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Seis: overview, deployment and first science on the ground

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The InSight mission landed on Mars on 11/26/2018. This is the first planetary mission deploying a complete geophysical observatory on another body than Earth after the Apollo Lunar Surface Experiments Package (ALSEP) deployed on the Moon during the Apollo program. It will provide the first ground truth constraints on interior structure of the planet. The Seismic Experiment for Interior Structure (SEIS) is one of the three primary scientific investigations, the two other ones being the Heat Flow and Physical Properties Package (HP3) and the Rotation and Interior Structure Experiment (RISE). SEIS is completed by the APSS experiment (InSight Auxiliary Payload Suite), one of which goal is to document the atmospheric source of seismic noise and signals. After a brief description of the SEIS experiment, we report the deployment process, including the evolution of the SEIS noise from on the deck measurements (with only SPs) toward on the ground (with both VBBs and SPs), without and finally with wind shield.
We compare these noise levels to those obtained on Earth during tests, to those recorded on the Moon and to those predicted prior the landing. In all configurations, we identify the contribution of the lander noise and finally discuss what might remain in term of micro-seismic background, i.e. uncoherent seismic waves background.
As proposed by several studies made prior the landing, atmospheric seismic signals on the ground are expected from turbulence in the planetary boundary layer or from dust devils, at both long period and short period. We expect also local time variation of the seismic noise as a consequence of weather activity as well as possible micro-seismic noise associated to trapped surface or body waves in the subsurface low velocity channel. We challenge these predictions with the data and discuss the events and spectrum identified with both the SEIS and APSS data. We finally compare them with modeling made with different subsurface structure.