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Aeolian Changes at the Insight Landing Site on Mars: Multi-instrument Observations

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The InSight (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport) mission landed in western Elysium Planitia on November 26, 2018. Because of its stationary position and a multi-instrument package, InSight offers the unique opportunity of detecting changes induced by aeolian activity and constraining the atmospheric conditions responsible for particle motion.

In this work, we present the most significant changes from aeolian activity as detected by the InSight lander during its first 400 Martian days of operations. We will show that particle entrainment by wind activity around InSight is a subtle process and report simultaneous measurements observed across multiple instruments. The changes observed are episodic and are seen correlated with excursions in both seismic and magnetic signals, which will be discussed further. Our observations show that all aeolian movements are consistent with the passage of deep convective vortices between noon to 3 pm local time. These vortices may be the primary initiators for aeolian transportation at InSight, inducing episodic particulate motion of grains up to 3 mm in diameter.

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