# Dust devils and daytime upslope winds explain Mars's constant haze

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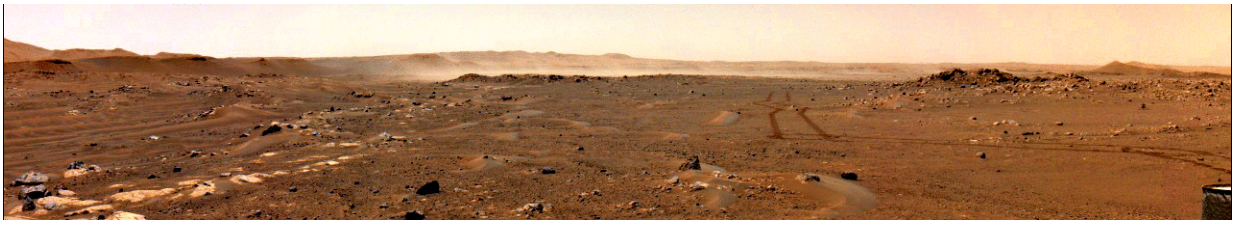

Stretched color version of a movie of a huge “gust lifting” event taken by the Navigation Camera (Navcam) on sol 117. Images are 14 seconds apart. Credit: NASA/Caltech-JPL/SSI

A large team of researchers affiliated with multiple institutions in the U.S., Spain, France and Finland has found that frequent dust devils and daytime upslope winds are the reason for Mars's constant atmospheric haze. In their paper published in the journal *Science Advances*, the group describes their study of data from the first 216 sols of Perseverance rover's trek across the surface of parts of the red planet and what they learned from it.

Scientists have known for many years that Mars looks red not only because of the dust that coats its surface, but because much of that dust is borne aloft in the planet's atmosphere. What has remained a mystery, until now, are the factors responsible for keeping the dust aloft. Prior research has shown that Mars experiences large, periodic dust storms

that carry enormous amounts of dust into the atmosphere, but study of the storms has shown that they are not frequent enough to explain the persistence of dust in the atmosphere. To find its true cause, the researchers studied data from the Perseverance rover.

Perseverance is equipped with a panel of sensors known collectively as the Mars Environment Dynamics Analyzer (MEDA). They include systems to monitor air pressure, temperature and wind speed. MEDA also has devices to analyze dust scattering through sunlight. The rover also has a microphone that can listen to the wind and cameras for capturing imagery.

The researchers found that dust devils are very frequent on Mars, at least on the part of the planet where Perseverance is traveling. They found that at least one dust devil was generated in the vicinity of the rover every day. They also found that daytime upslope winds were quite common as well. These events were less common than the dust devils, but tended to pull more dust from the surface into the atmosphere. The researchers suggest that taken together, the wind events provide a reasonable explanation for the persistence of dust in the atmosphere.

**More information:** Claire E. Newman et al, The dynamic atmospheric and aeolian environment of Jezero crater, Mars, *Science Advances* (2022). DOI: 10.1126/sciadv.abn3783