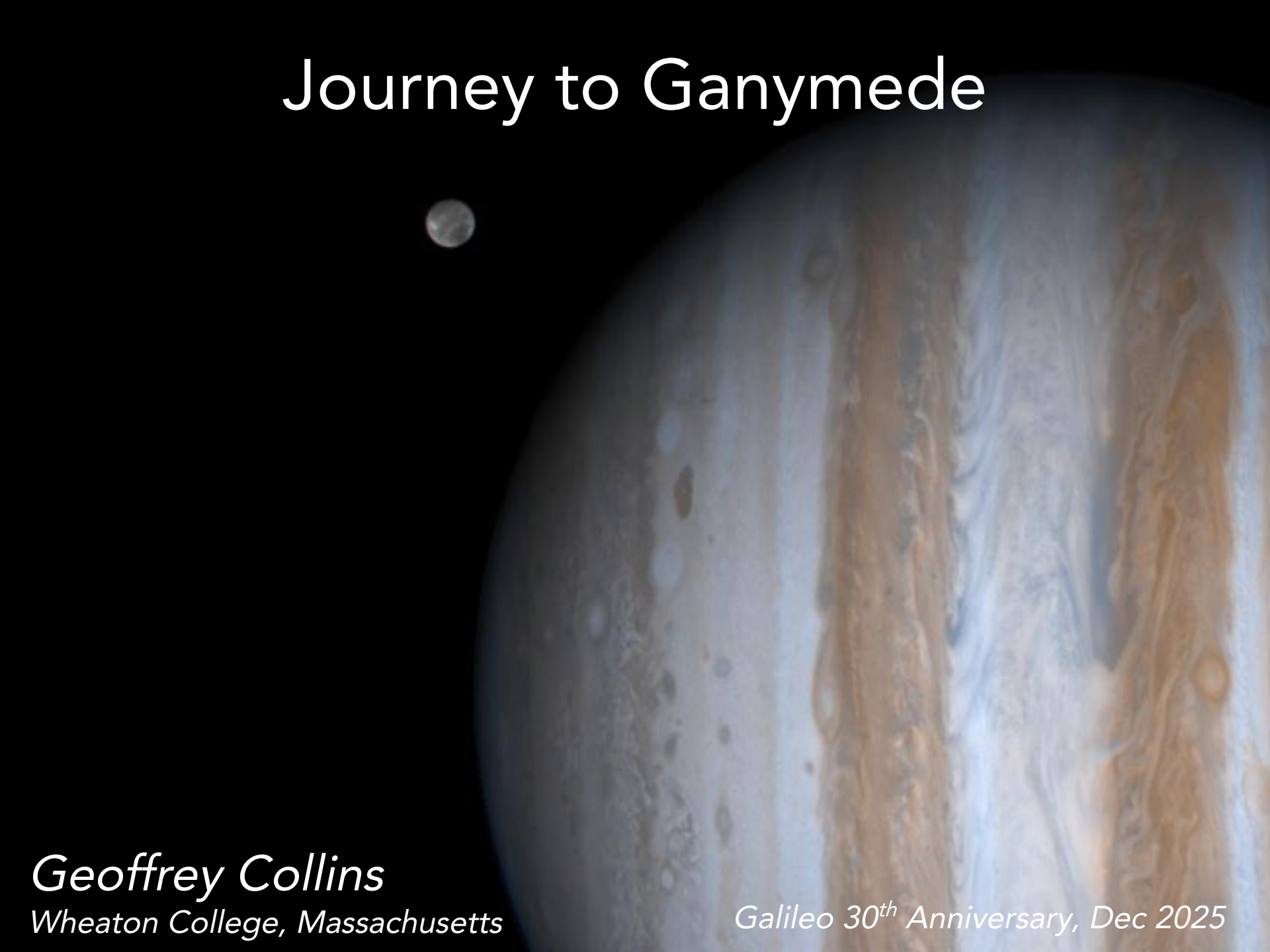
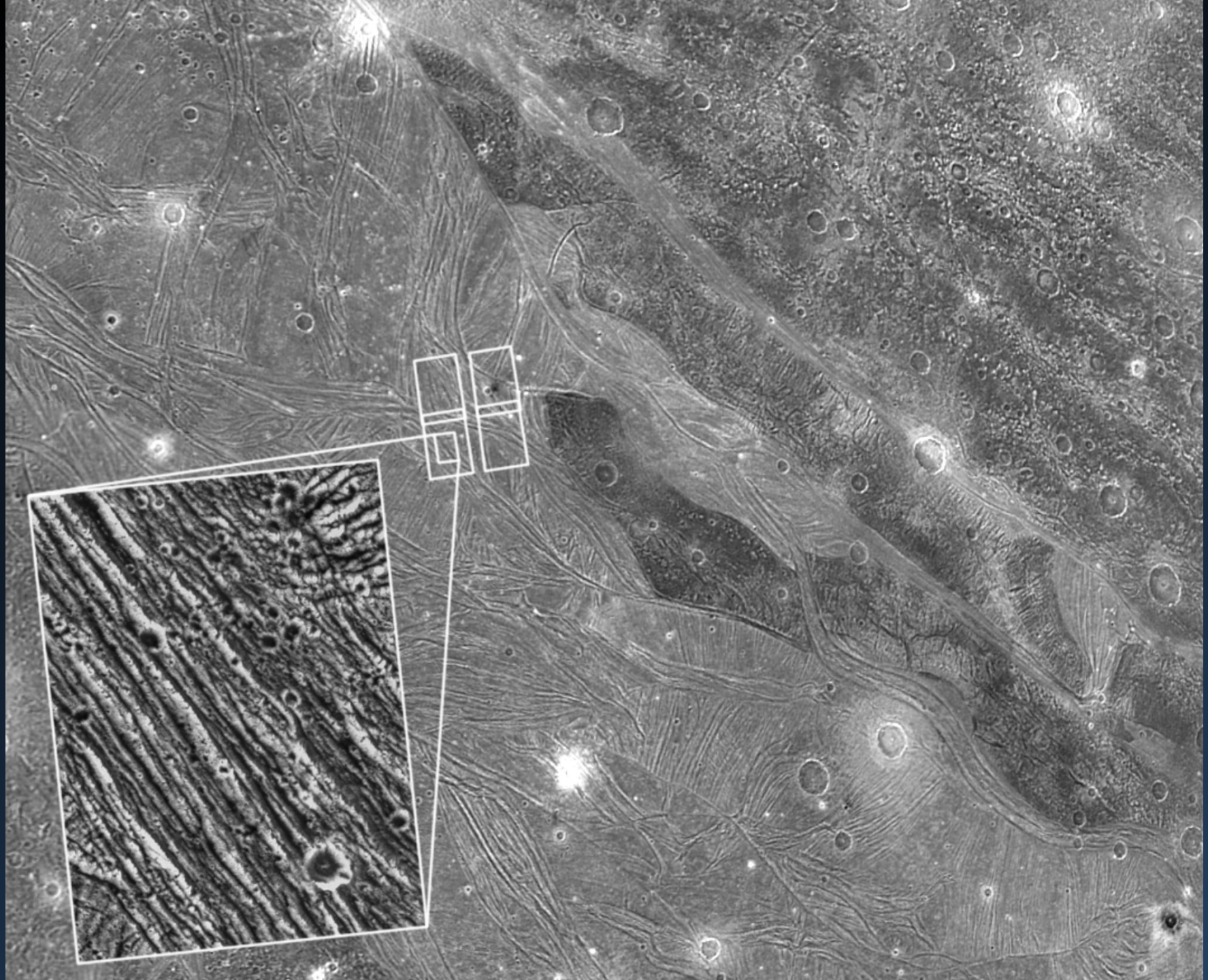
Journey to Ganymede



Geoffrey Collins
Wheaton College, Massachusetts

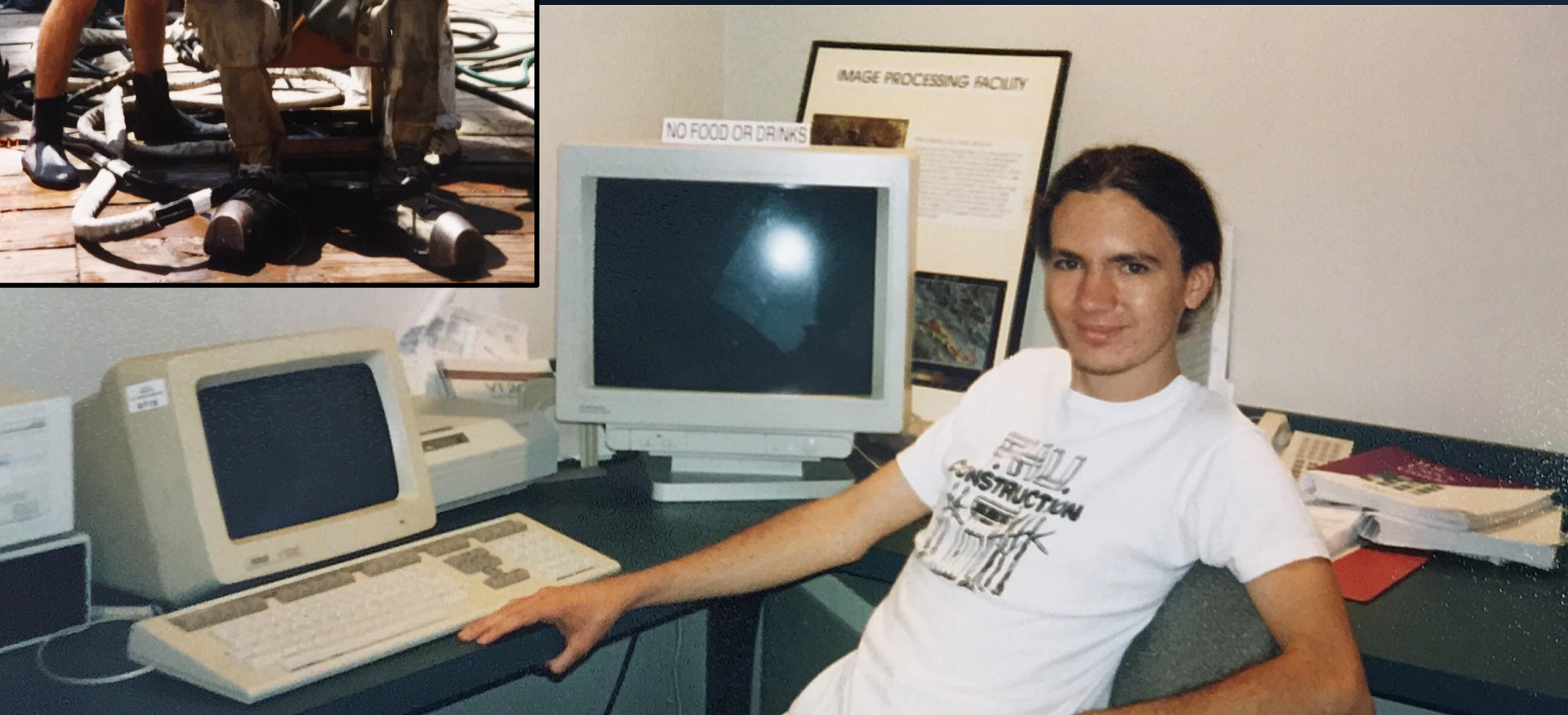
Galileo 30th Anniversary, Dec 2025

Galileo G1 press conference, July 1996

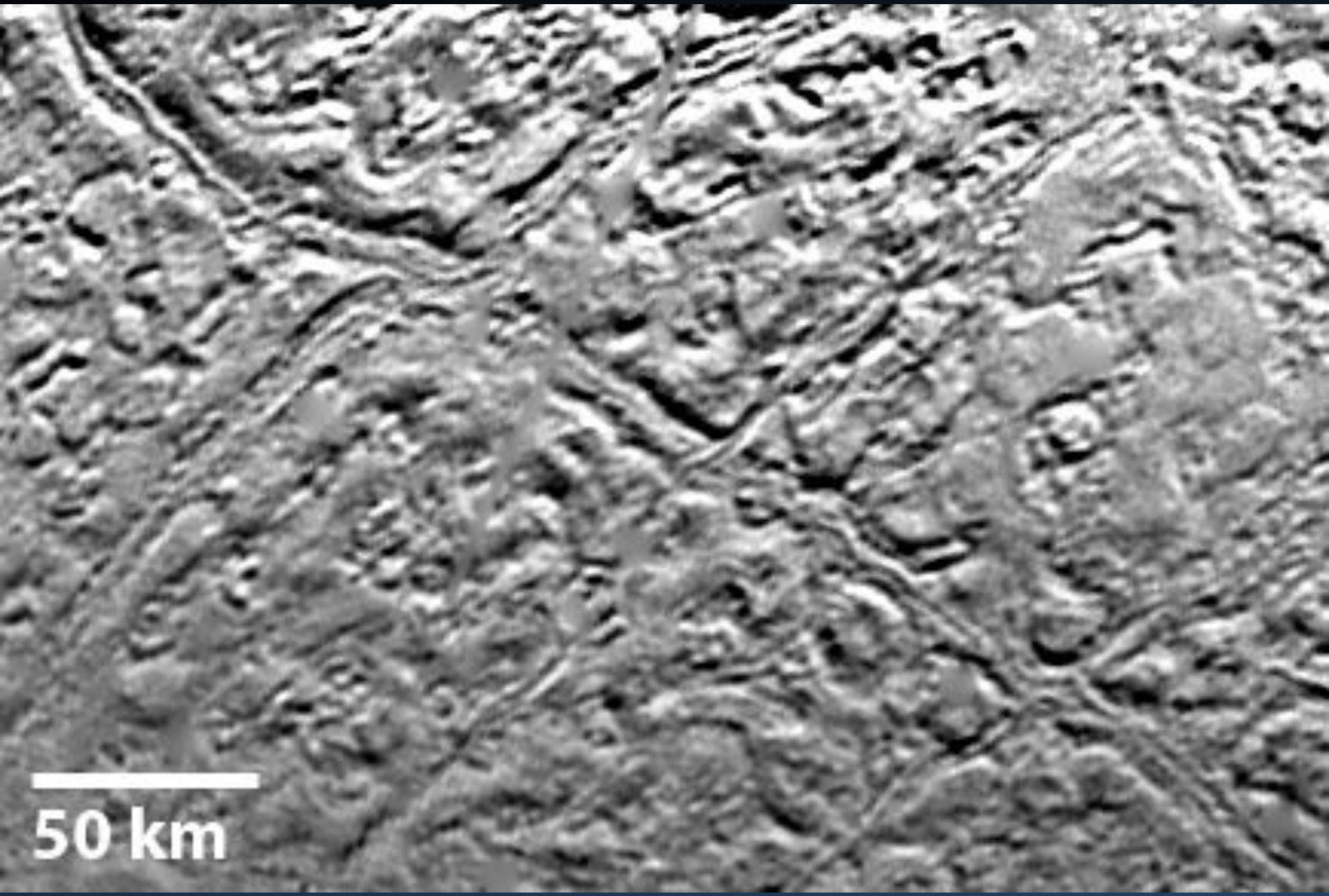


A brand-new LPI building welcomes the interns of 1993

Working with Paul Schenk --
Learning to use VICAR to process
Voyager images of Triton

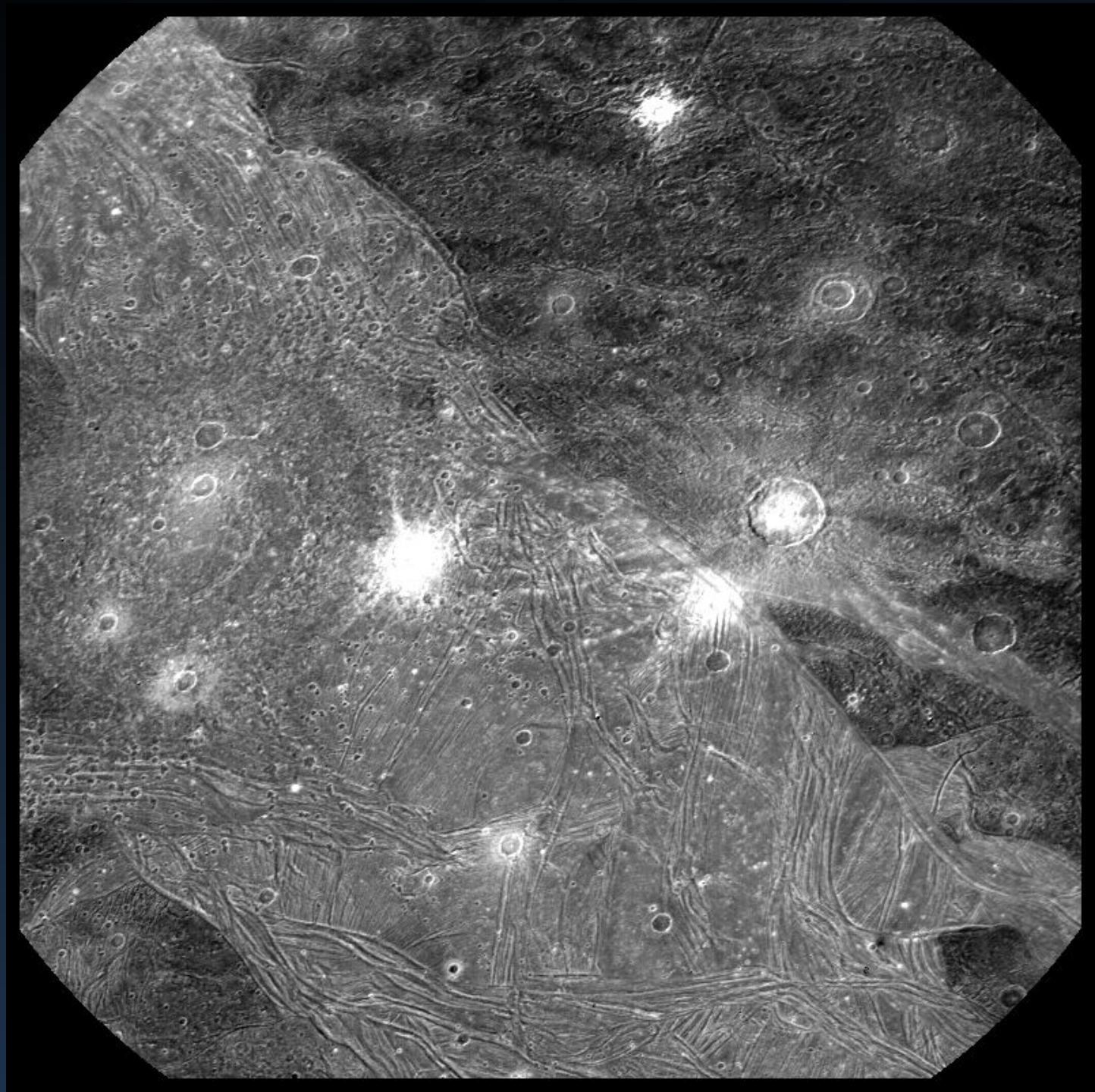


What are these tectonic features on Triton?

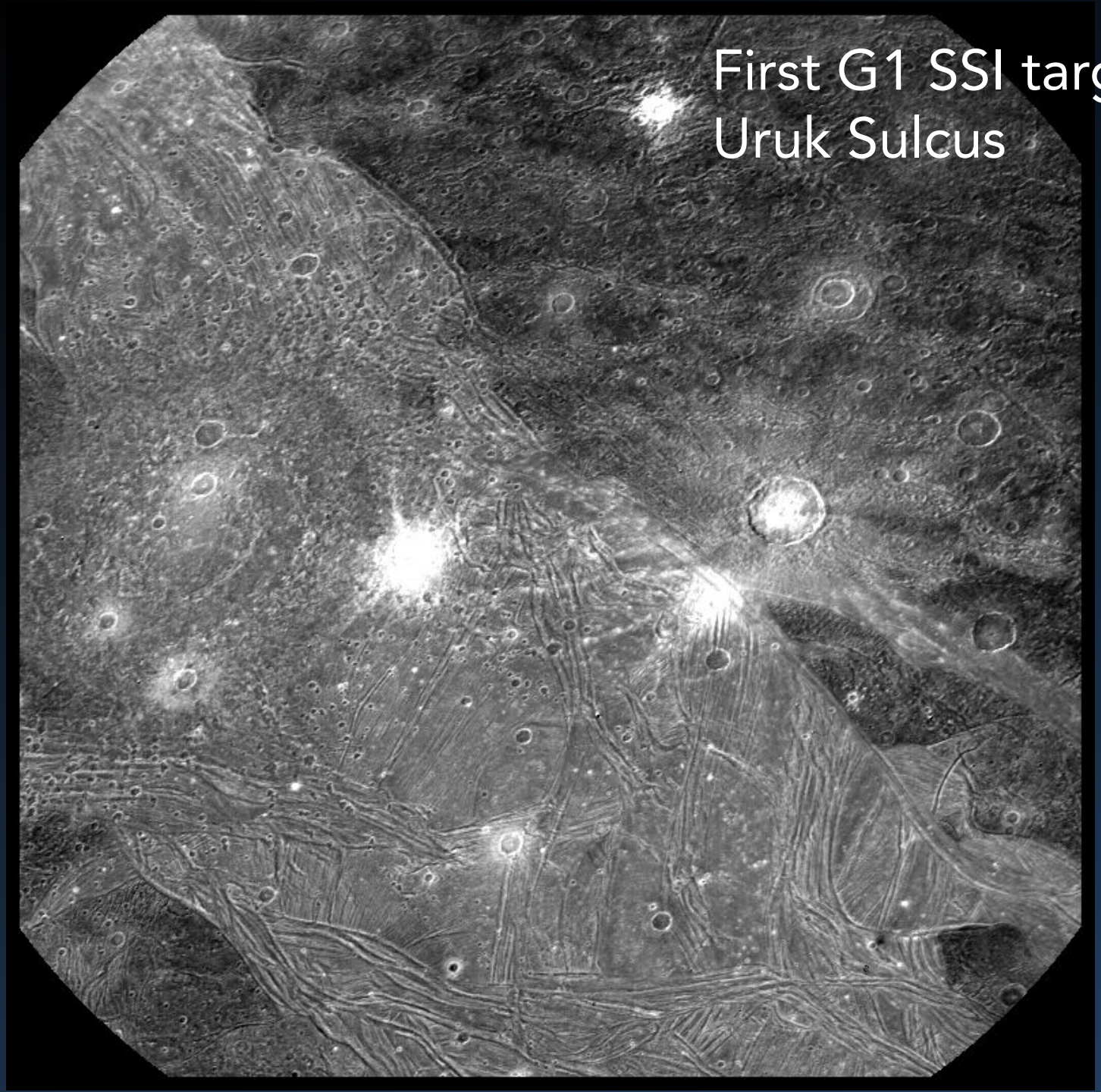


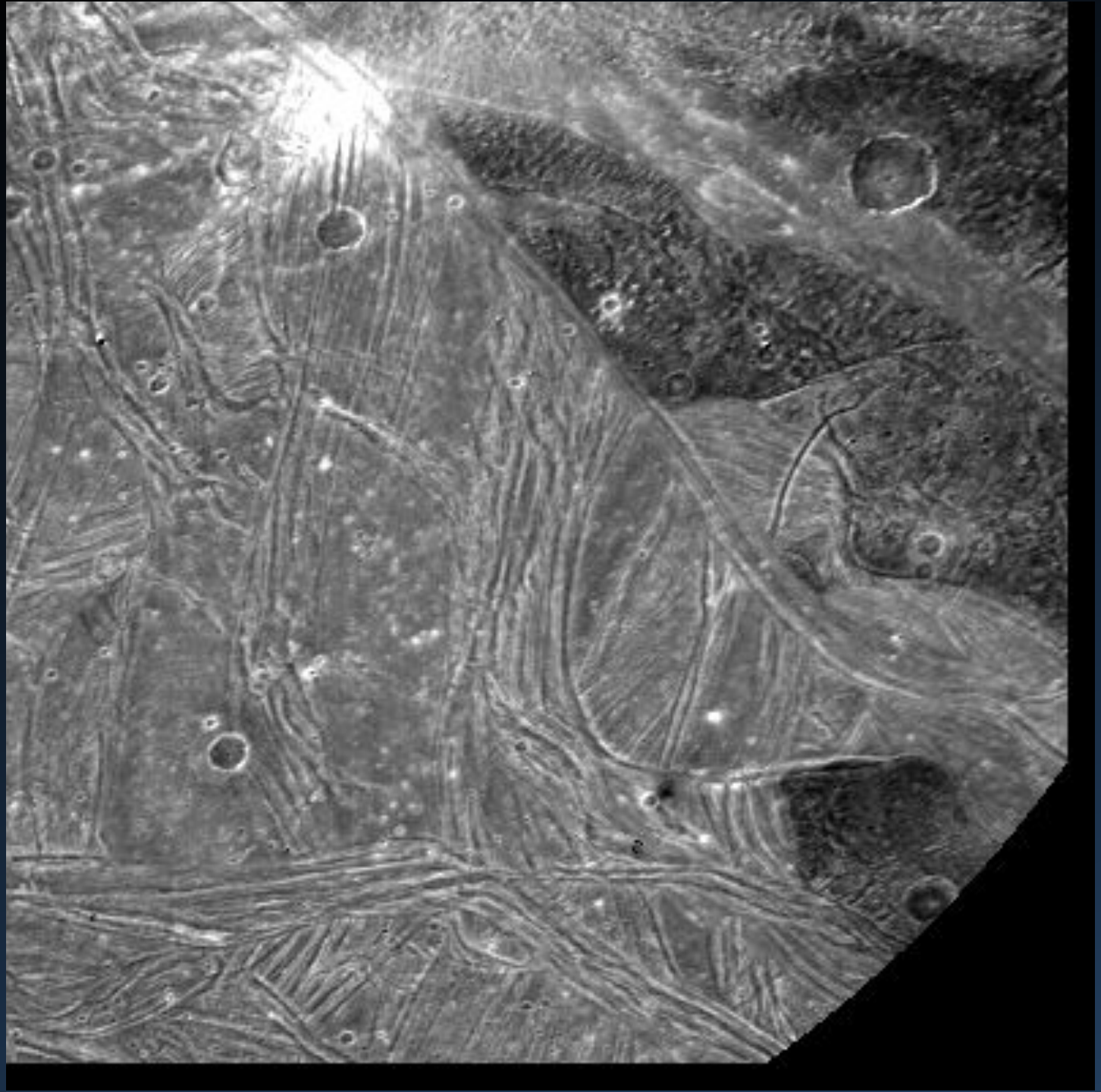
Searching for analogues

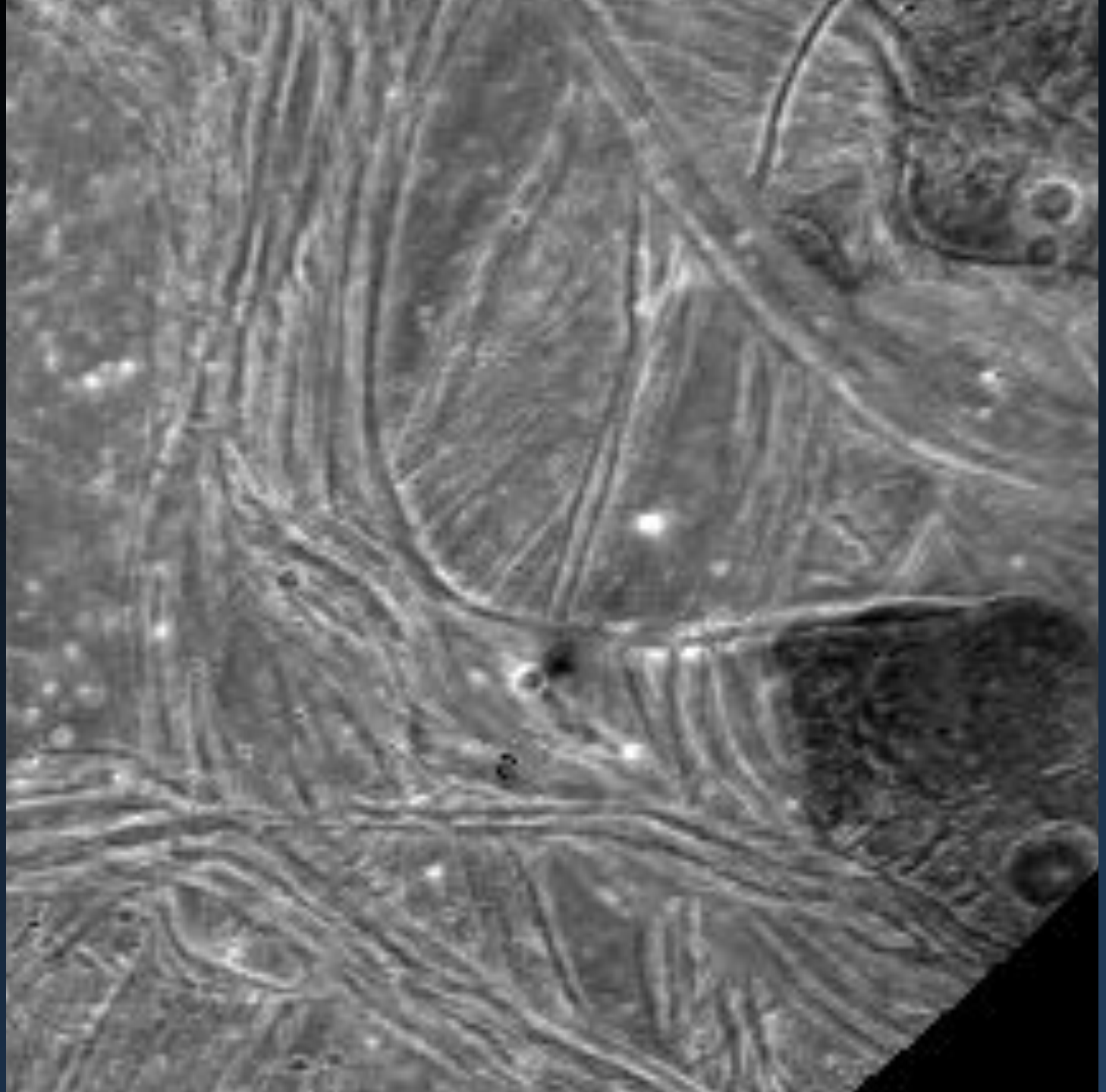
How I became interested in Ganymede

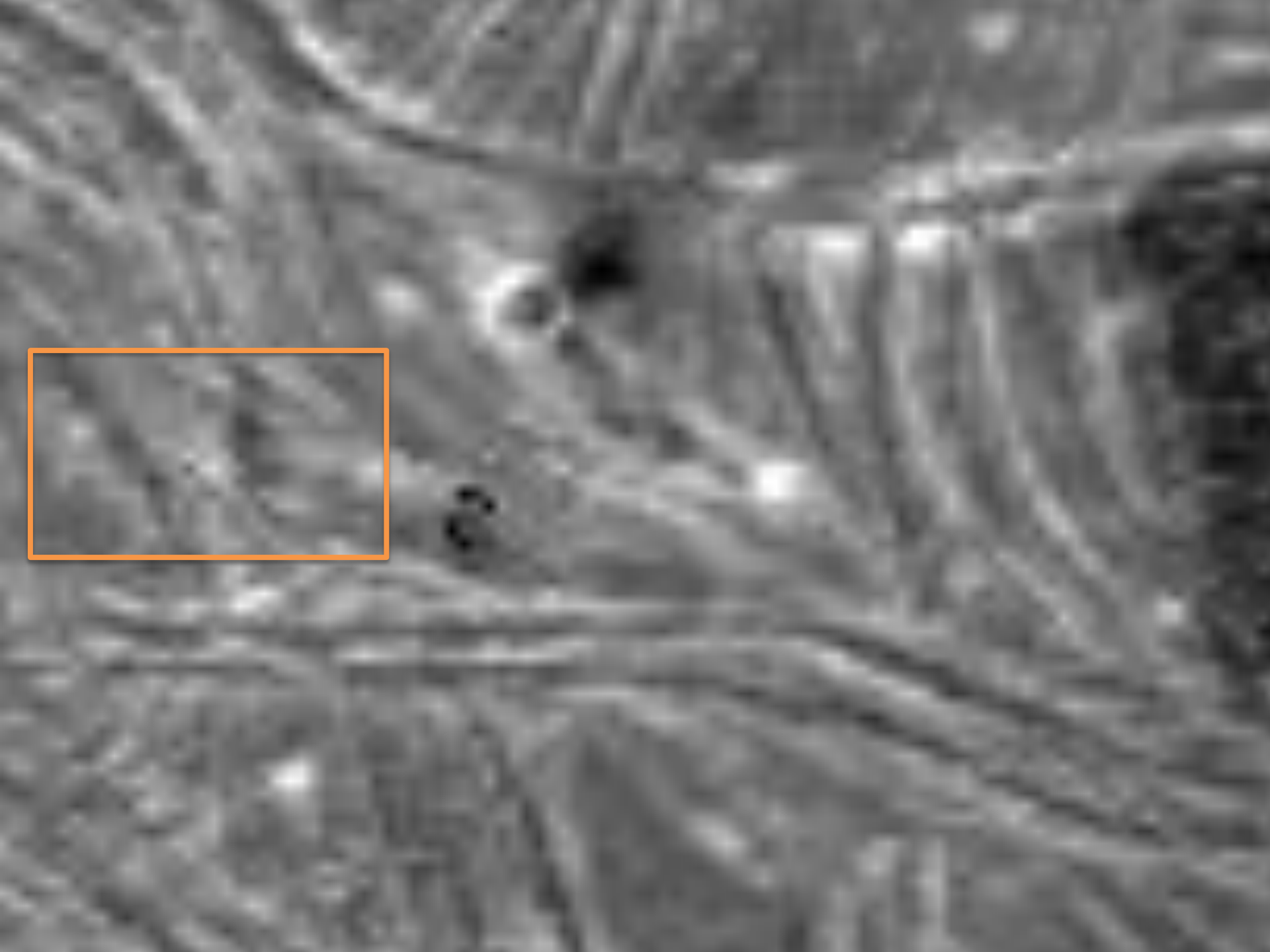


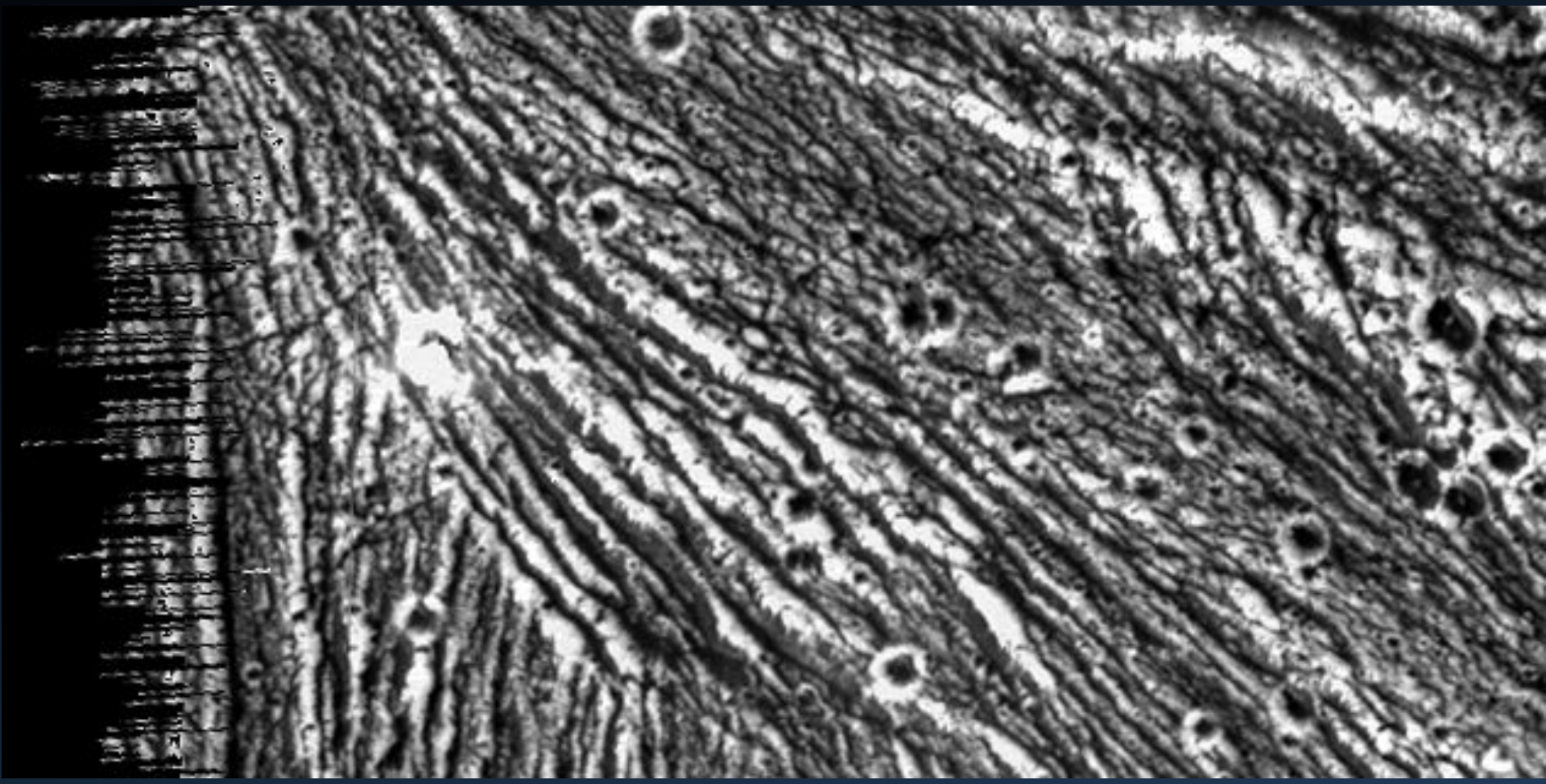
Working with Jim Head & Bob Pappalardo at Brown … picking up where Scott Murchie left off on Galileo SSI Ganymede planning

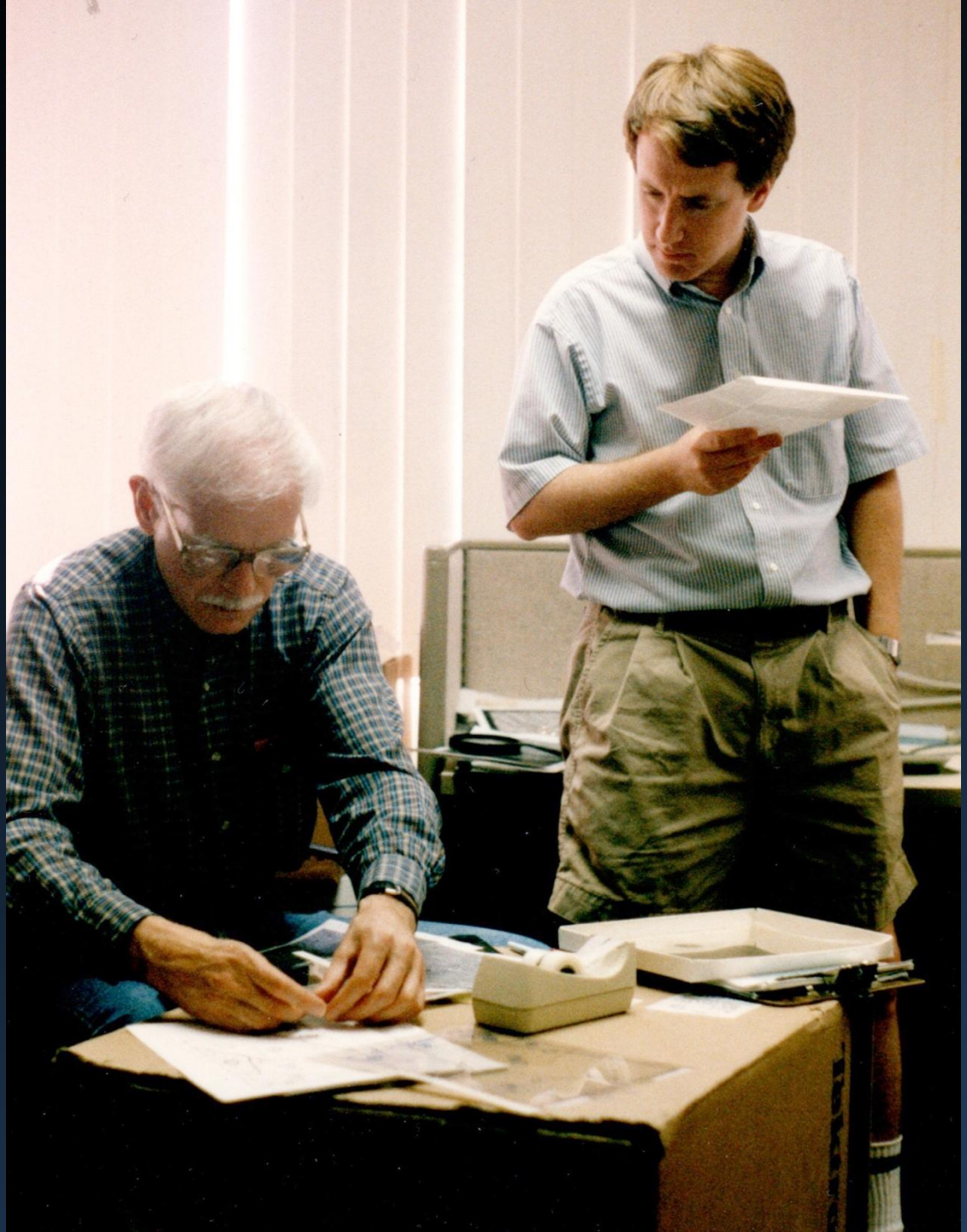

First G1 SSI target:
Uruk Sulcus

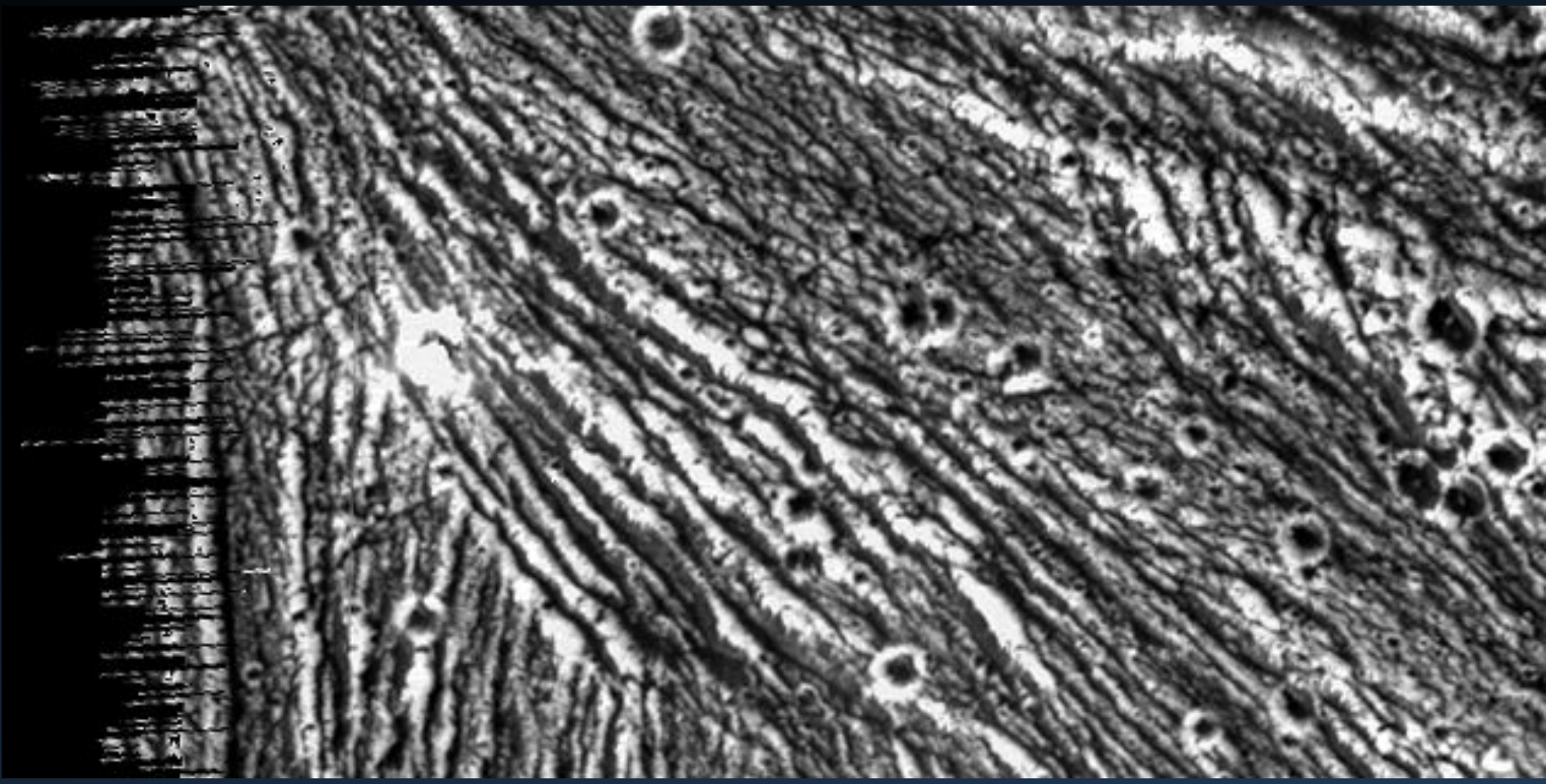


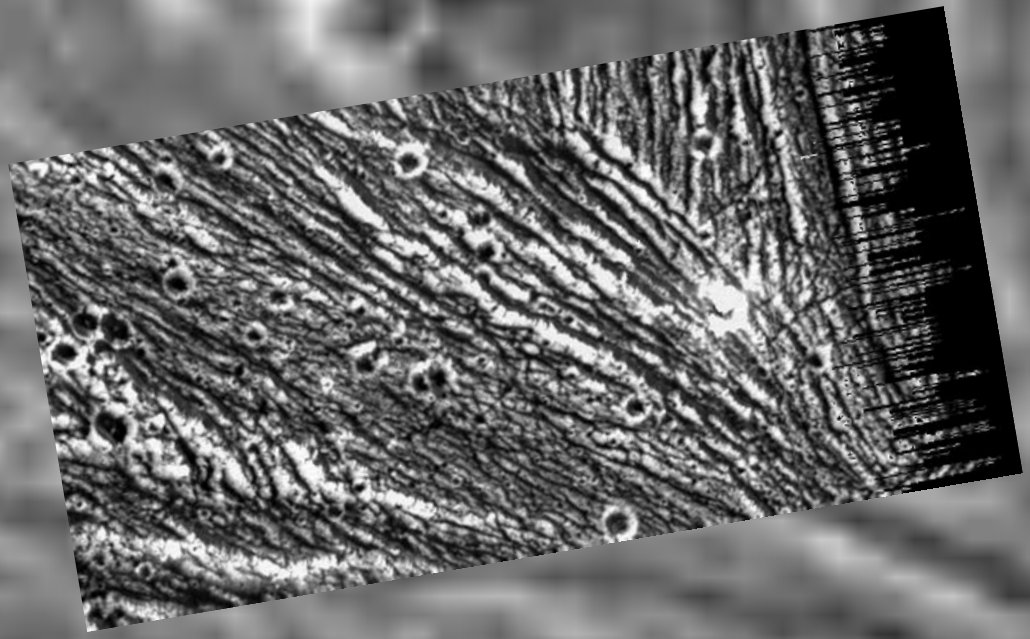




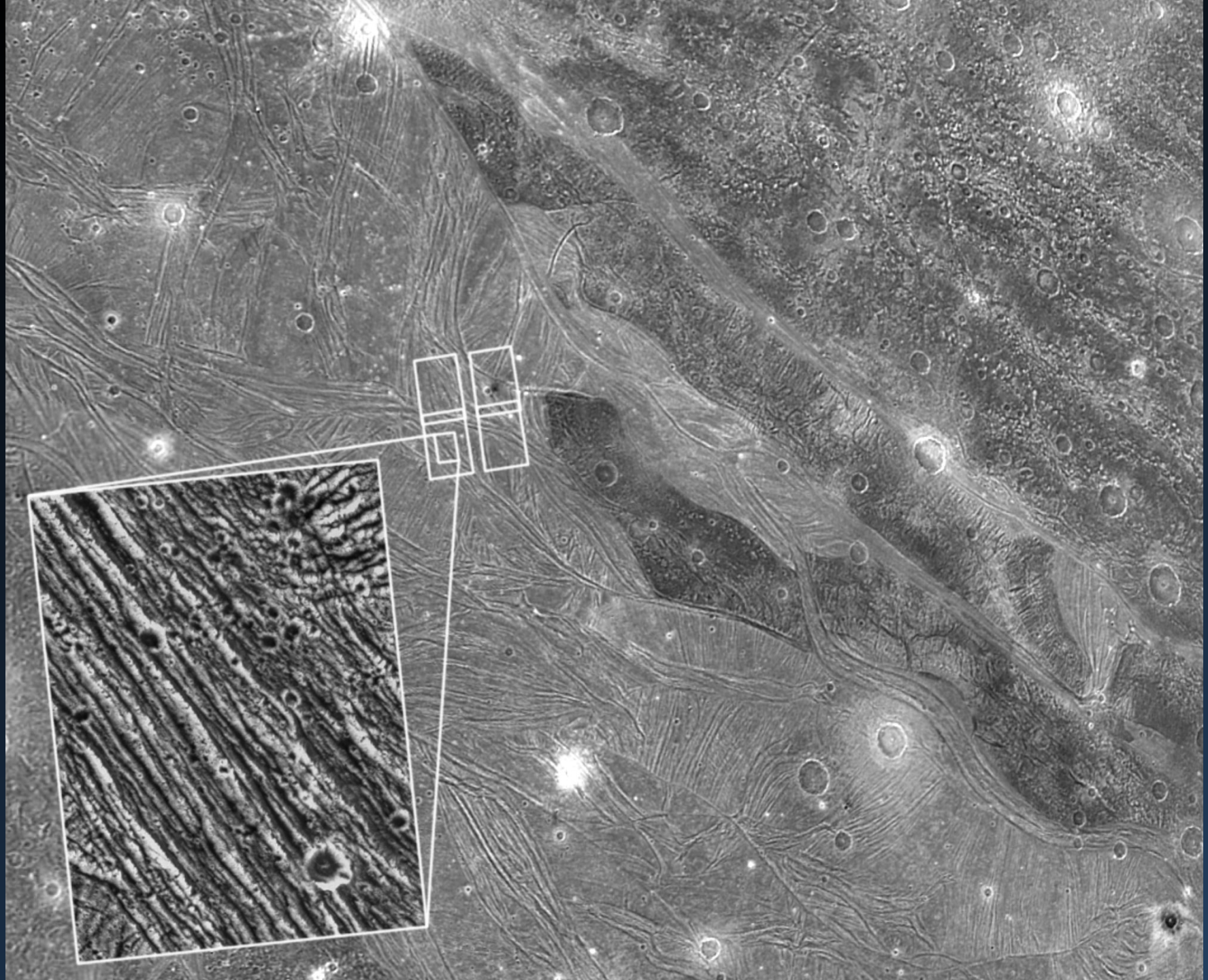






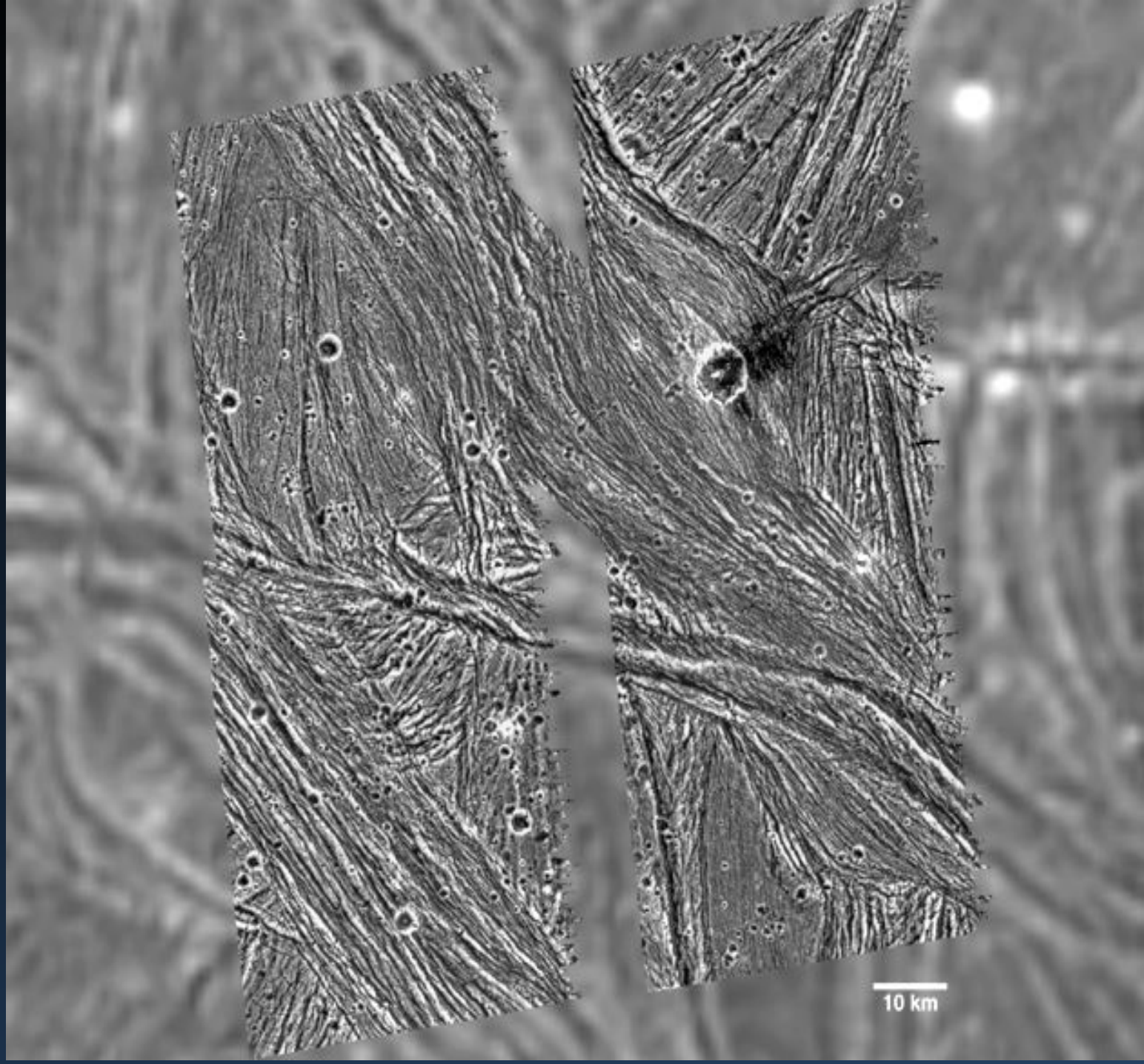



SOLARIS



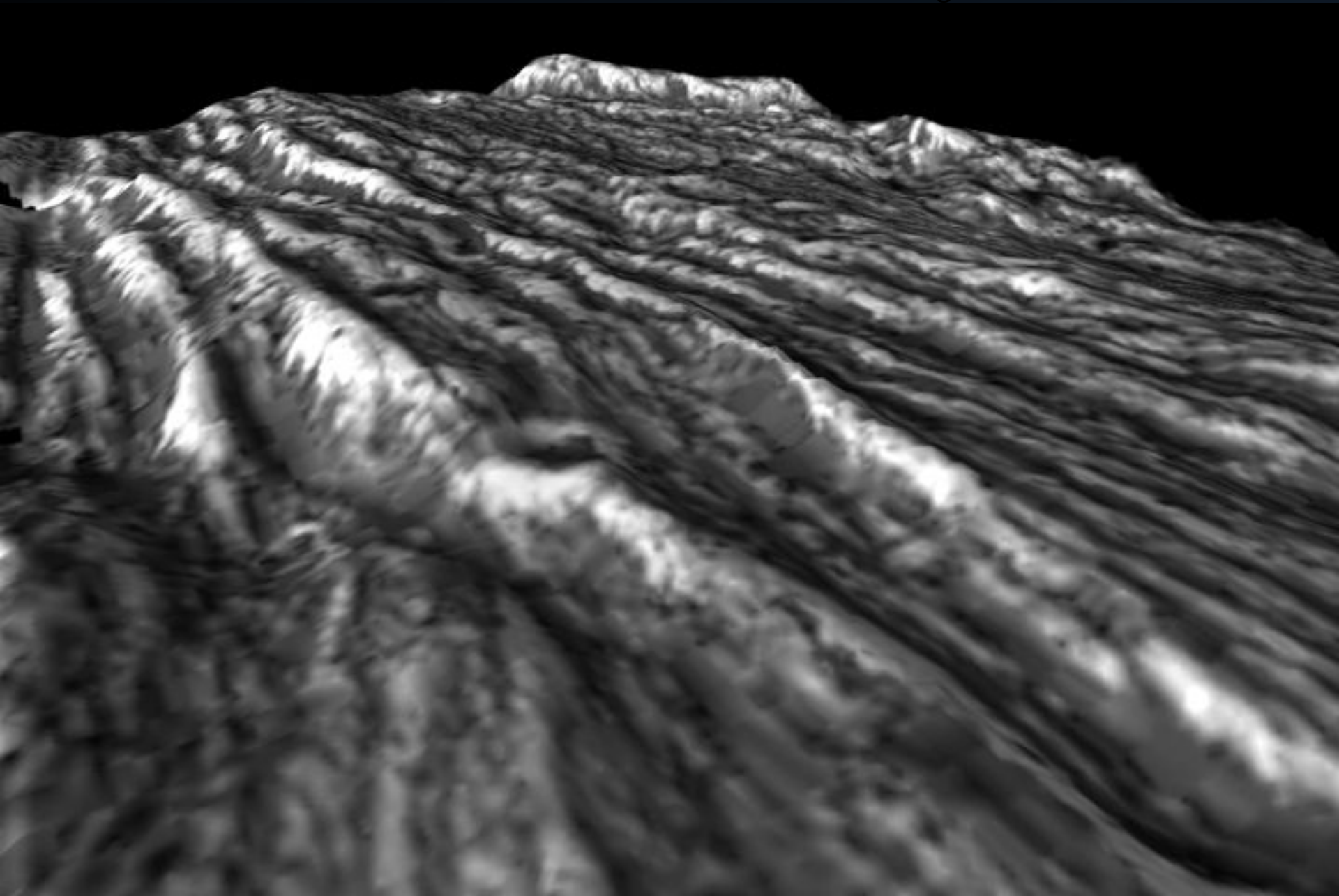

JPL teleconferencing,
1996 technology

Final Uruk mosaic



First DEM over grooved terrain

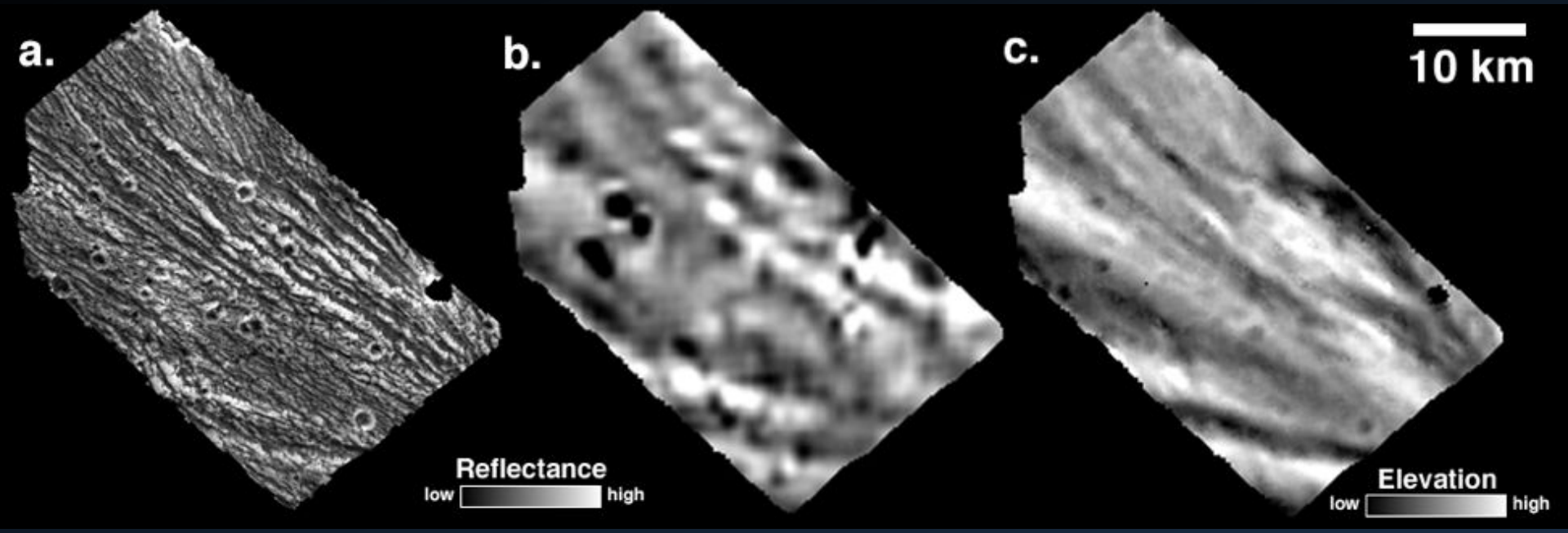
Origin of stress?
Timing?

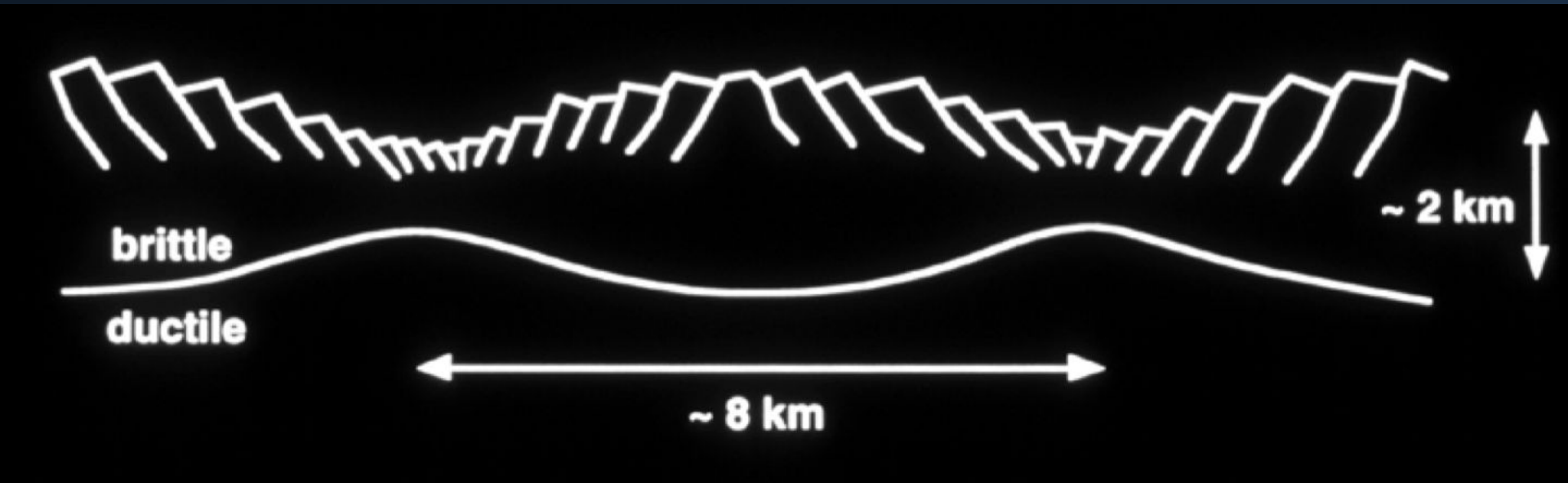


Galileo image

Voyager image

Digital elevation model



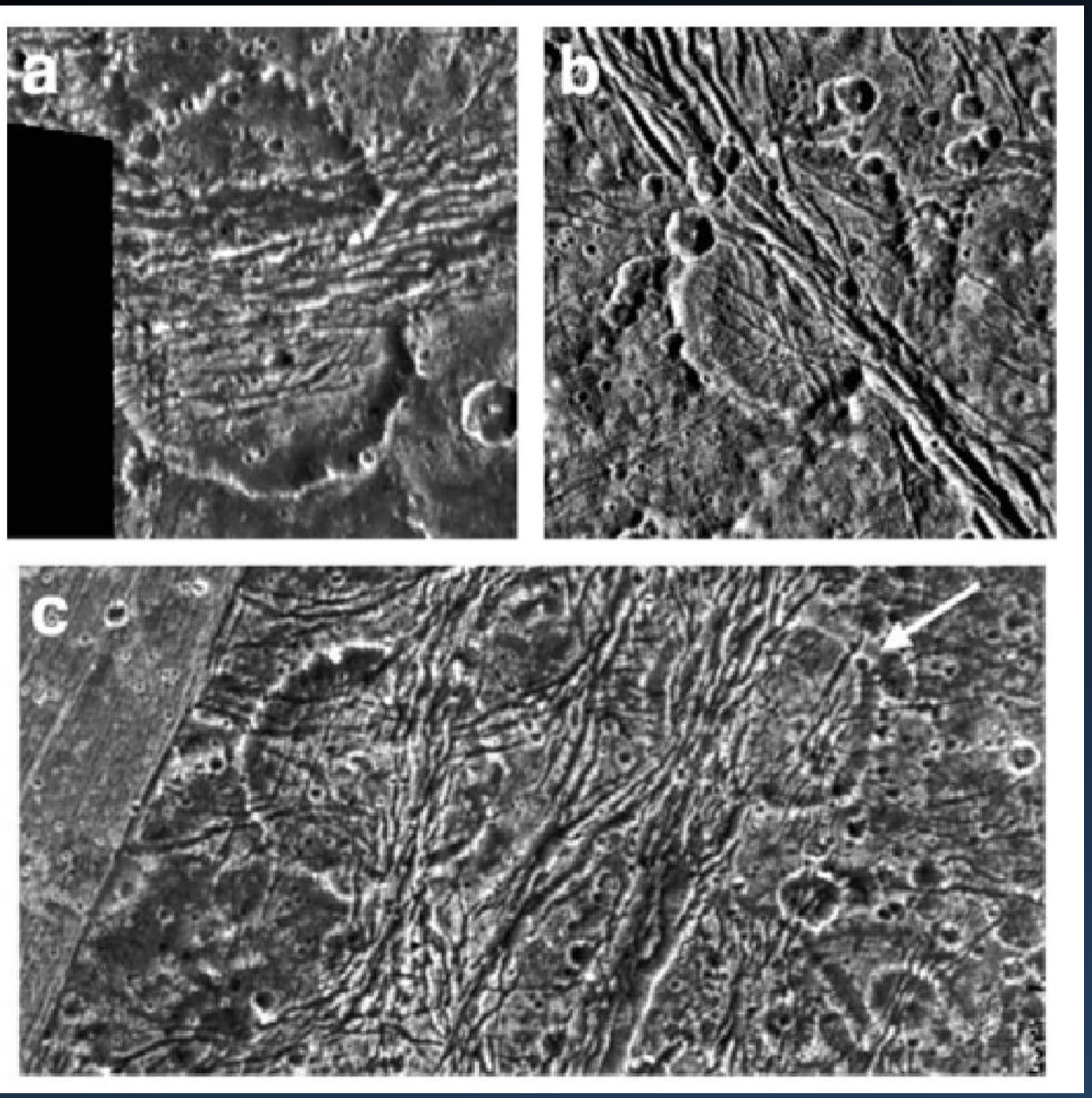



How does dark terrain turn
into light grooved terrain?

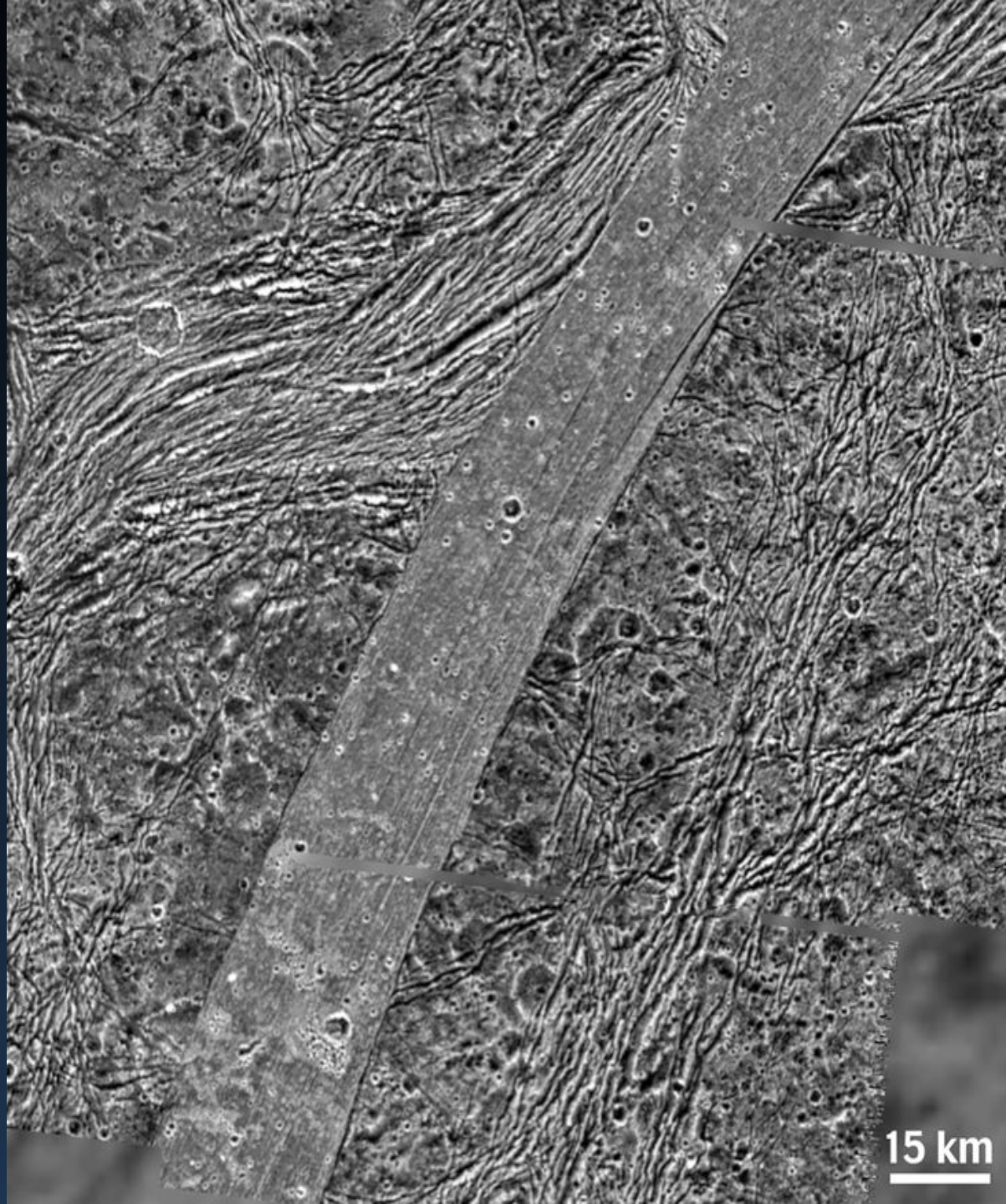

Nicholson Regio

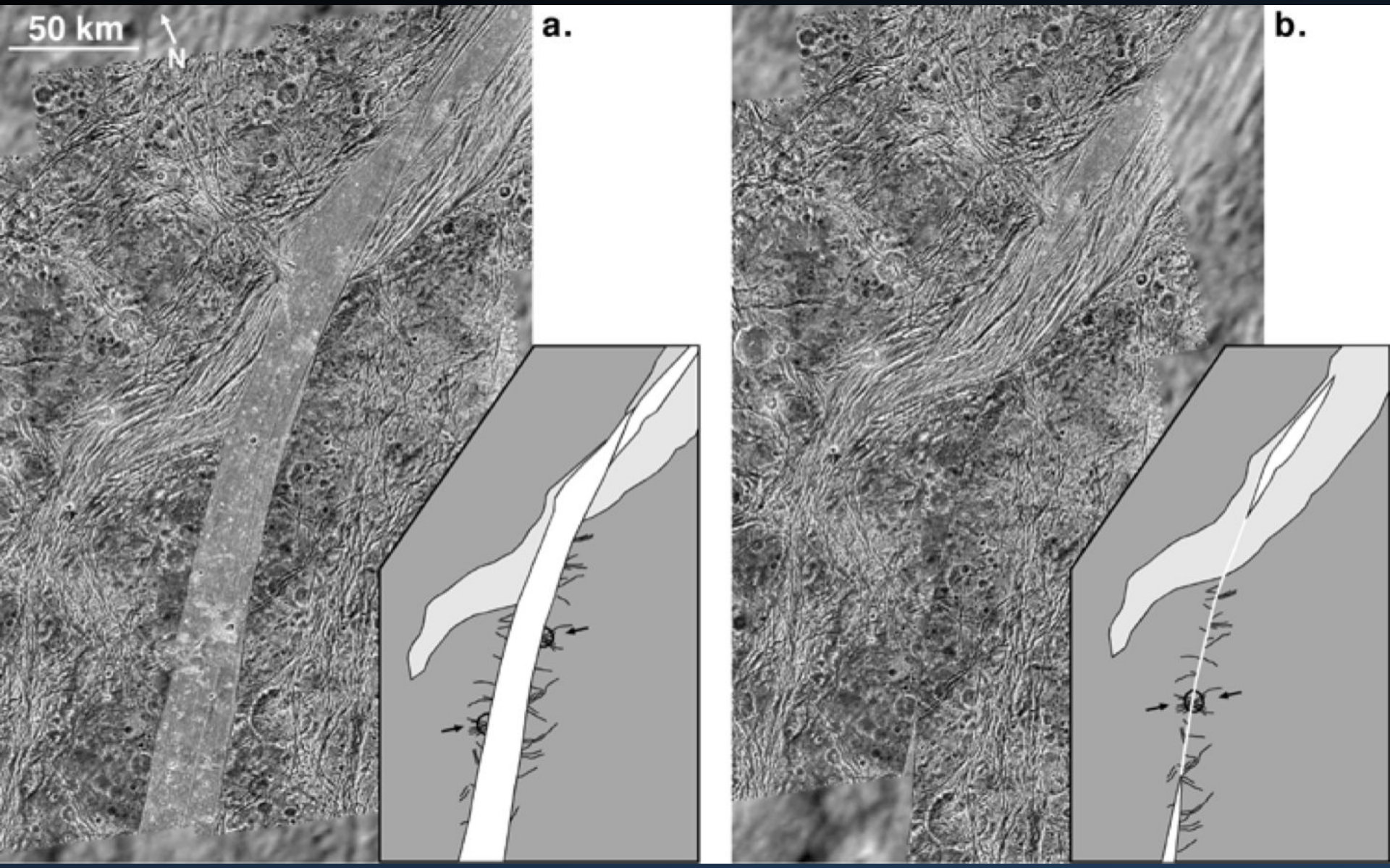
Dissected dark terrain craters

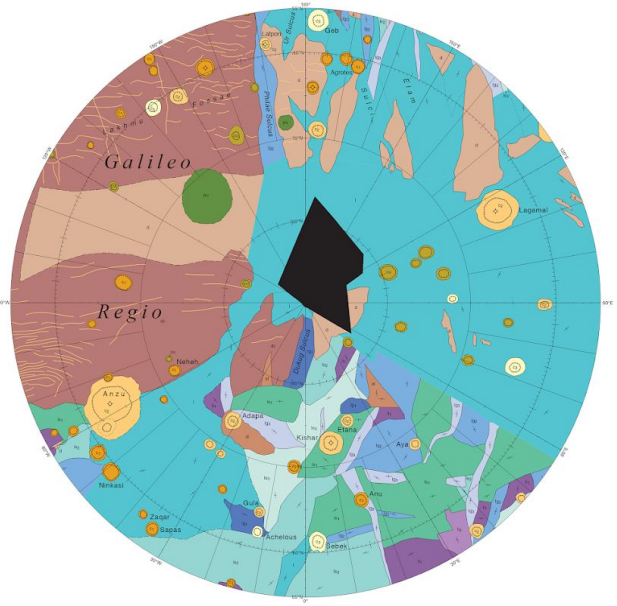
50% to 150% extension in the fault zones



Arbela Sulcus: Europa-like smooth band




50 km
N
a.
b.



Dark Material

- dc *Cratered*
- dl *Lineated*
- d *Undivided*

Light Material

- lg_1 *Grooved*
- lg_2
- lg_3
- ls_1 *Subdued*
- ls_2
- ls_3
- li_1 *Irregular*
- li_2
- li_3
- l *Undivided*

Reticulate Material

- r *Reticulate*

Crater Material

- c_1 *Degraded*
- c_2 *Partially Degraded*
- c_3 *Fresh*
- cu *Unclassified*

Palimpsest Material

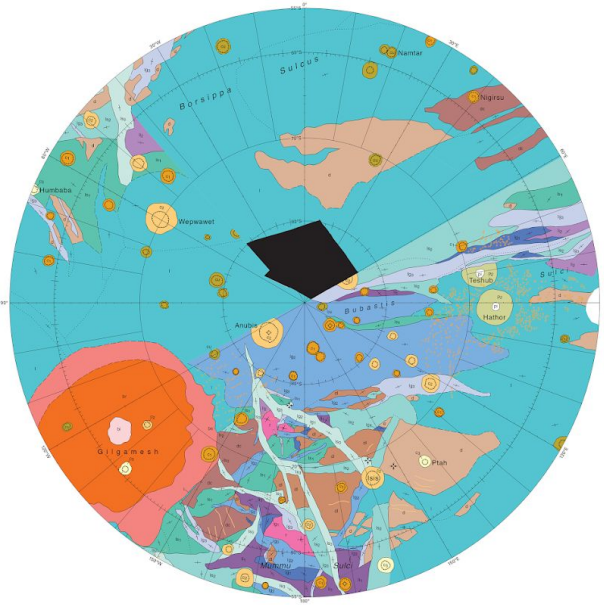
- p_1 *Ancient*
- p_2 *Young*
- pu *Unclassified*
- pi *Interior Plains*

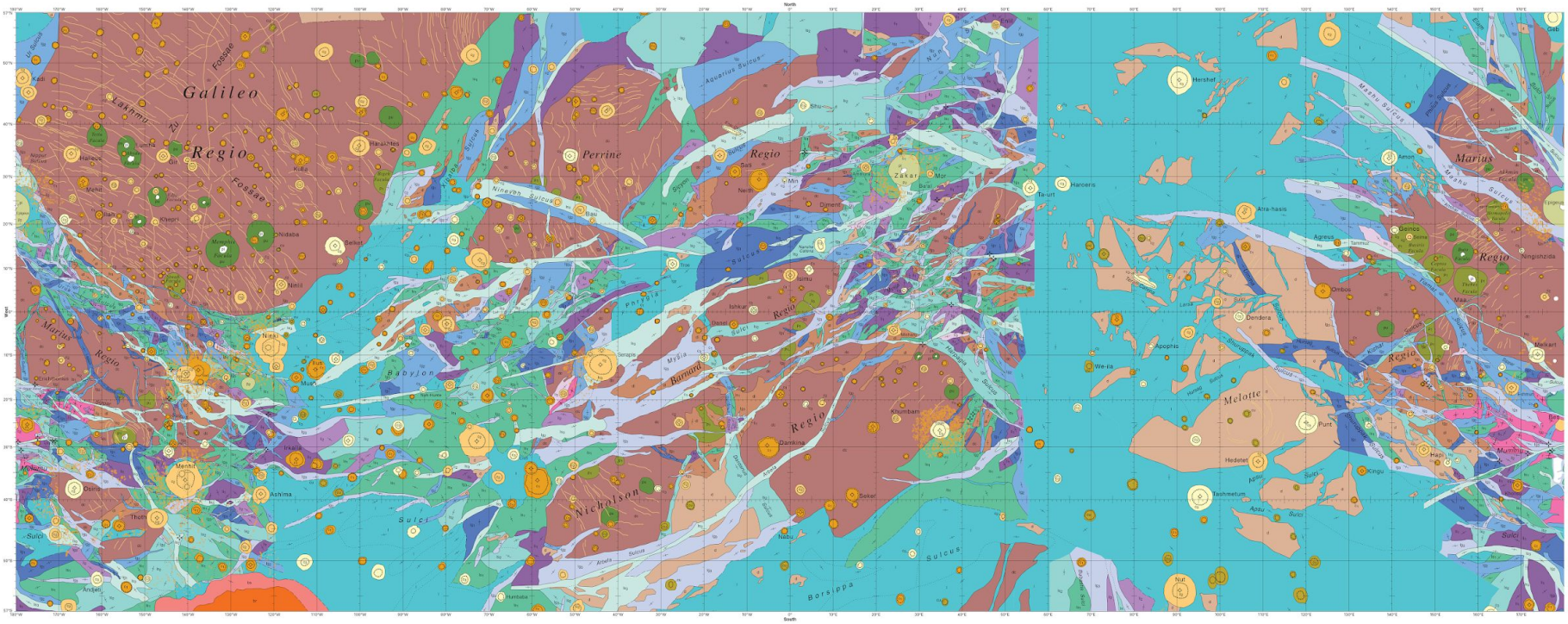
Basin Material

- br *Rugged*
- bs *Smooth*
- bi *Interior Plains*

Other Features

- *Furrow*
- *Representative Groove Trend*

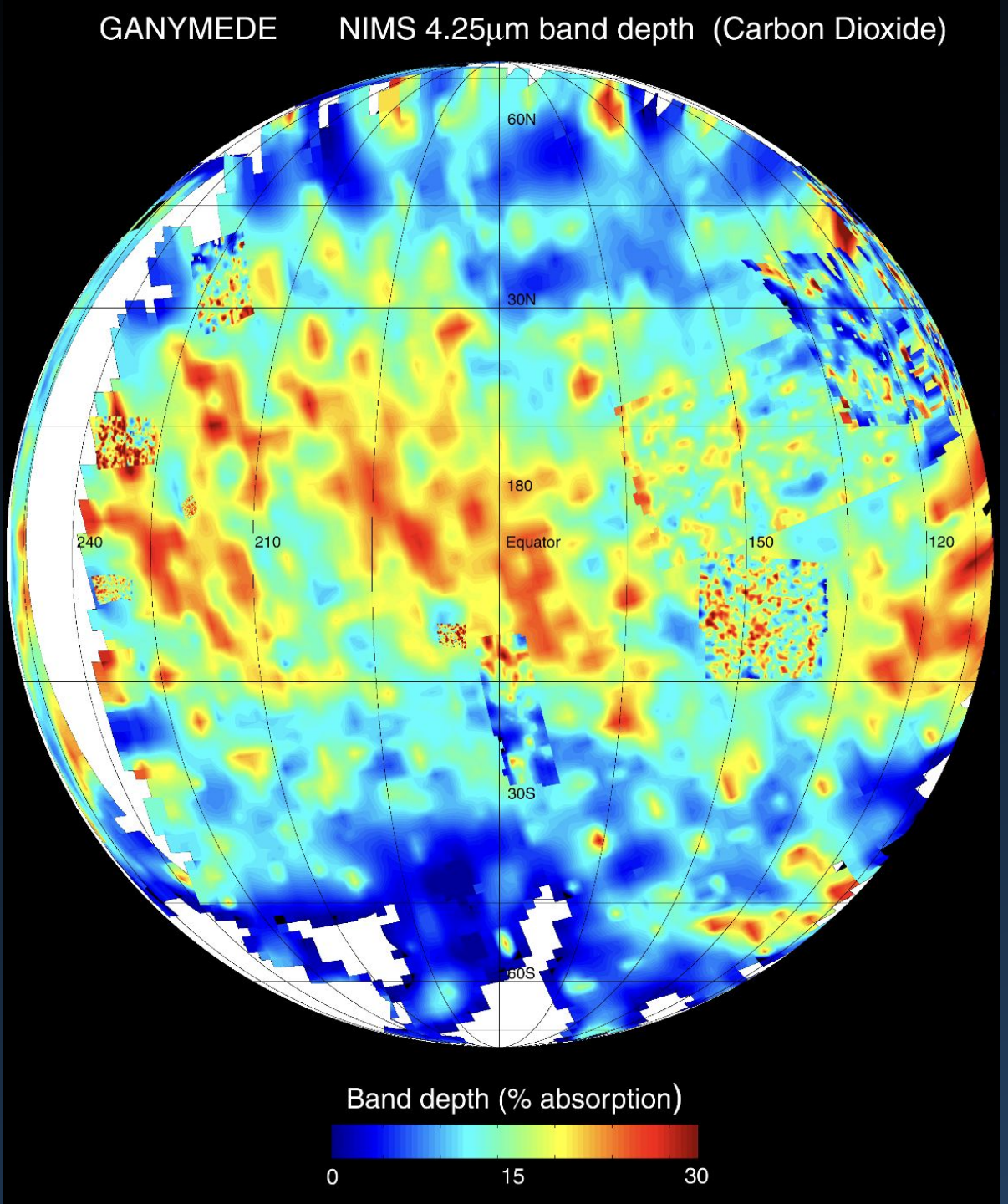




A few other cool things about Ganymede that *Galileo* discovered

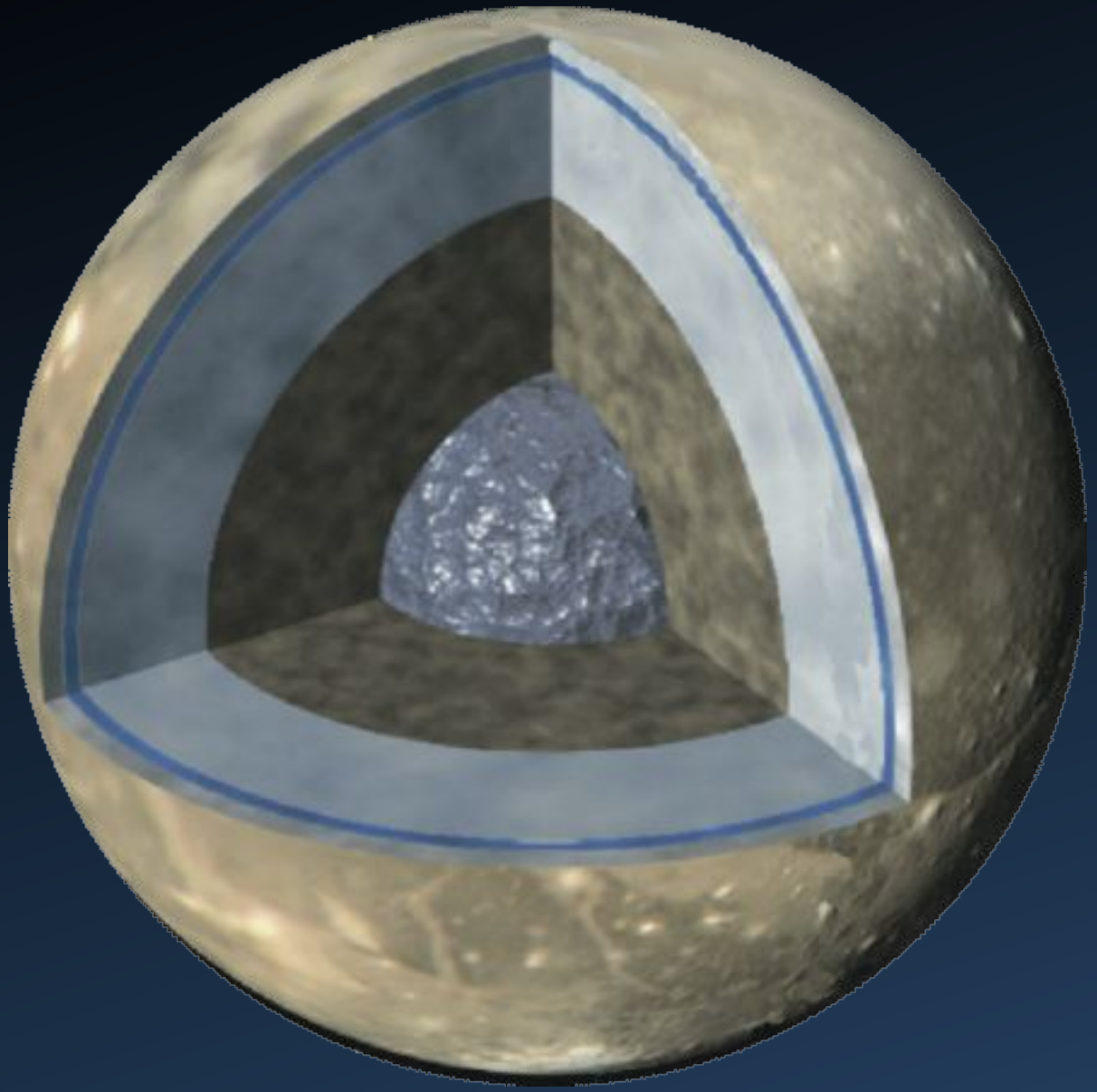
Trace constituents

(e.g. CO_2 bound to non-ice material)



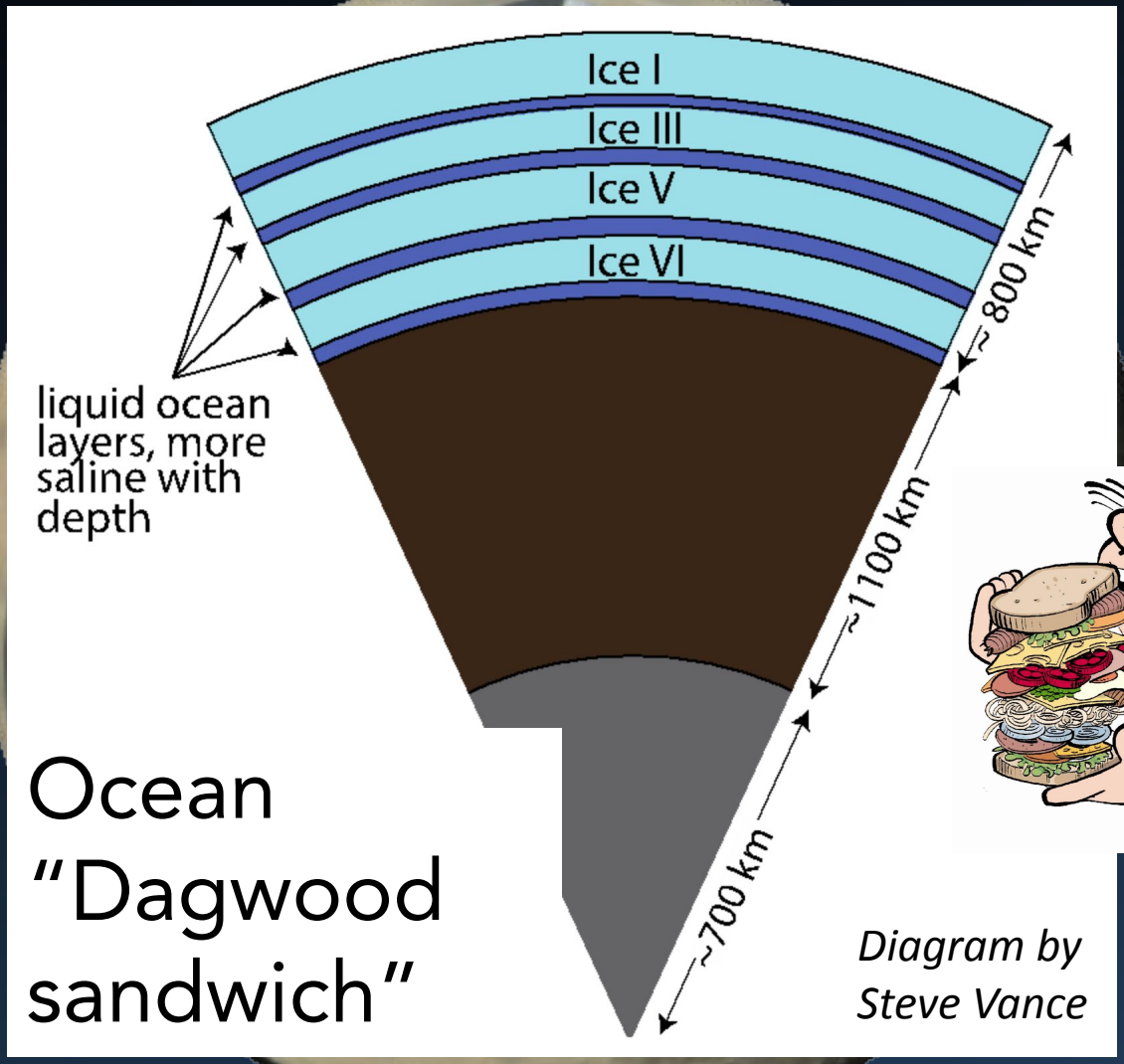
Differentiated interior

Ocean “sandwich”



Differentiated interior

Ocean "sandwich"



National Aeronautics and Space Administration

NASA

IT'S EXCLUSIVE!

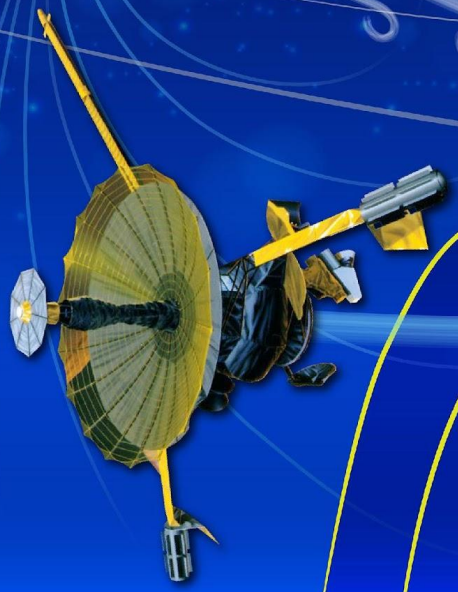
GANYMEDE'S MAGNETOSPHERE

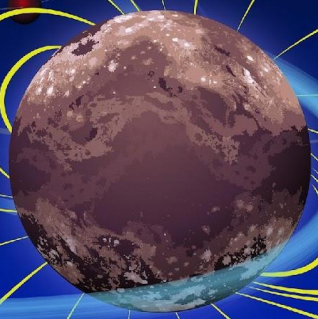
THE SOLAR SYSTEM'S WEIRDEST MAGNETIC ENVIRONMENT

Magnetospheres are regions around planets dominated by their magnetic fields. They protect the planet from harmful radiation from the Sun and interstellar space.

Plasma from Jupiter spins with the planet, pushing Ganymede's magnetosphere like a tailwind and sculpting its distinctive shape, as shown by the yellow lines.

The only moon with a magnetosphere, Ganymede, is uniquely embedded in Jupiter's protective bubble.



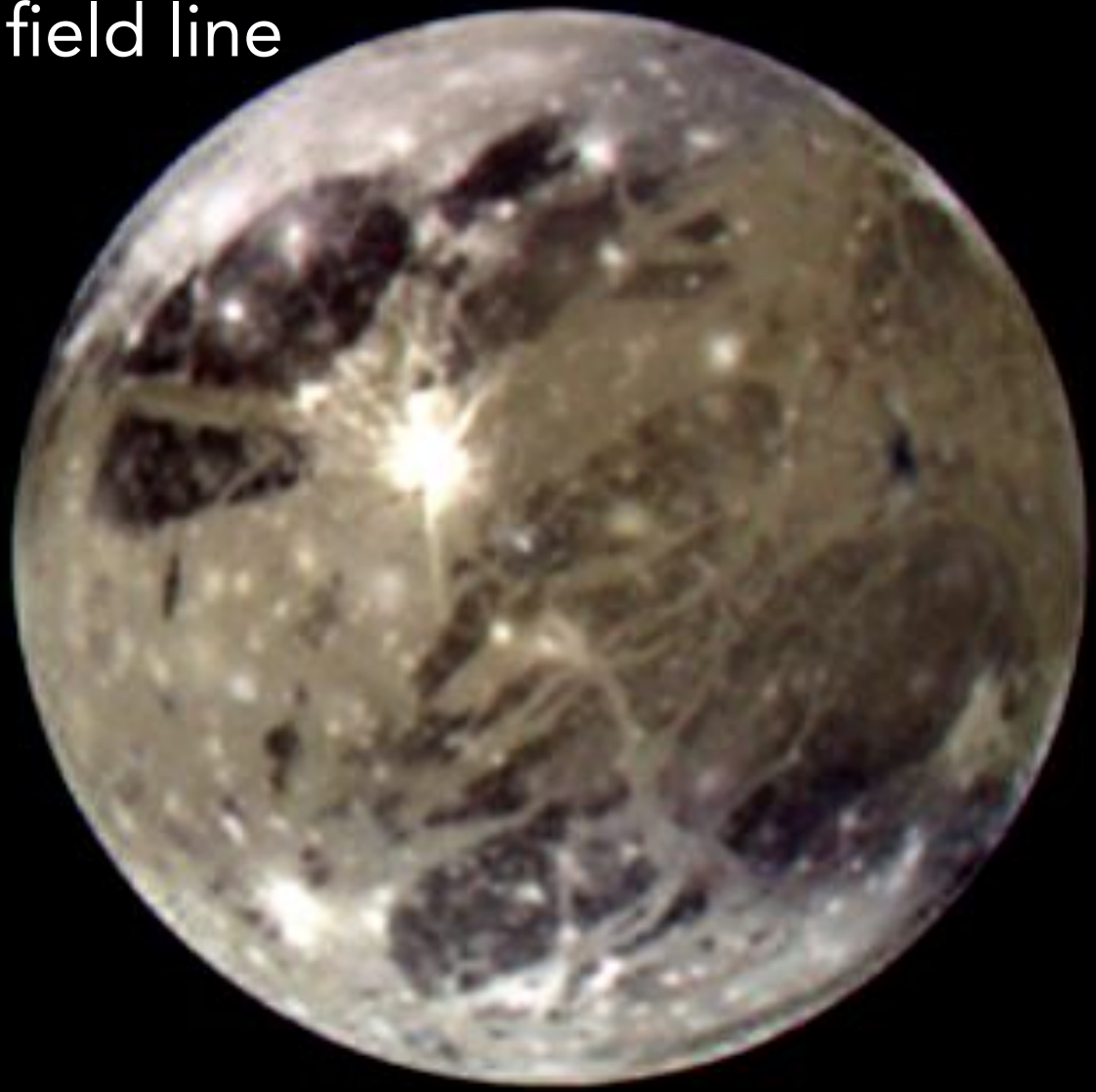


NASA's Galileo spacecraft made the first flyby in 1996, discovering the magnetosphere.

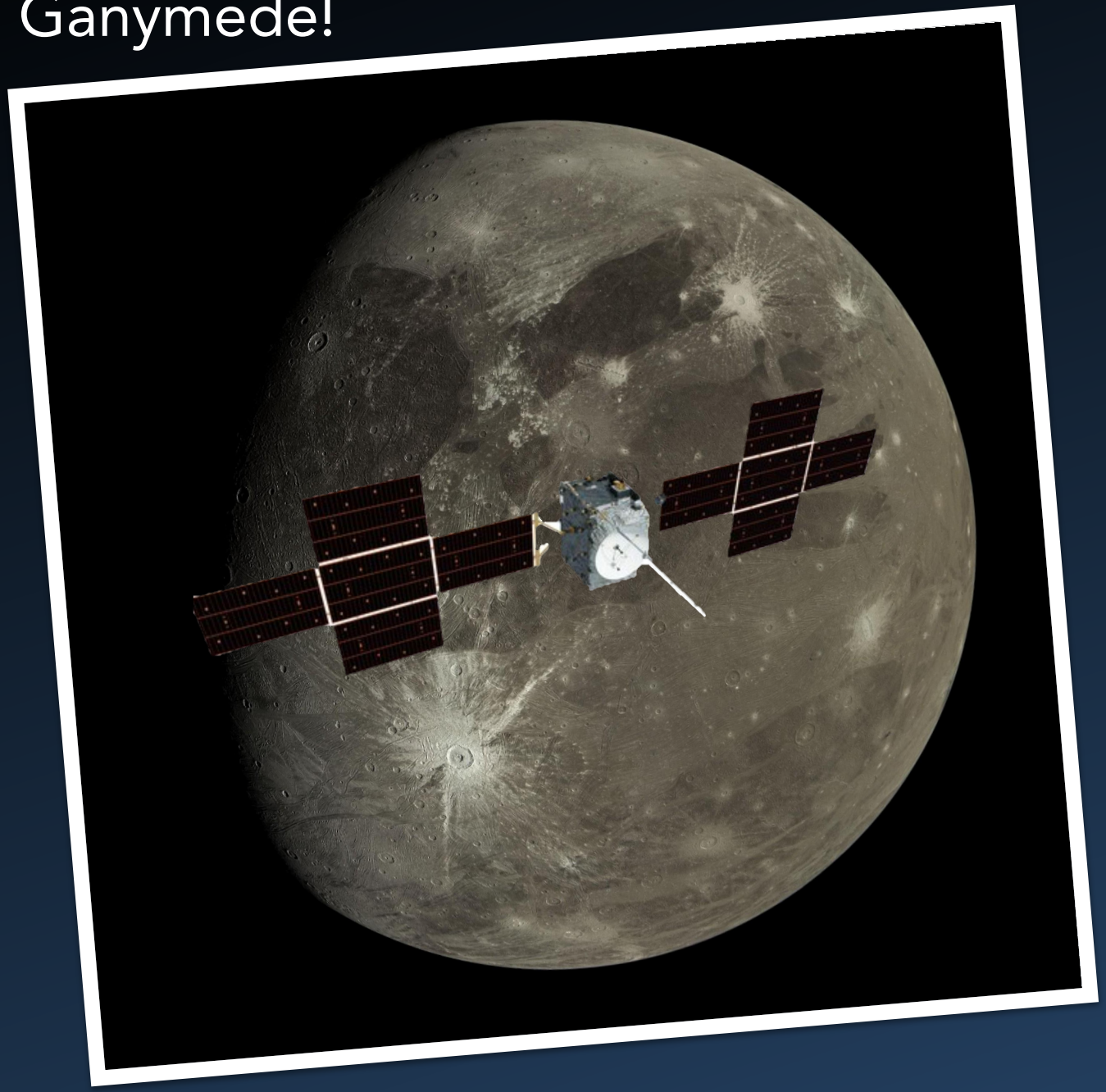
Magnetospheres are important to study as they may be essential for the development of life, since they cocoon planets from harmful radiation.

www.nasa.gov

Polar caps matching field line boundary



Return to Ganymede!



Backup slides
(nostalgia from the final
SSI team meeting)

Passing the baton at the final Galileo SSI team meeting

More pics from the final SSI team meeting