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Prediction of the InSight SEIS instrument noise in the dc-10 hz bandwidth from seis-vbb on the ground analysis and seis-sp on the deck acceleration measurements.

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Despite its ground installation at about 1.5 meter from the lander, SEIS (Seismic Experiment for Interior Structure) will be sensitive to the ground displacement generated by the lander, in addition to direct forces from the lander propagating along the tether. This lander noise is also expected in the VBB (Very Broad Band seismometers) bandwidth, including below the gravest resonance mode of the lander, expected close or below 10 Hz. In the VBB bandwidth, the lander deck acceleration has been monitored by the SPs (Short Period seismometers) when the latter were operating on it. These measurements provide key constrains on the level of deck acceleration and possibly deck rotation and can therefore be used to predict the forces generated by the lander on the ground and to compare them with the observations made by the SEIS VBBs on the ground. We use formalism developed by Fayon et al. (2017) to model the lander and its 3 feet and complete the approach of Murdoch et al (2017) by adding the torques generated on each foot by the lander rotations, which might likely be important in the bandwidth of the VBB sensors, e.g. [0-10 Hz]. We then identify on the ground VBB signals the largest resonances in the 0-10 Hz bandwidth, including in term of polarized signals on the 3 axes components and analyze their amplitude as a function of wind level and pressure fluctuation. For all the identified VBB resonances, we repeat the analysis using the SP data on the deck. We present preliminary results and tests on a noise rejection algorithm, in order to improve the capability of the VBBs to detect non-lander atmospheric signals and seismic signals in the DC-10 Hz bandwidth. We finally conclude by discussing the opportunity offered by this lander signal to better characterize the wind flow on the lander.