



Structural patterns on Titan identified using Cassini SAR PCA

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The current SAR data coverage on Titan encompasses several areas in which multiple radar passes are present and overlapping, providing additional information to aid the interpretation of geological and structural features.

We exploit the different combinations of look direction and variable incidence angle to examine Cassini Synthetic Aperture RADAR (SAR) data using the Principal Component Analysis (PCA) technique, as a tool to aid in the interpretation of structural features. Look direction is of particular importance in the perception and identification of geological and structural features, as extensively demonstrated in Earth and planetary examples.

The PCA enhancement technique uses projected non-ortho-rectified SAR imagery in order to maintain the inherent differences in scattering and geometric properties due to the different look directions.

We focus on the Hotei region, using overlapping SAR images of flybys T41 and T43, in which lineaments can be enhanced and outlined in the PC1 and PC2 components. The PC2 component provides a stereo view of the Hotei Basin in which lineaments and flow features can be outlined. We also present results for the Xanadu region, which is covered by the overlapping SAR images of flybys T13 with T43 and T44.

Results of this technique provide excellent insights into the structural interpretation of these areas by enhancing the geometry of structural features within a regional context and a wider structural interpretation of tectonics on Titan.