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A complete Martian year of atmospheric observations with InSight instruments

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On the first hundreds of sols in which the InSight lander operated on the surface of Mars, its instrumentation has proven to be particularly suitable to unveil and understand atmospheric variability at all temporal scales, from the synoptic scale (baroclinic waves) to the sub-hour scale (gravity waves, bores) down to the turbulent scale (vortices, gusts, infrasounds). Recently, the InSight lander achieved a complete Martian year of observations of the atmosphere of Mars -- allowing for the seasonal variability of the Martian atmosphere and its phenomena at all scales to be monitored almost continuously, including during several large dust storms episodes. In this presentation, based on this Martian year of InSight observations, we will review the annual CO₂ sublimation / condensation cycle, the variability of large-scale meteorology, the statistics of a year of wind observations -- and insightful comparisons with global climate models, the strong seasonal variability of gravity wave and turbulent activity, including a burst of activity of convective vortices

in Mars' southern summer. We will also discuss how the atmosphere influences seismic and magnetic signals captured by InSight -- and the search for Martian infrasound.

InSight & TWINS & SEIS teams: led by M. Panning / S. Smrekar / W.B. Banerdt (JPL / USA) & J.A. Rodriguez-Manfredi (CAB / Spain) & P. Lognonné (IPGP / France)