



Dione's History of Tectonic Disruption

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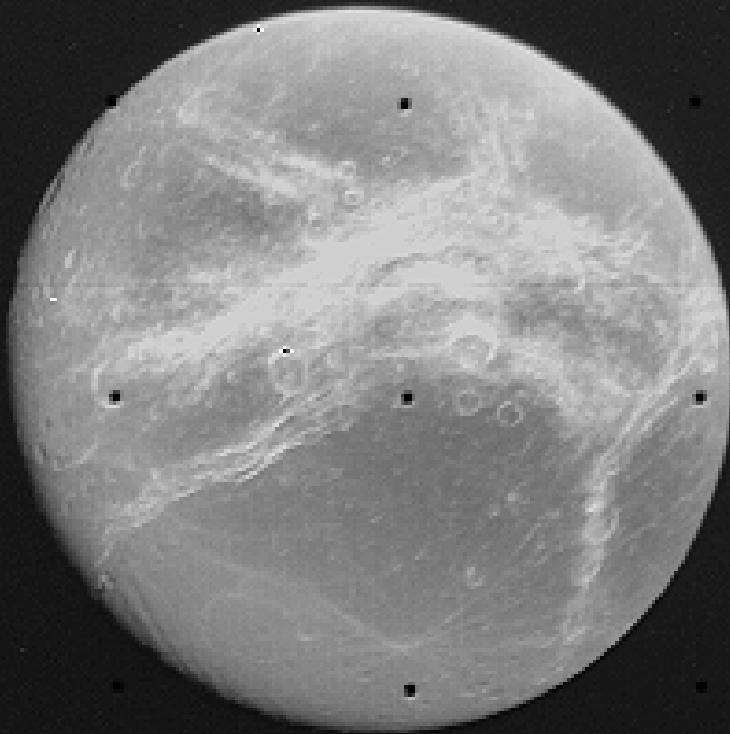


Smithsonian
National Air and Space Museum

Motivations & Approach

What caused the pulse of tectonic activity driving the formation of the wispy terrains?

- 1) Characterize the morphology and distribution of tectonic and linear structures in the wispy terrains of the trailing hemisphere
- 2) Use mapped fracture patterns to compare with theoretical stress models to constrain possible stress mechanisms

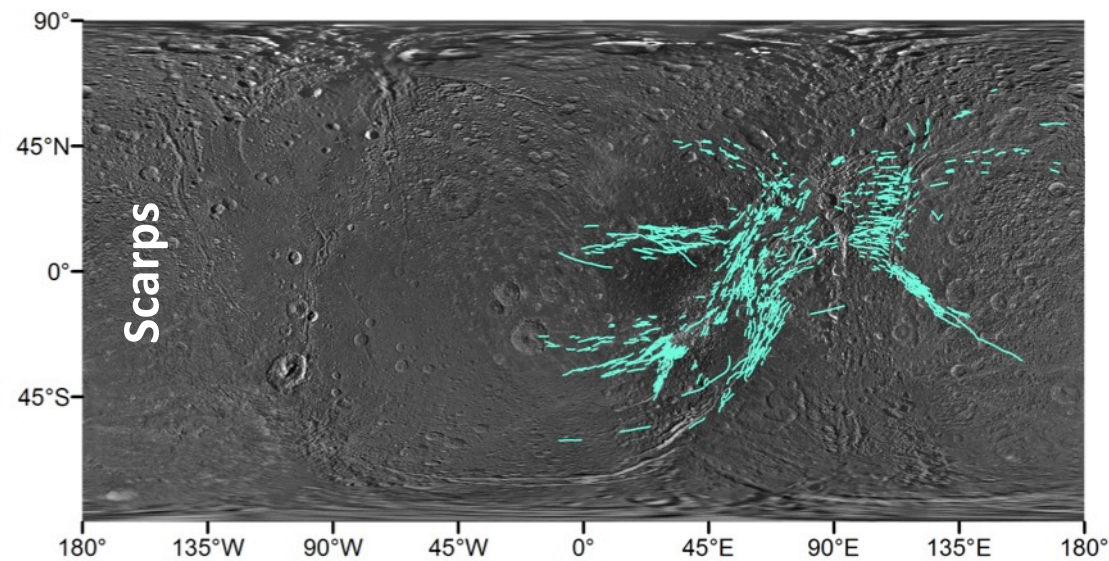
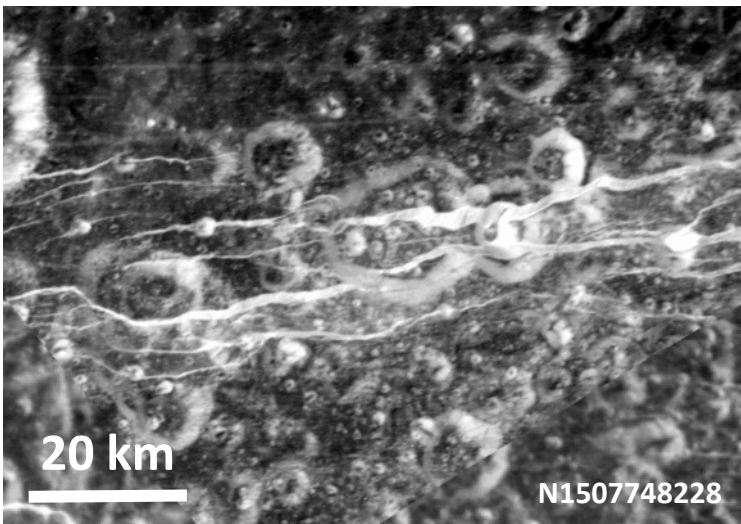
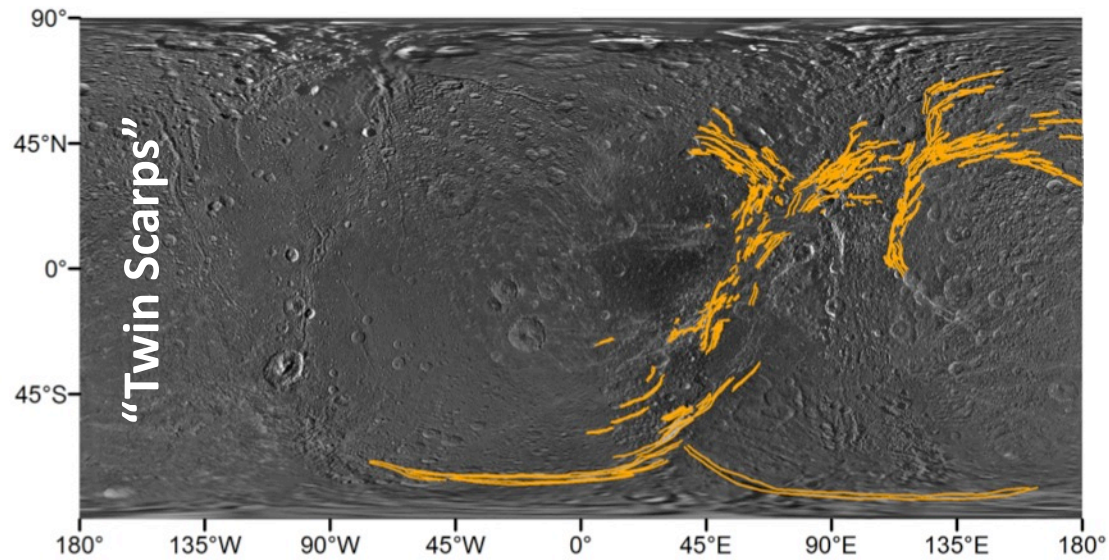
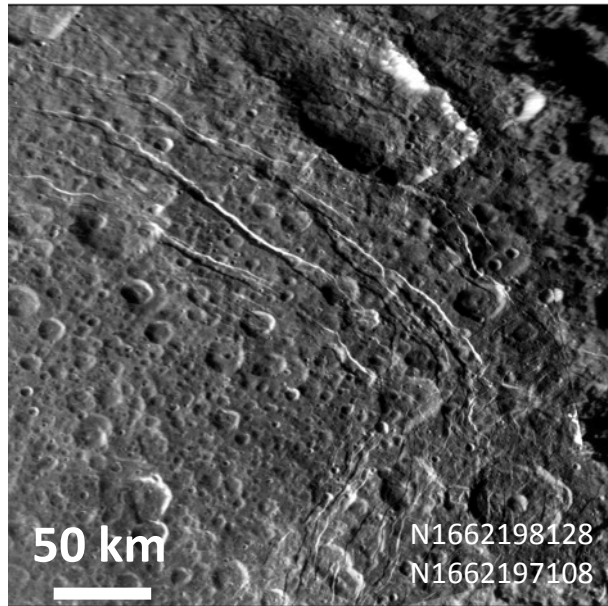


Voyager

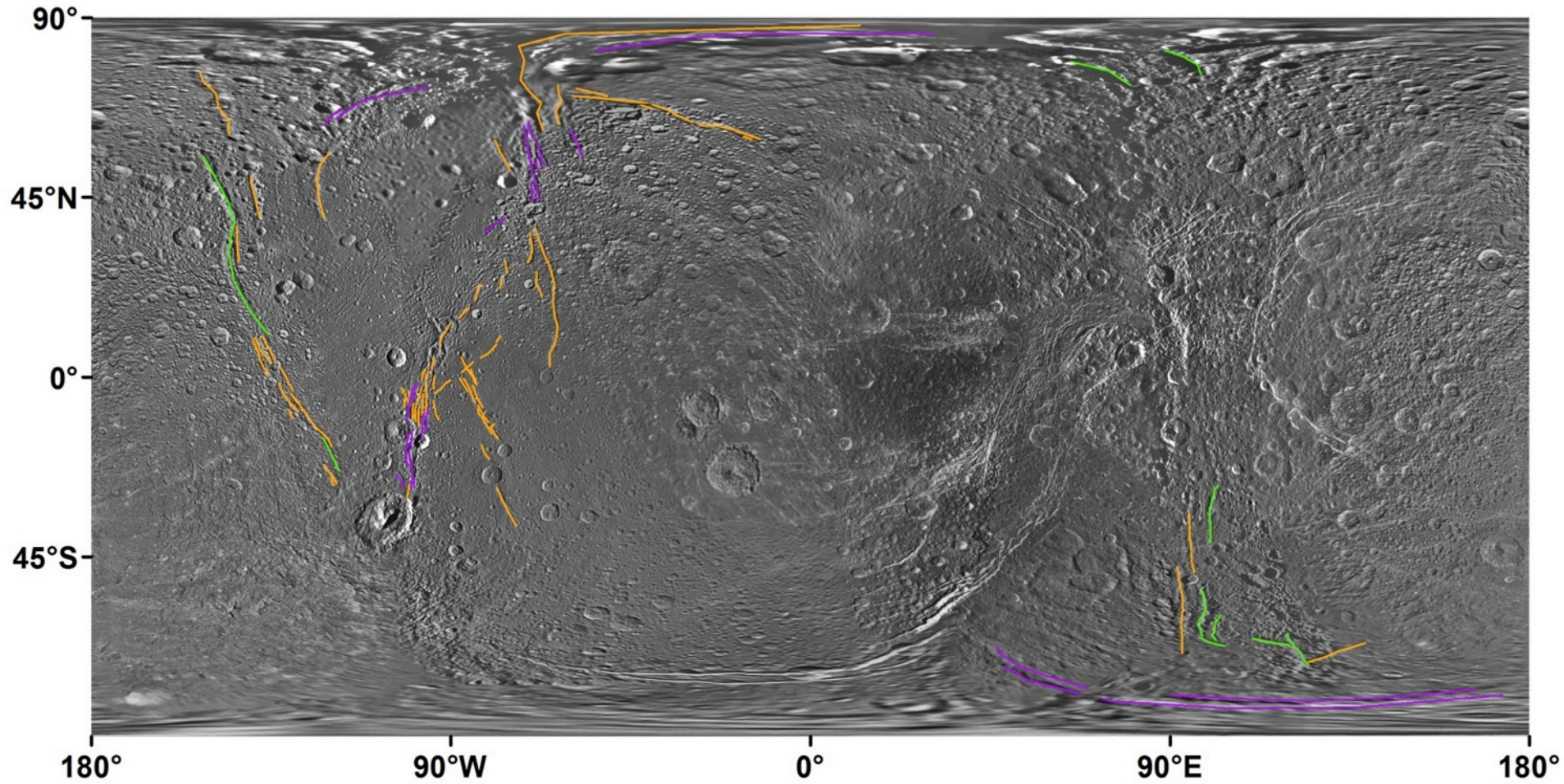


Cassini

Characterization: Recent



Characterization: Ancient

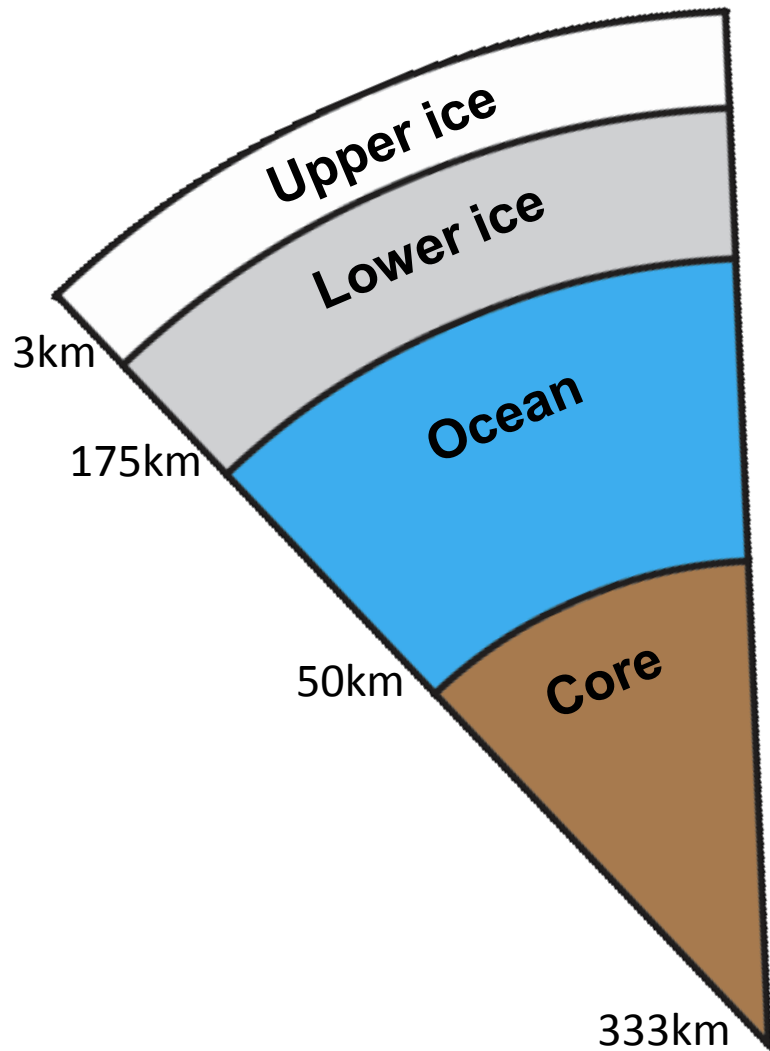


 Ridges

 Trough

 Scarp

Preliminary Modeling Results



(Not to scale!)

Build a Dione using previously published rheological estimates using SatStressGUI (Patthoff et al., 2016)

Consider fracturing when magnitudes reach 1-2 MPa

Diurnal Tidal Stress

Nonsynchronous Rotation

(10ky, 100ky, 1My, 10My)

Ice Shell Thickening