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A super resolution method applied to WISDOM martian radar soundings

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The rover of the ExoMars 2020 mission will be the first able to collect samples down to 2m in the Martian subsurface. To select the best drilling sites available in terms of mission safety and scientific interest, the ExoMars science team will have at their disposal the soundings of the WISDOM ground penetrating radar. The vertical resolution of those soundings is limited by the bandwidth of the instrument. To enhance this resolution, the Bandwidth Extrapolation technique is employed. It allows the extrapolation of a certain amount of frequencies which are not in the spectra measured by the radar. The parameters required by the method were determined with experimental WISDOM soundings from different field campaigns, and the resolution improvement as well as the conservation of amplitude ratios was confirmed on experimental soundings from semi-controlled environments. In 2021, WISDOM will be able to collect soundings with a vertical resolution 2 to 3 times better than expected with the instrument bandwidth.

Field

Instrumentation

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