



# Automatic detection of wrinkle ridges in Venusian Magellan imagery

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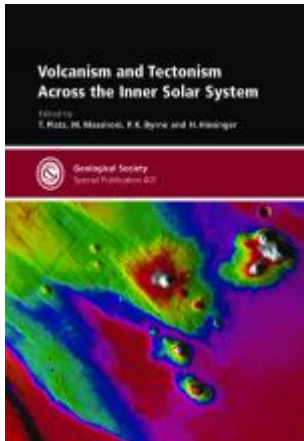
## Abstract

Wrinkle ridges constitute one of the most abundant tectonic features on terrestrial planetary surfaces. On Venus, evidence suggests a connection between wrinkle ridges and the climatic evolution of the planet. However, like other planets and moons that experience more active surface geological processes, such as Earth, Mars, Europa, Io and Titan, visible impact craters on the Venusian surface are less common because they are eroded, buried or transformed by tectonics or other geological processes over time. It is of great importance to identify and understand some characteristics of those surface morphologies, such as orientation, length, spacing, original dimension and topography. Nevertheless, these parameters can only be computed on remotely sensed images after their segmentation. Until now, the manual identification of these features has been focused on those of major geological significance, leaving many more to be identified, mapped and studied. The main aim of this paper is to provide a method for automatic detection of wrinkle ridges from Magellan Synthetic Aperture Radar (SAR) imagery at different scales. The proposed algorithm, based on a combination of fractal dimension and morphological operators, identifies regions of interest to this study, namely those of anisotropic behaviour, but also impact craters and their ejecta blankets. The high performances achieved in a variety of situations demonstrate that its robustness can be applied to an automated procedure.

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[^ Back to top](#)

## In this volume



Geological Society, London, Special Publications

Volume 401  
2015

[Table of Contents](#)

[Table of Contents \(PDF\)](#)

[About the Cover](#)

[Index by author](#)

[Back Matter \(PDF\)](#)

[Front Matter \(PDF\)](#)



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