



## **Automated 3-D mapping of subsurface stratigraphy using SHARAD data over the Promethei Lingula region on Mars**

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Subsurface layers have been observed by radar sounders orbiting Mars and are thought to be a record of past depositional and erosional history, which are postulated as being controlled by local climate conditions affected by the oscillations in the Martian axial obliquity [1]. Martian radar sounders, such as the SHALLOW RADAR (SHARAD) on board the NASA Mars Reconnaissance Orbiter (MRO), transmits radar signals to Mars and receives a set of signals returned from the dielectric boundaries in the probed subsurface regions. The dielectric boundaries represent contrast changes in the dielectric properties of the probed medium. Subsurface layers are found to extend laterally over hundreds of kilometres within the South Polar Layered Deposits (SPLD) [2]. These subsurface layers can be observed in the upper  $\sim 1$  km by using SHARAD radargrams. Detection and extraction of these subsurface layers are required before being able to understand the formation of the SPLD. In this study, we choose a study site in Promethei Lingula (PL) region in the Martian SPLD and apply a method based on the log-Gabor filtering, Continuous Wavelet Transform (CWT) and an Automatic Phase Picker (APP) for automatically extracting these subsurface layers from SHARAD radargrams [3]. After combining results from all SHARAD radargrams in the PL region, we show 3D visualisations of the subsurface features.

### References:

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