

Exploring Venus

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Tesserae only cover 7% of the surface of Venus, but these materials represent the oldest rock record on the surface and may preserve evidence of different earlier climate conditions on Venus. Despite the importance of the tesserae for understanding Venus prior to ~500 Ma, its surface properties are not well constrained. Here we quantify the range in radar brightness, or backscatter coefficient, across the tesserae to extract important information about the distribution of crater ejecta or locally-derived regolith, as well as inherent differences in the original tessera materials. We found that radar brightness does vary significantly across tesserae. Correlations between radar brightness and crater ejecta exist and our analysis indicates that crater ejecta is preserved in rougher tesserae longer than on adjacent low-lying plains ($>35\pm 15$ Ma). While no correlations between radar brightness and volcanic constructs have been identified, there is evidence that differences in tesserae morphology and/or local elevation differences are associated with variations in backscatter coefficient. These backscatter coefficient variations may be related to the inherent tesserae properties. The results of this study provide tantalizing information about the geologic history of Venus preserved in the tesserae, a story which can only be enhanced with new mission data.