conclude the low-albedo sediments are 80-90% glass, likely composed of sand-size grains of iron-bearing glass. A glass so durable it even forms dunes. They propose the glass was created during explosive volcanic eruptions when lava violently interacted with ice and water, in contrast to eruptions that poured out sheets of lava. Given the vast extent of these glass-rich sediments, explosive volcanism may

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See: Horgan, B. and Bell III, J. F. (2012) Widespread Weathered Glass on the Surface of Mars, *Geology*, v. 40(5), p. 391-394, doi: 10.1130/G32755.1 [[article](#)], and the **PSRD** article: [Timeline of Martian Volcanism](#). See also information about [OMEGA on the Mars Express Mission](#), from the European Space Agency.

See also the June 2012 "Image of the Month" from the IAG Planetary Geomorphology Working Group: [Glass-rich Sand Dunes and Plains Suggest Ice-magma Interactions on Mars](#), with images and captions by Briony Horgan (Arizona State University).

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