

# Lifting Jupiter's Cloudy Veil: Our Exploration of the Giant Planet



JUNO



juice

THE ROYAL  
SOCIETY



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Leigh Fletcher (@LeighFletcher)

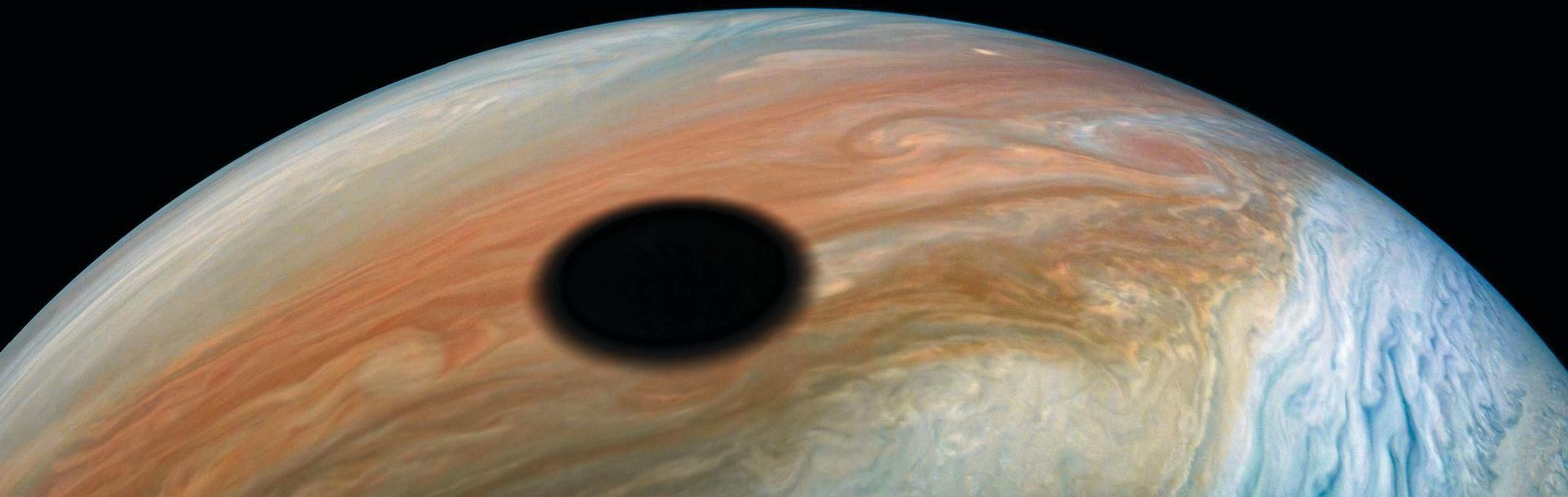


EUROPA VIEW - (EUROPA, moon of JUPITER)

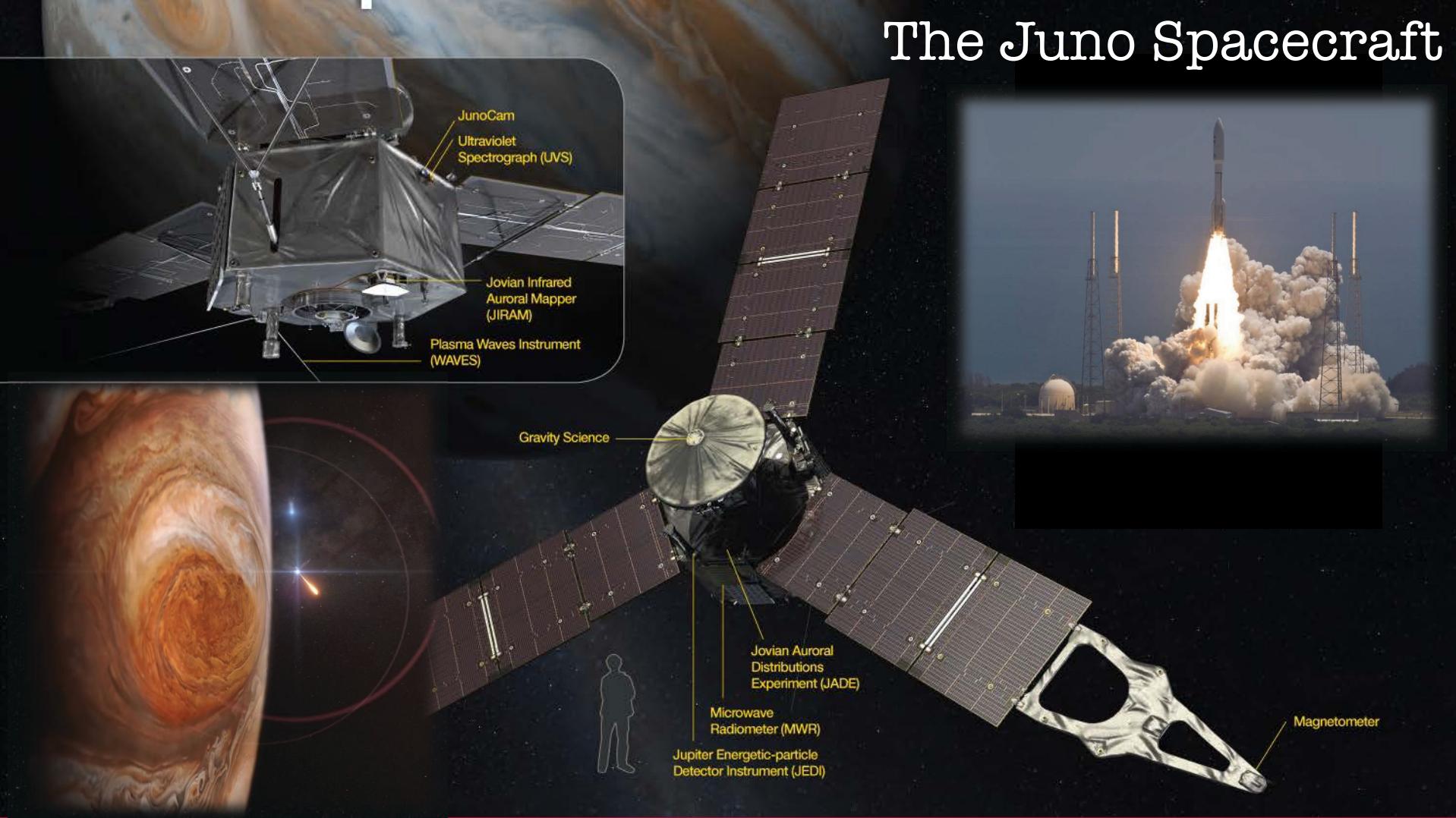
W A N D E R E R S  
A SHORT FILM BY ERIK WERNQUIST

[www.erikwernquist.com/wanderers](http://www.erikwernquist.com/wanderers)

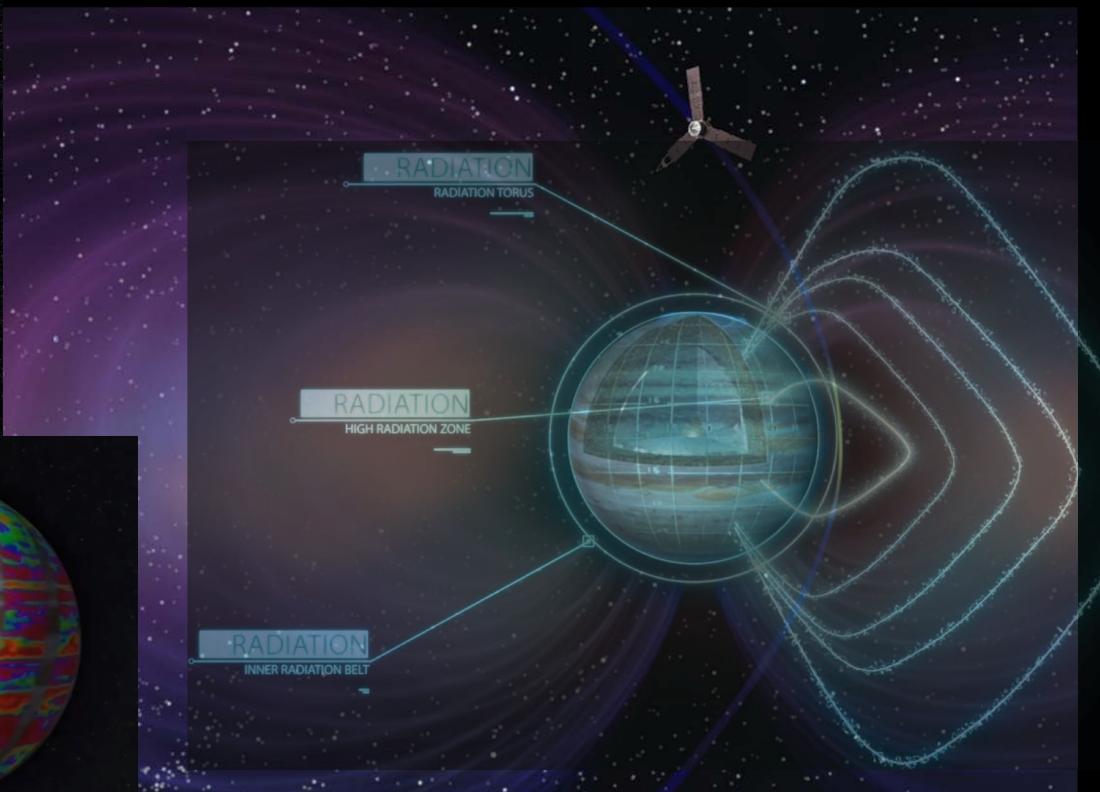
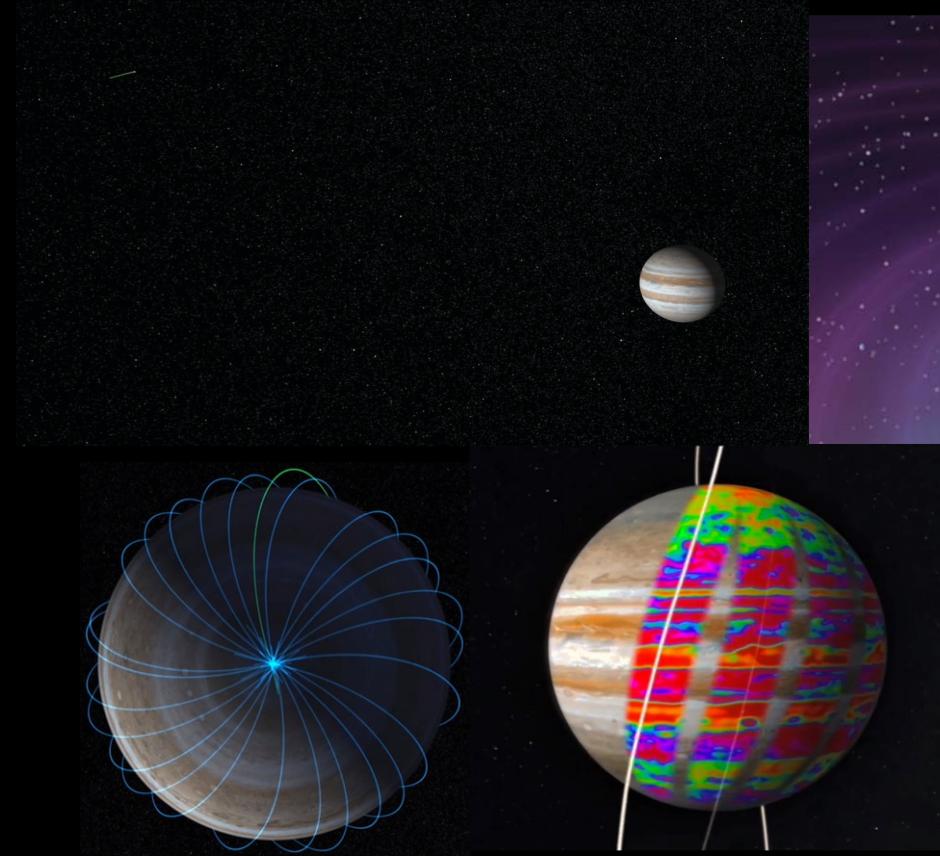
Image credit: Image data: NASA/JPL-Caltech/SwRI/MSSS  
Image processing by Kevin M. Gill, © CC BY 3.0



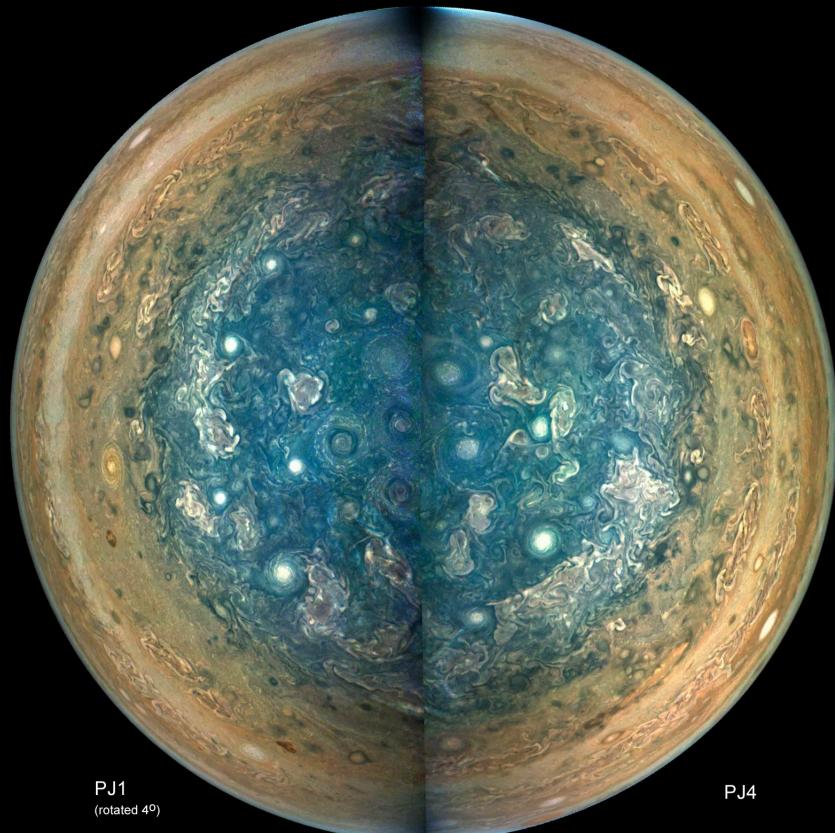
# The Juno Spacecraft



# Polar Orbiting Spacecraft



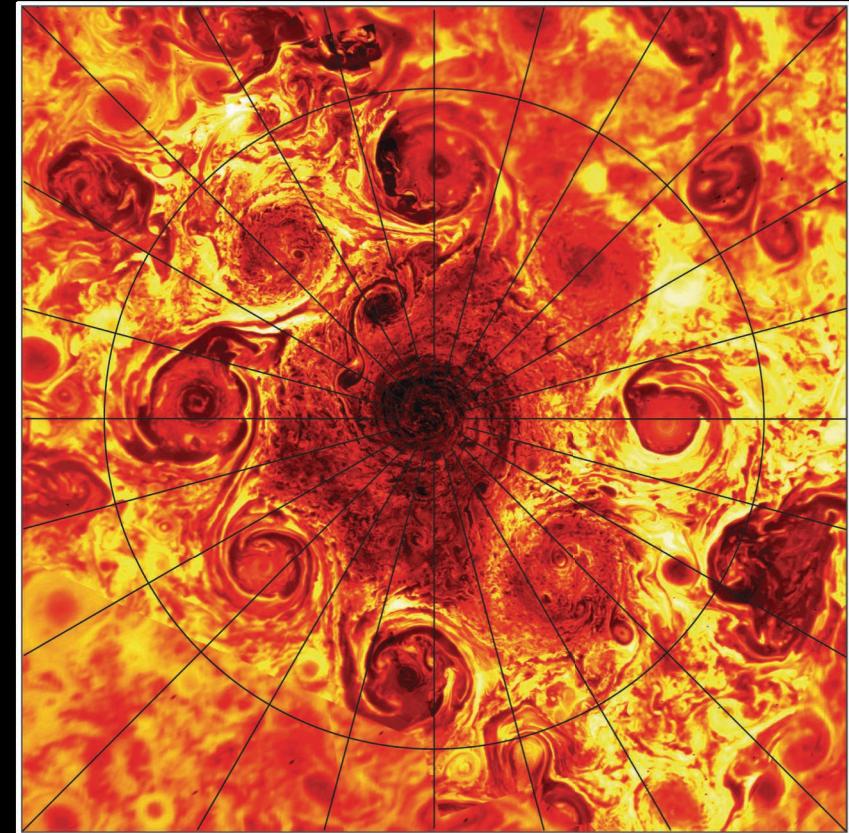
# Revealing the Crown of the Giant



PJ1  
(rotated 4°)

PJ4

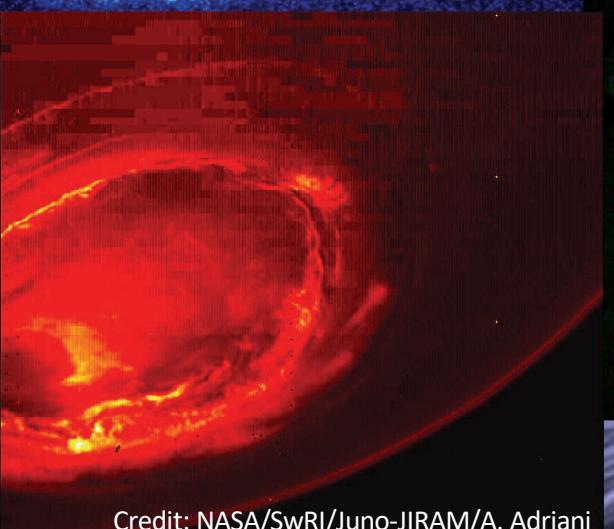
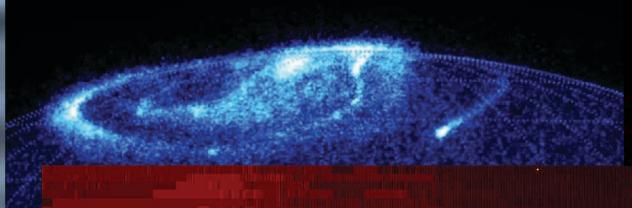
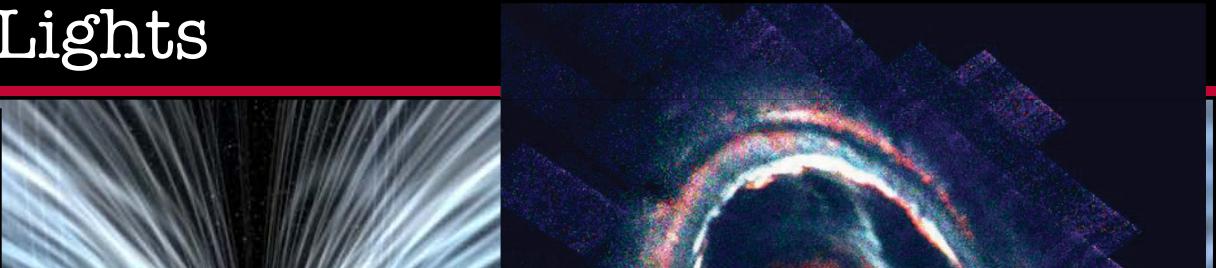
NASA/SWRI/MSSS/Gerald Eichstädt/John Rogers



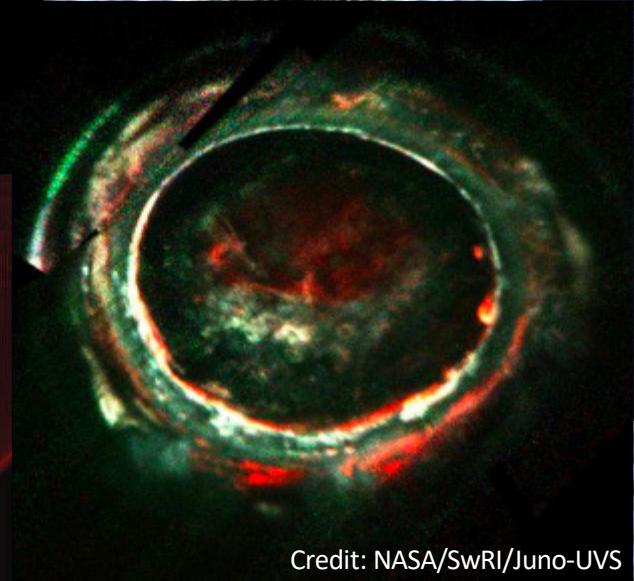
Adriani et al., (2018)

# Jupiter's Northern Lights

Credit: Hubble/NASA/ESA/J.D. Nichols



Credit: NASA/SwRI/Juno-JIRAM/A. Adriani



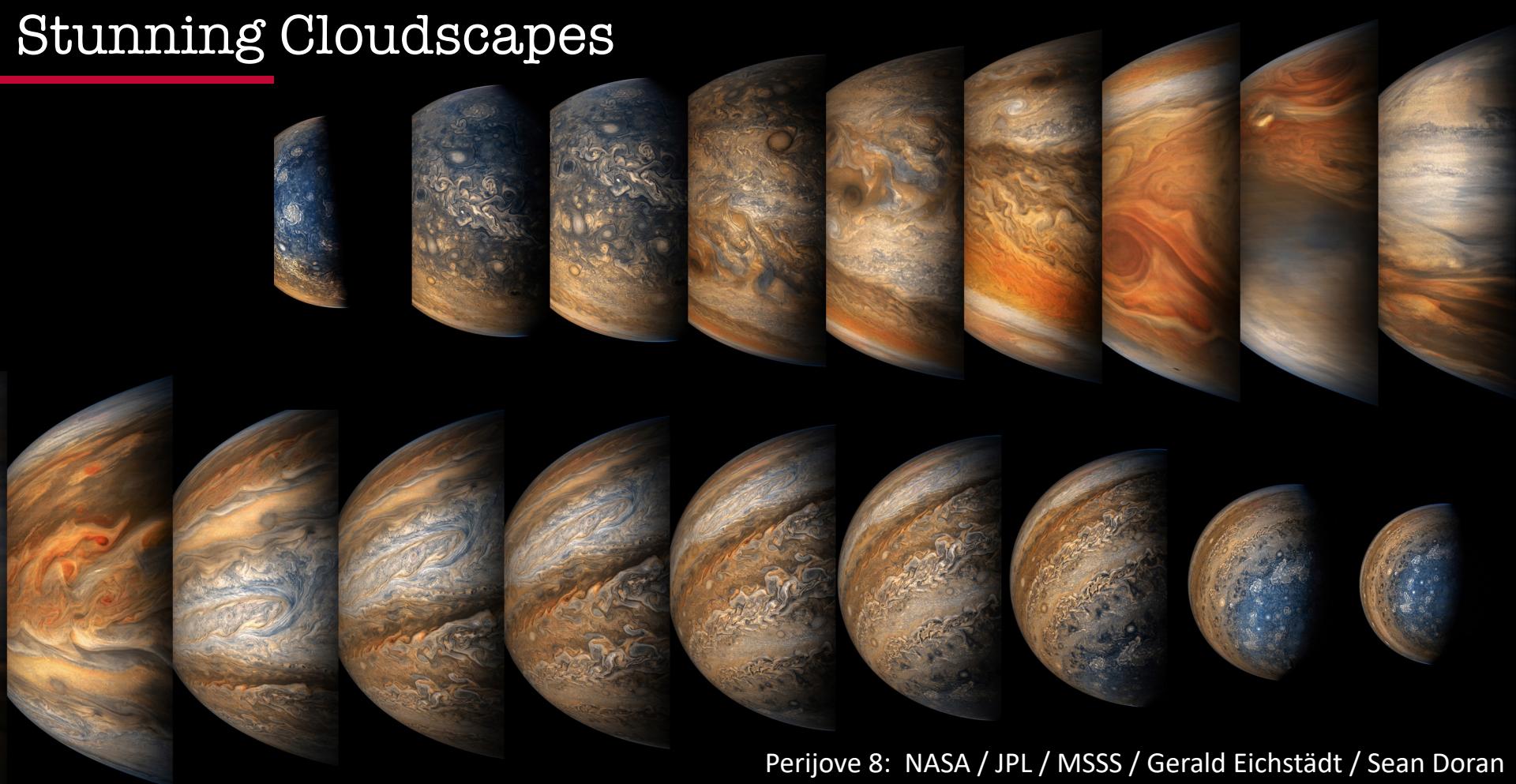
Credit: NASA/SwRI/Juno-UVS



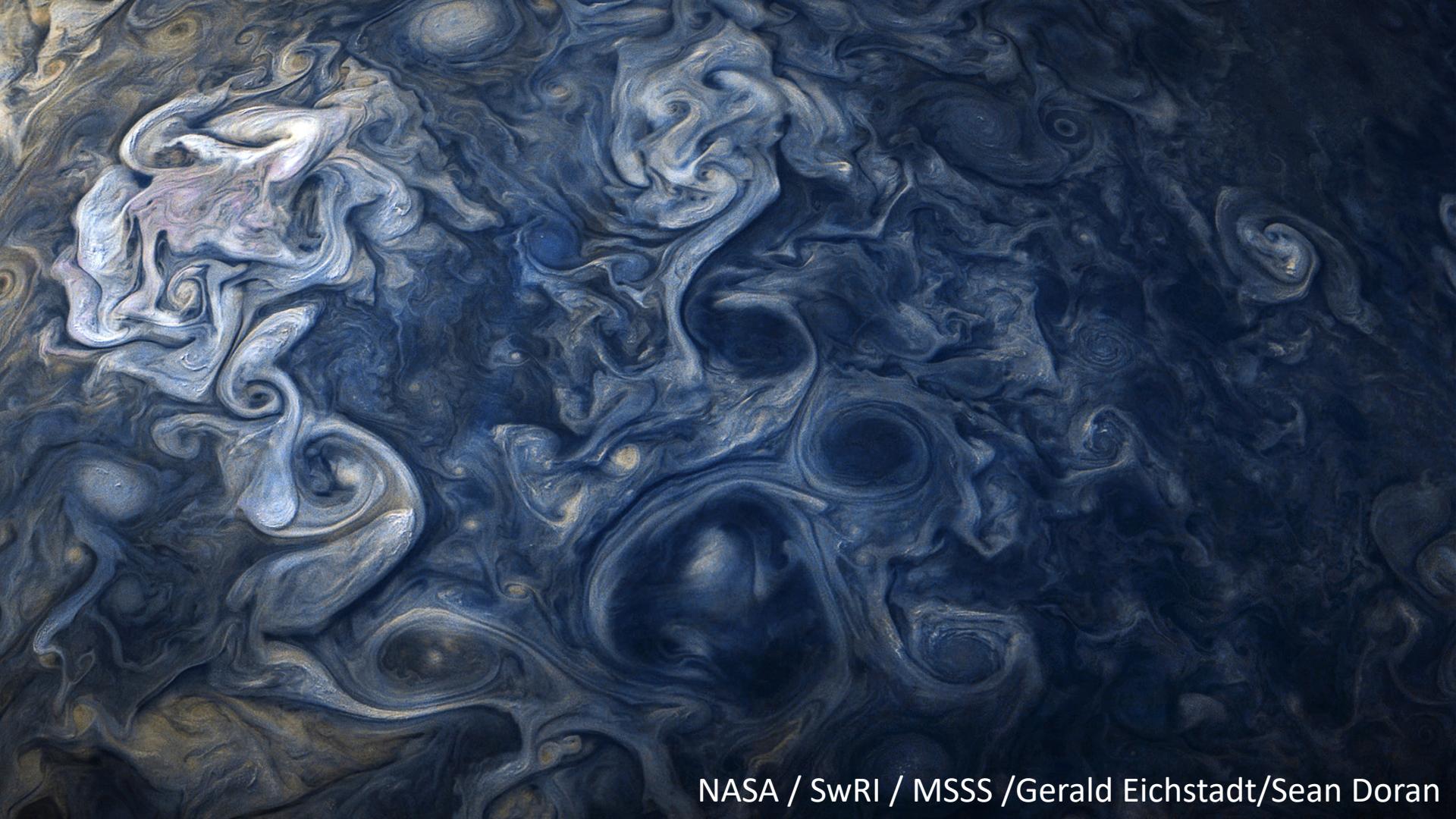
Credit: NASA/SwRI/Juno-UVS



# Stunning Cloudscapes

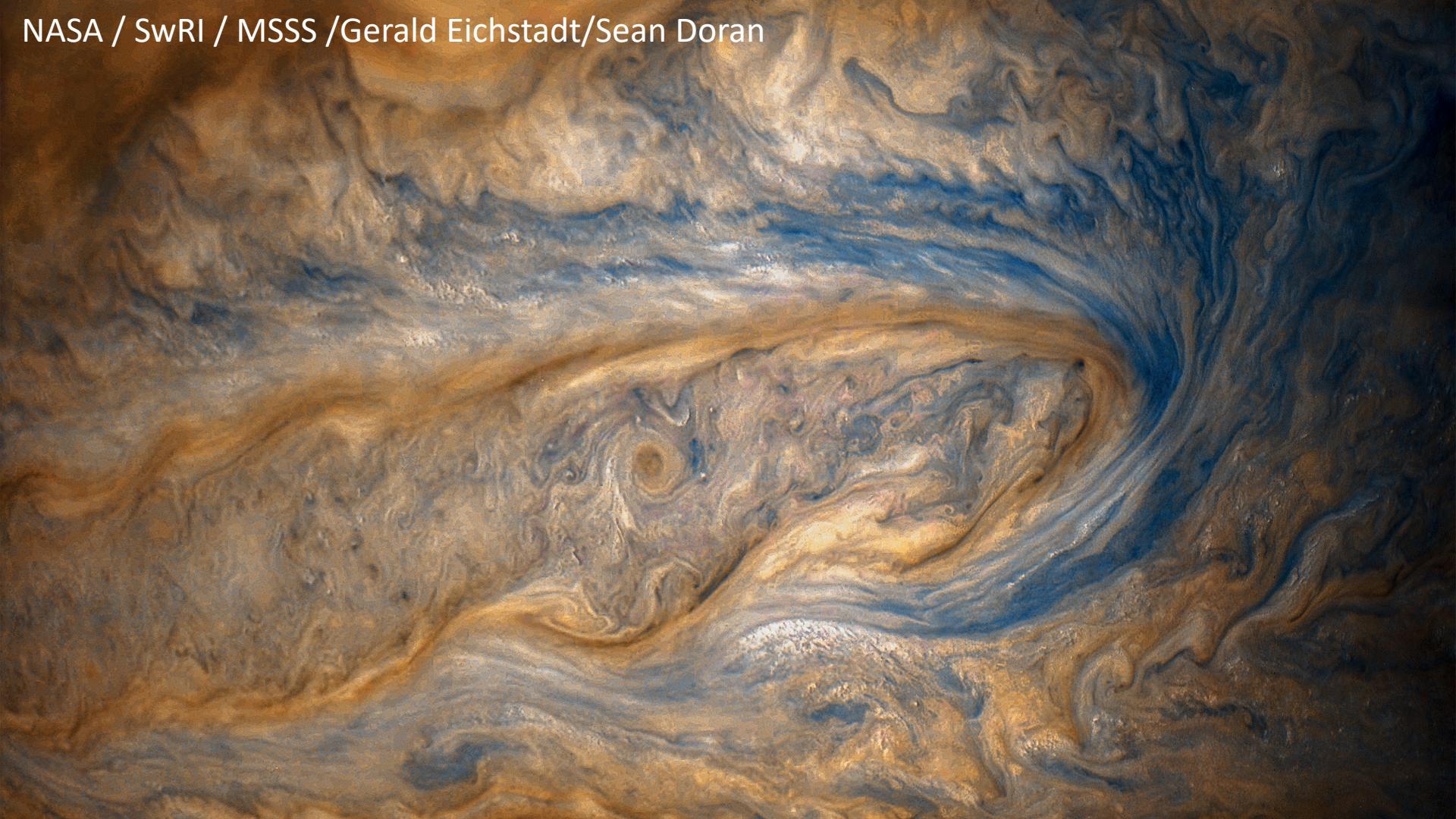


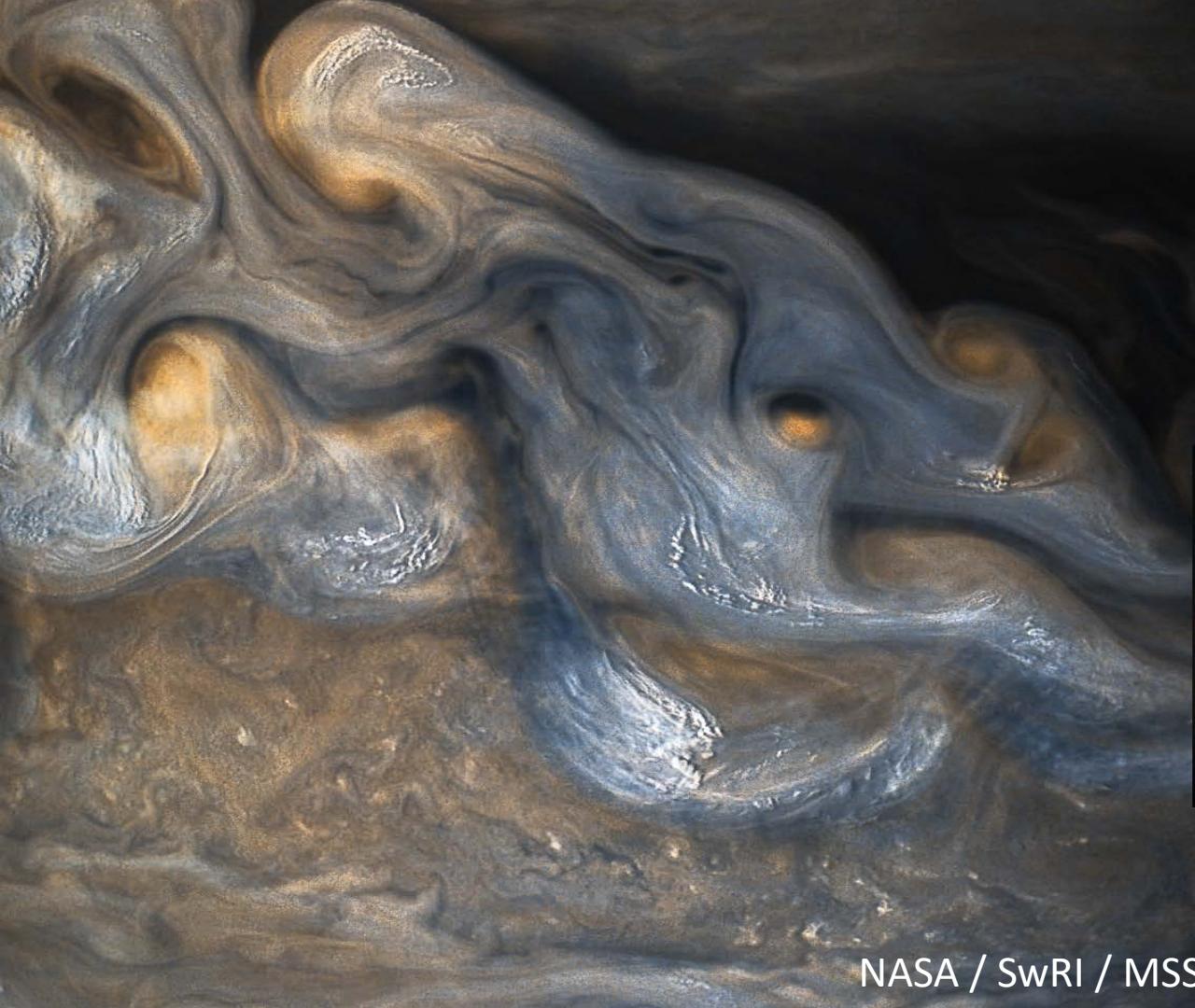
Perijove 8: NASA / JPL / MSSS / Gerald Eichstädt / Sean Doran



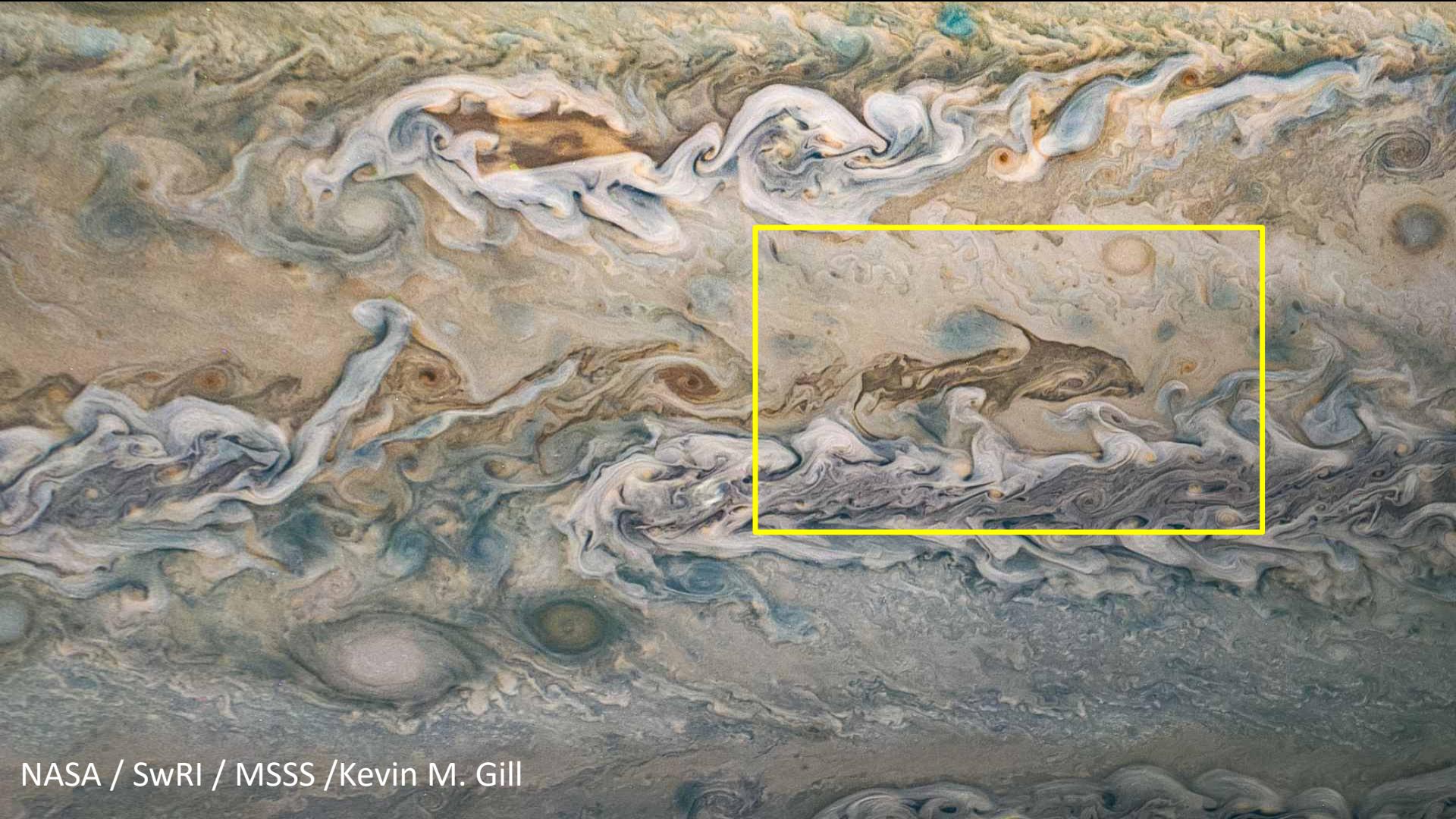
NASA / SwRI / MSSS /Gerald Eichstadt/Sean Doran

NASA / SwRI / MSSS /Gerald Eichstadt/Sean Doran

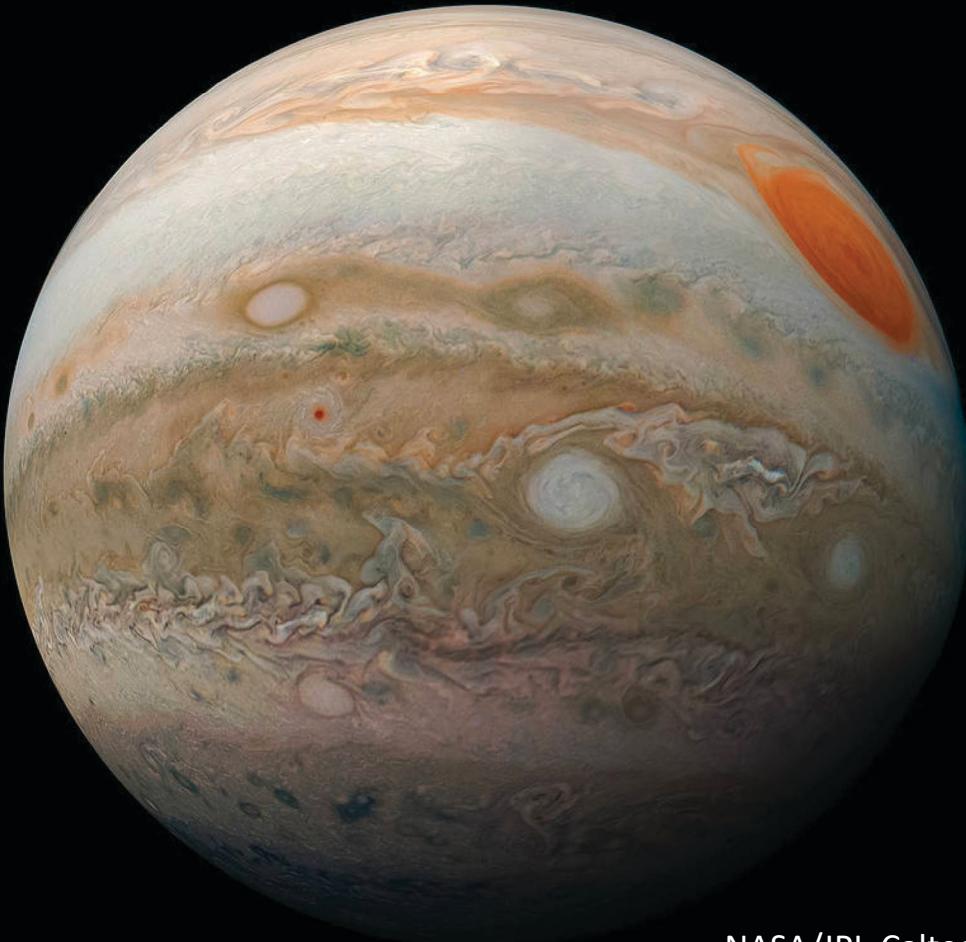




NASA / SwRI / MSSS /Gerald Eichstadt/Sean Doran



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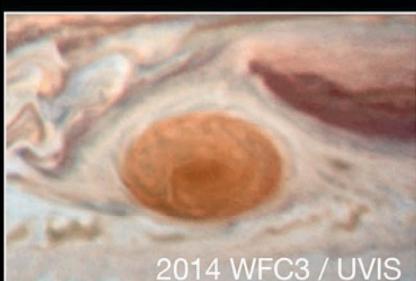
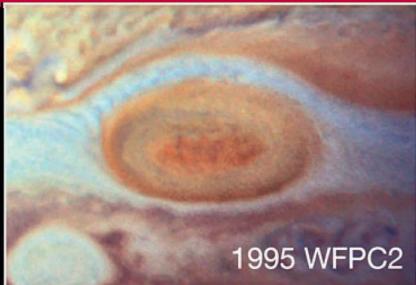


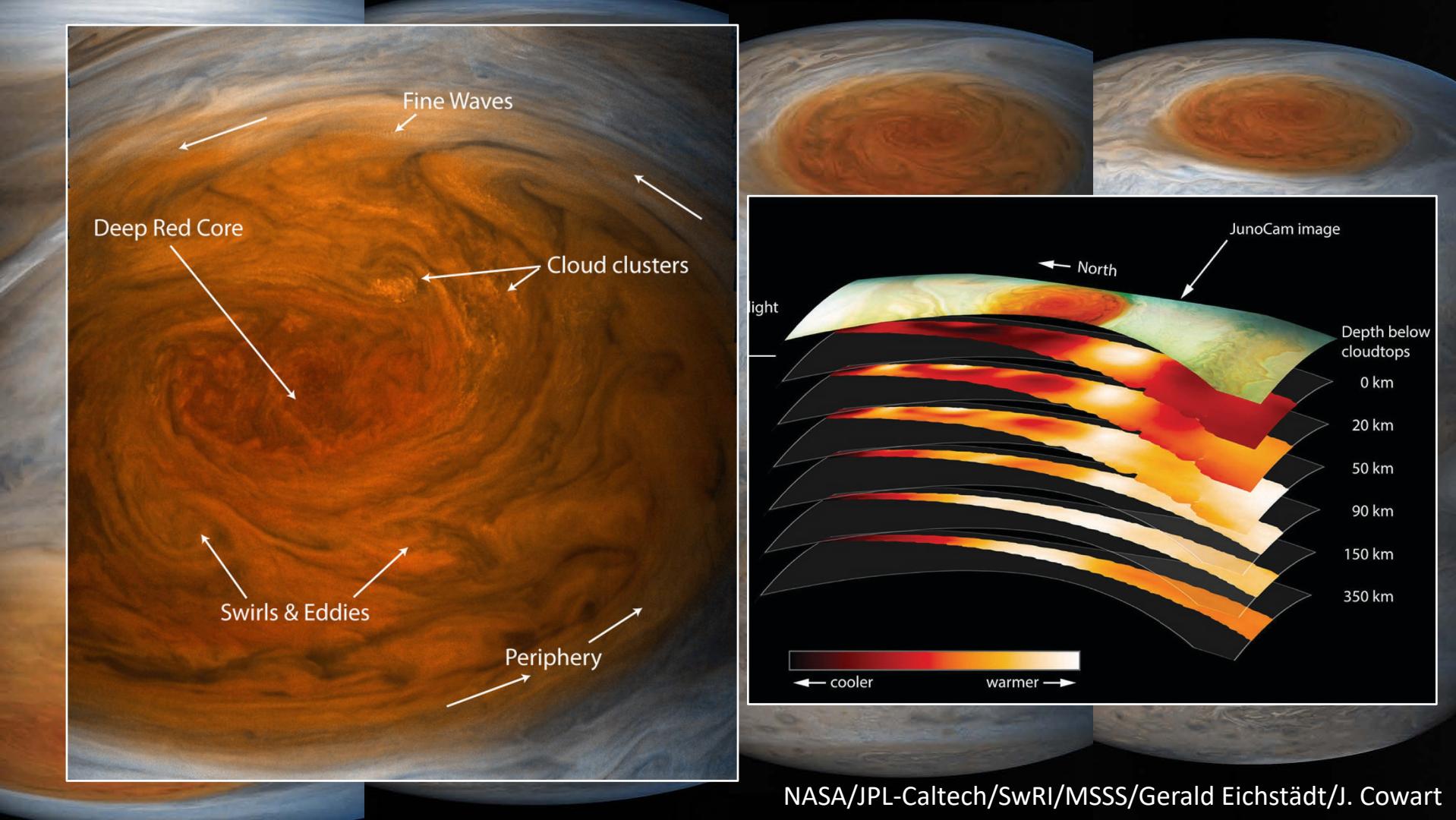
NASA/JPL-Caltech/SwRI/MSSS/Gerald  
Eichstädt/Seán Doran

NASA/JPL-Caltech/SwRI/MSSS/Kevin M. Gill

@LeighFletcher, Exploring Jupiter, New Scientist Live 2019

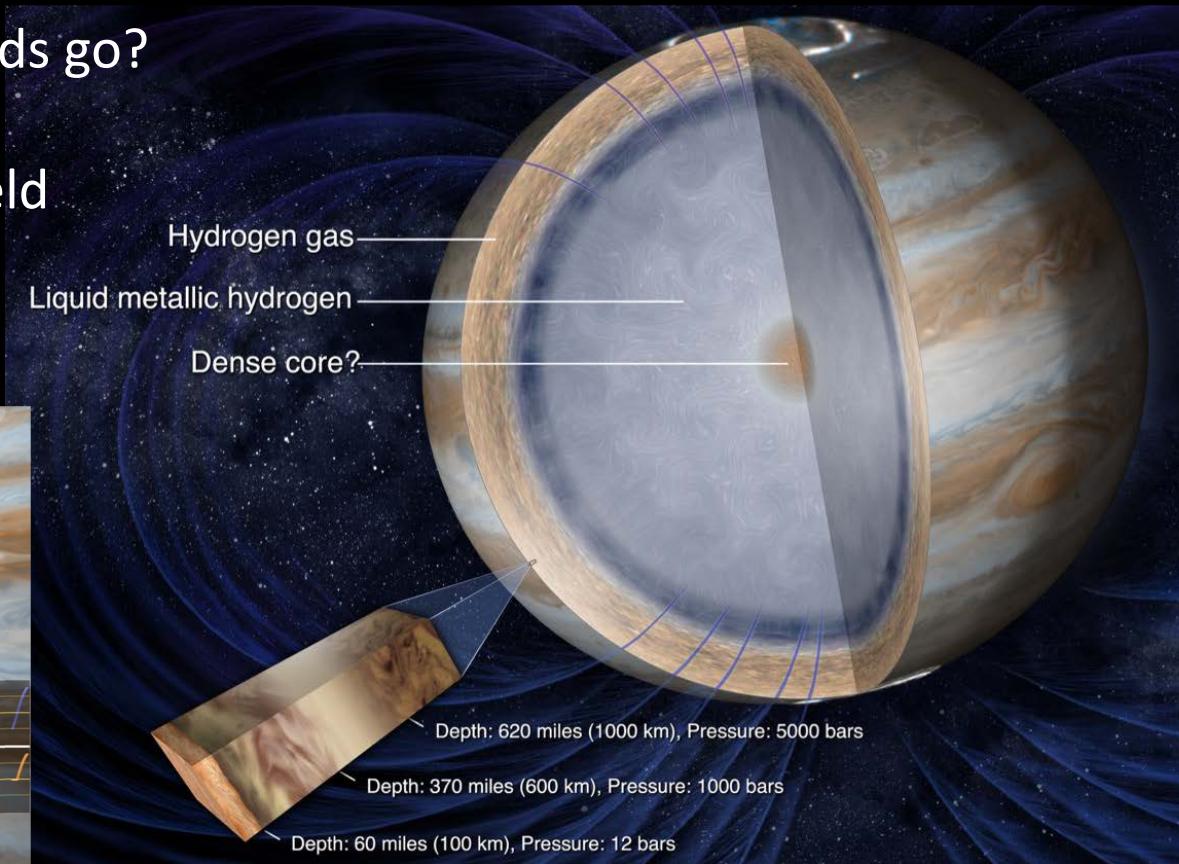
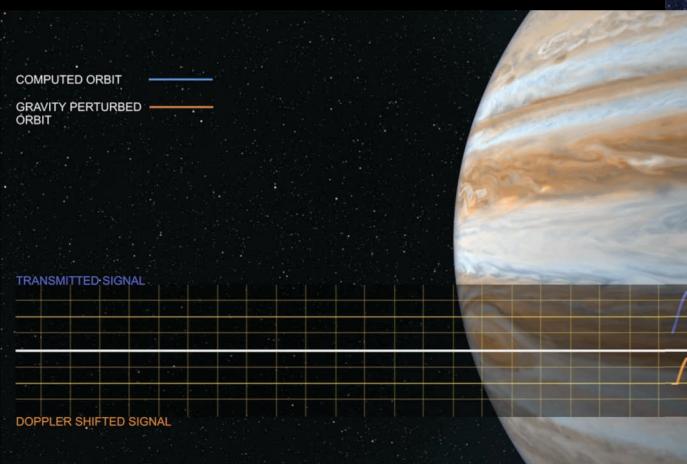
# The Demise of an Iconic Storm?



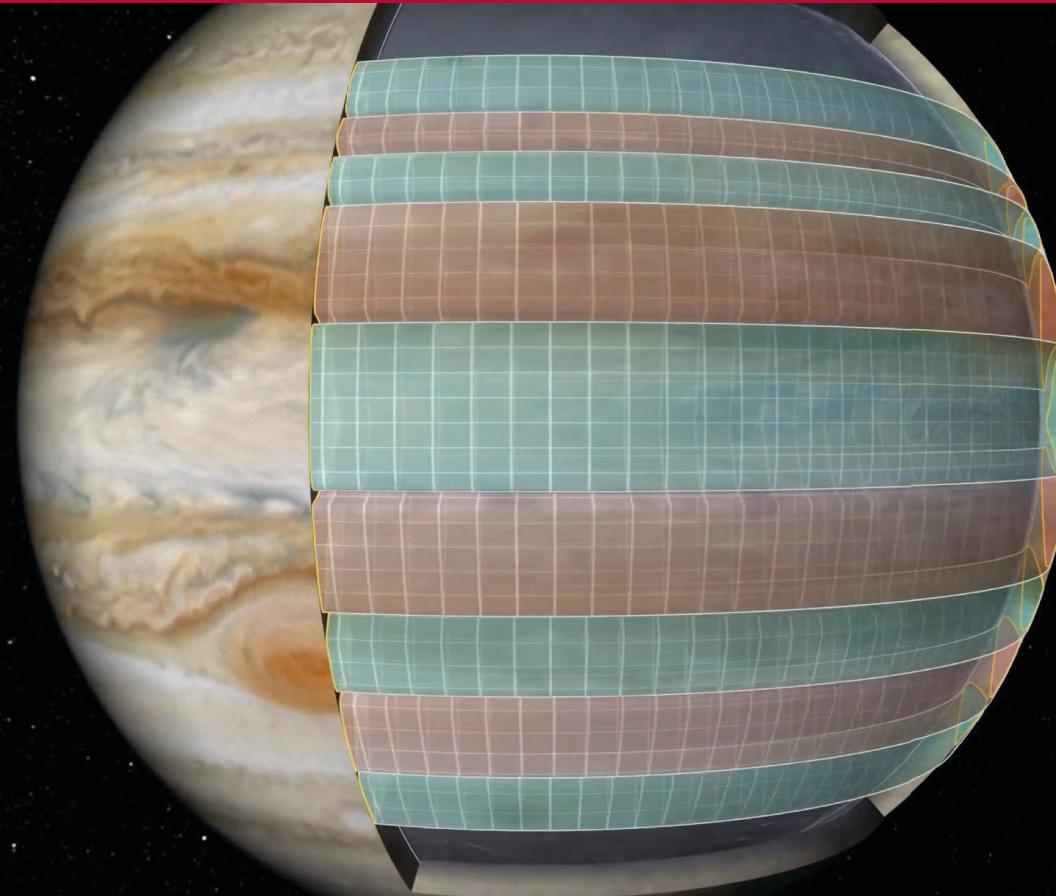


# Pushing Below the Clouds

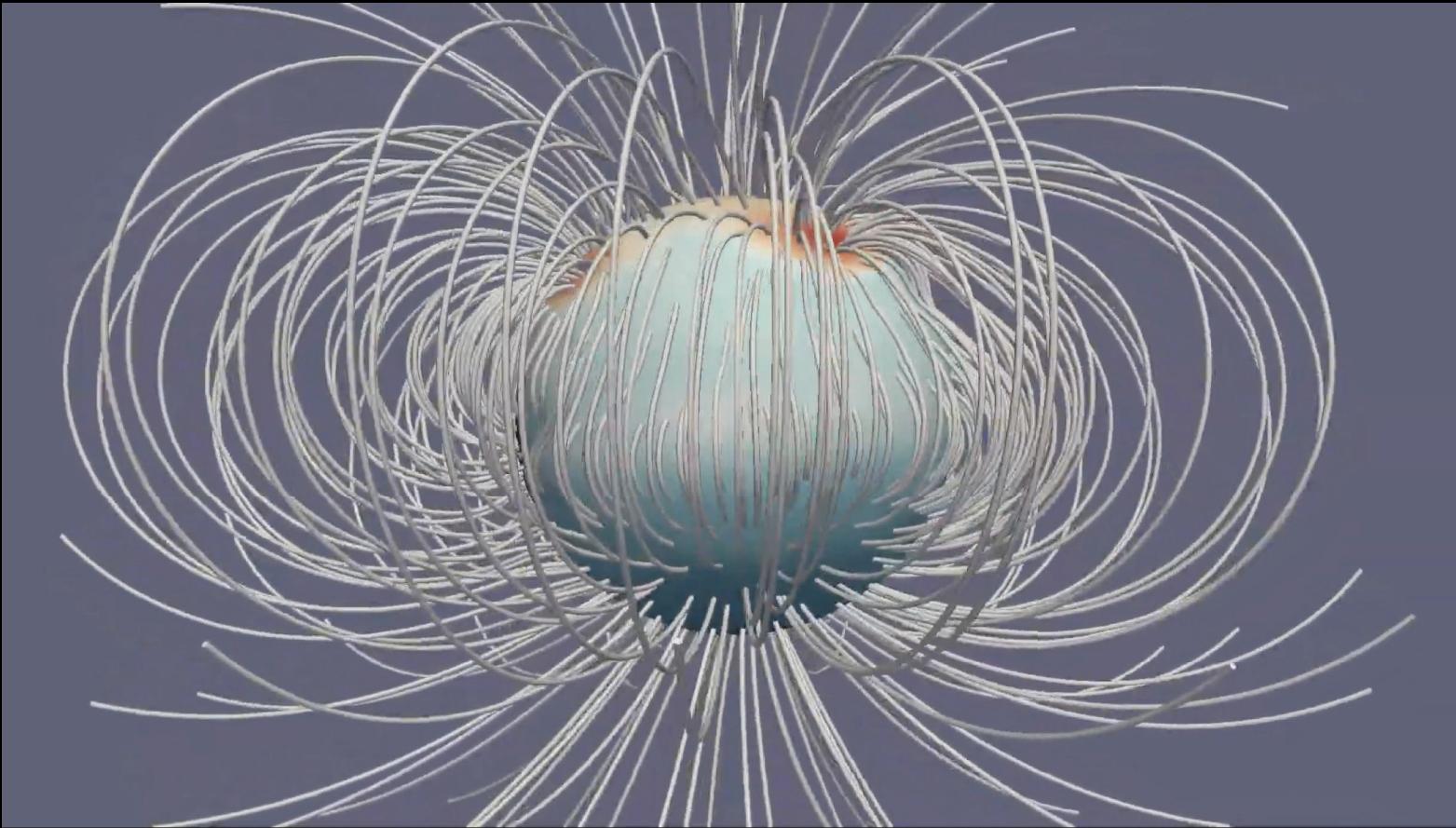
- How far down do the winds go?
- Does Jupiter have a core?
- Where is the magnetic field generated?



# Winds Shallow or Deep?

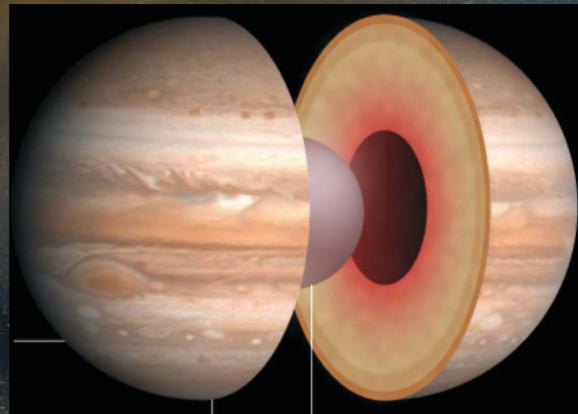
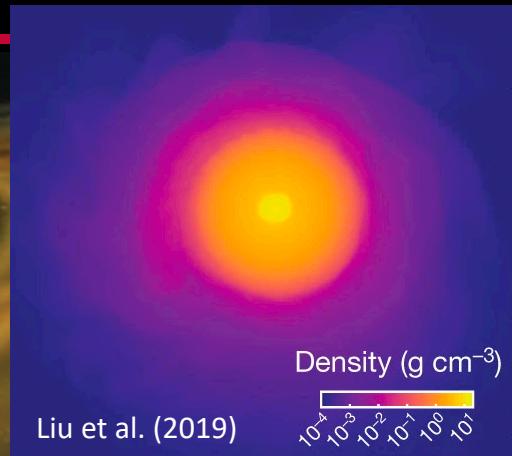
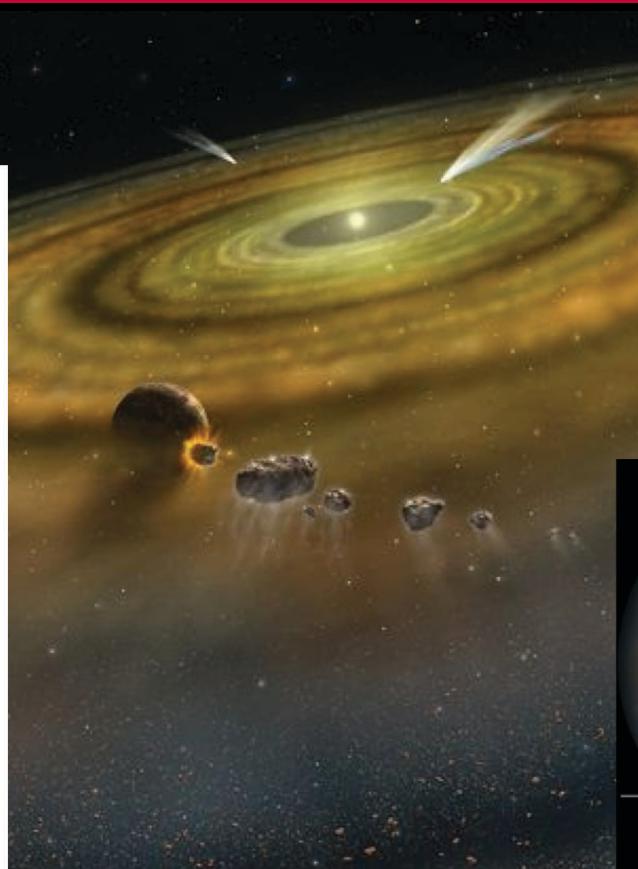
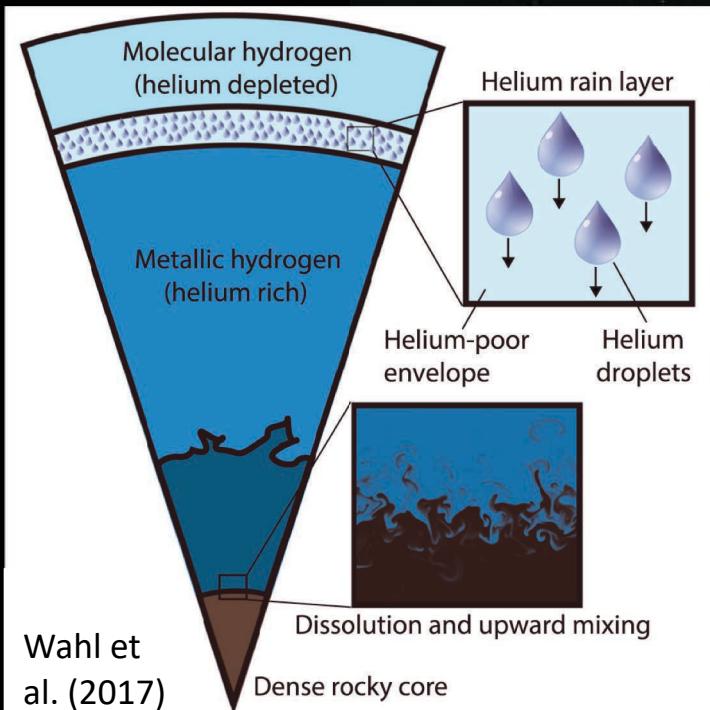


# Complex Magnetic Field



Connerney  
Moore & Bloxham

# Jupiter DOES Have a Core



# Juno Continues....

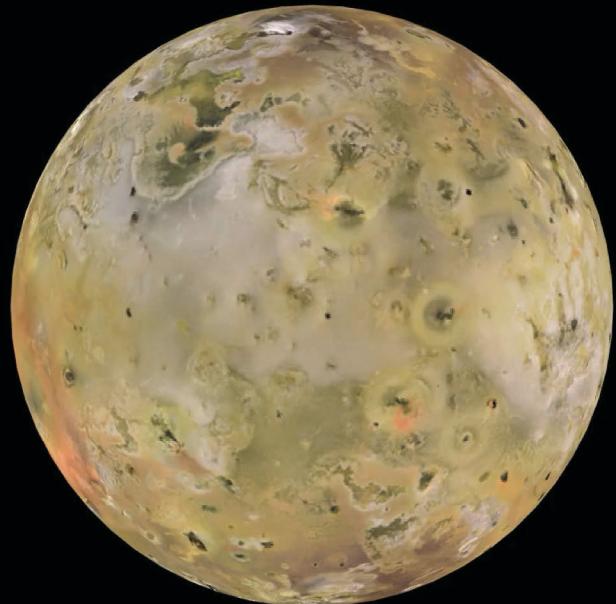
NASA / SwRI / MSSS / Gerald Eichstädt / Seán Doran



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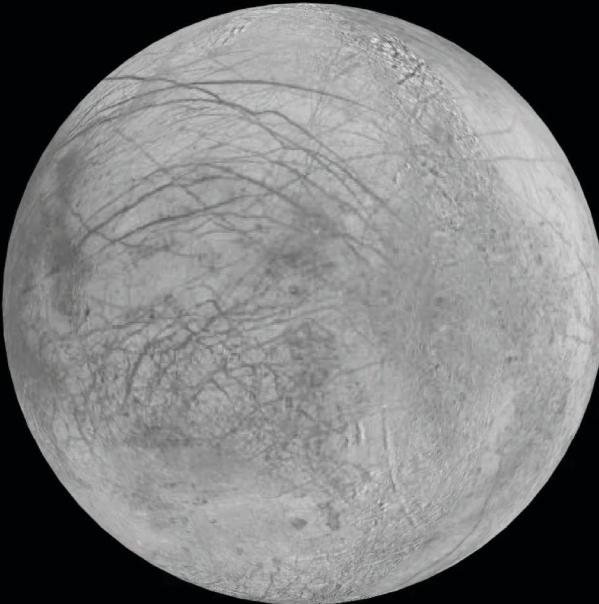
# Worlds of Ice and Fire

180°



Io

180°



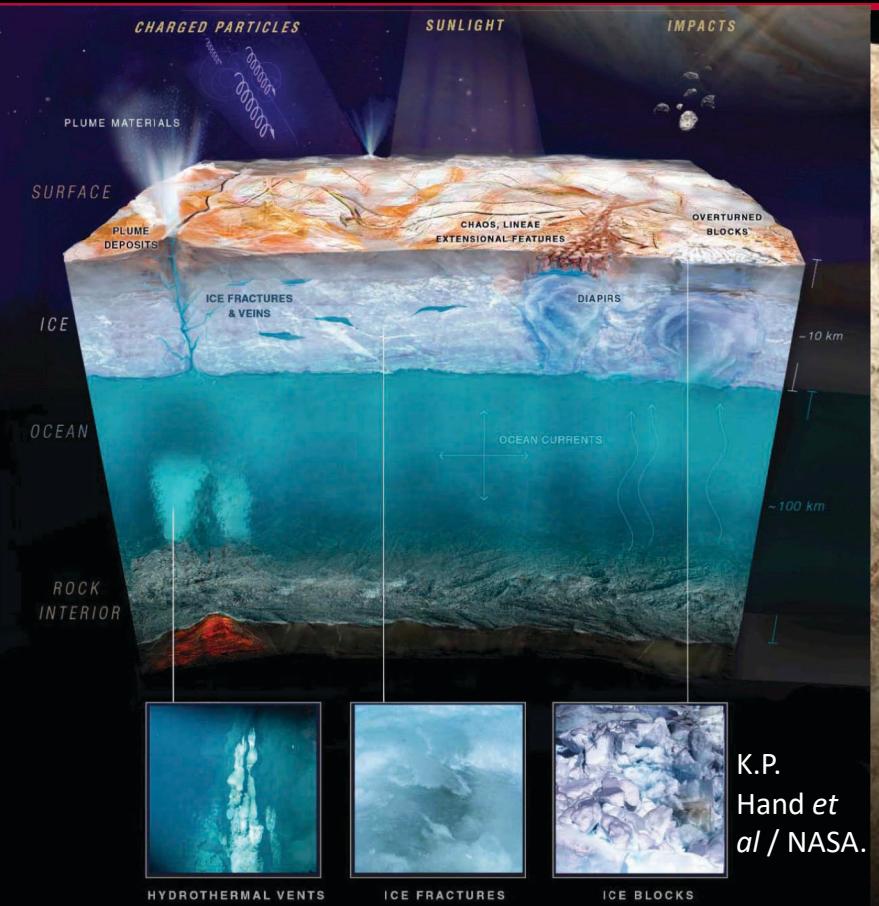
Europa

180°



Ganymede

# Europa's Hidden Ocean

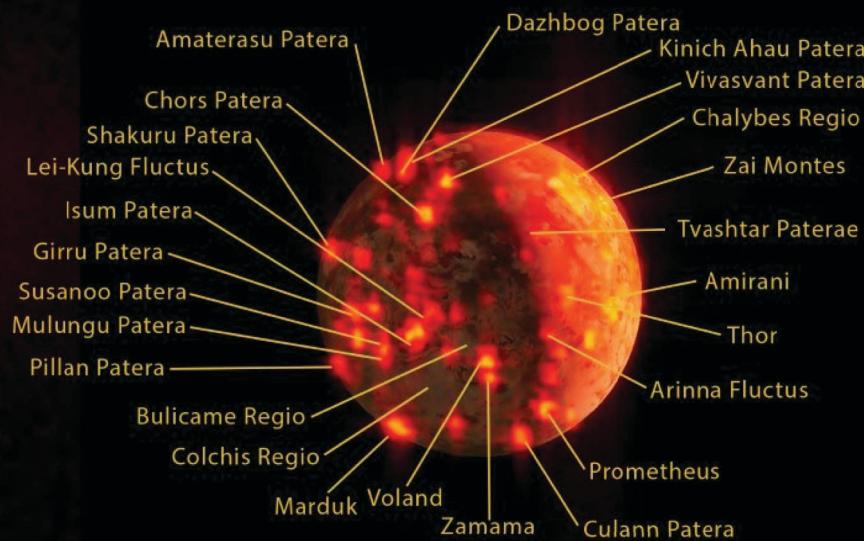


@LeighFletcher, Exploring Jupiter, New Scientist Live 2019

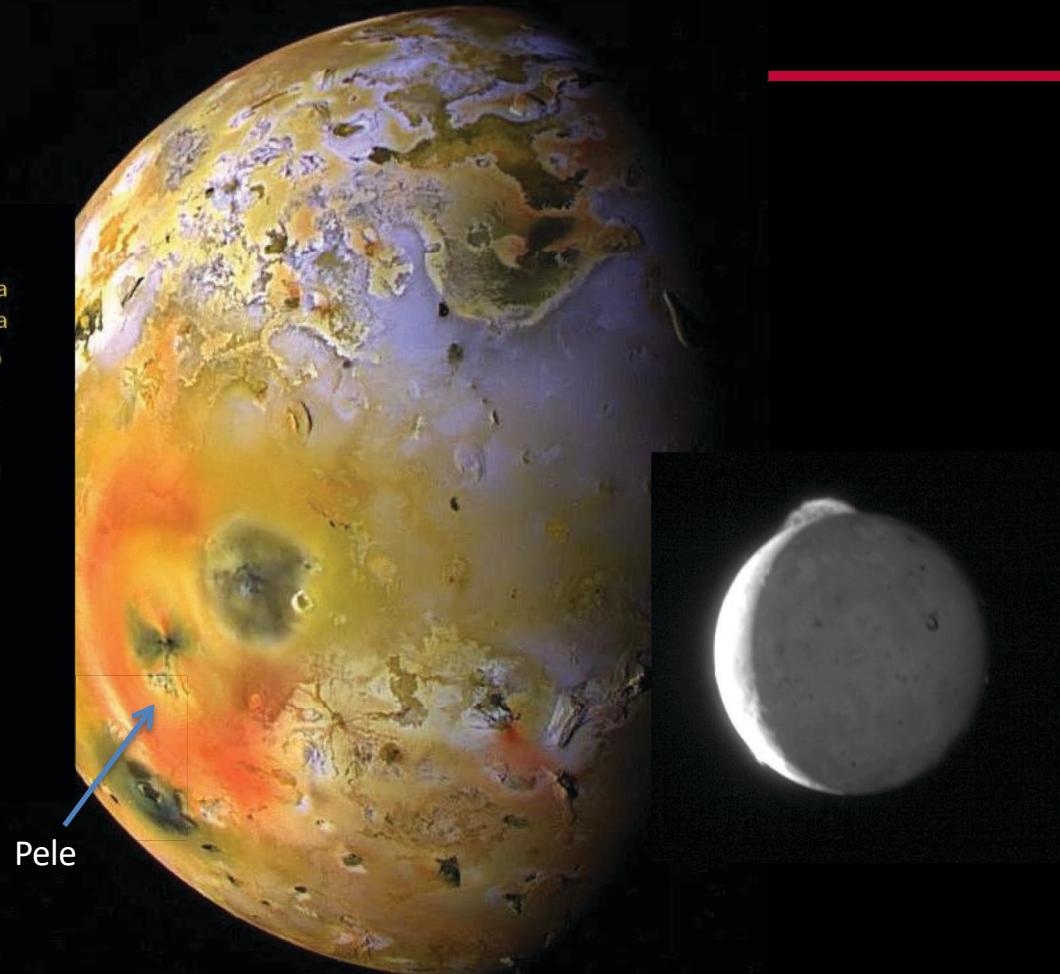


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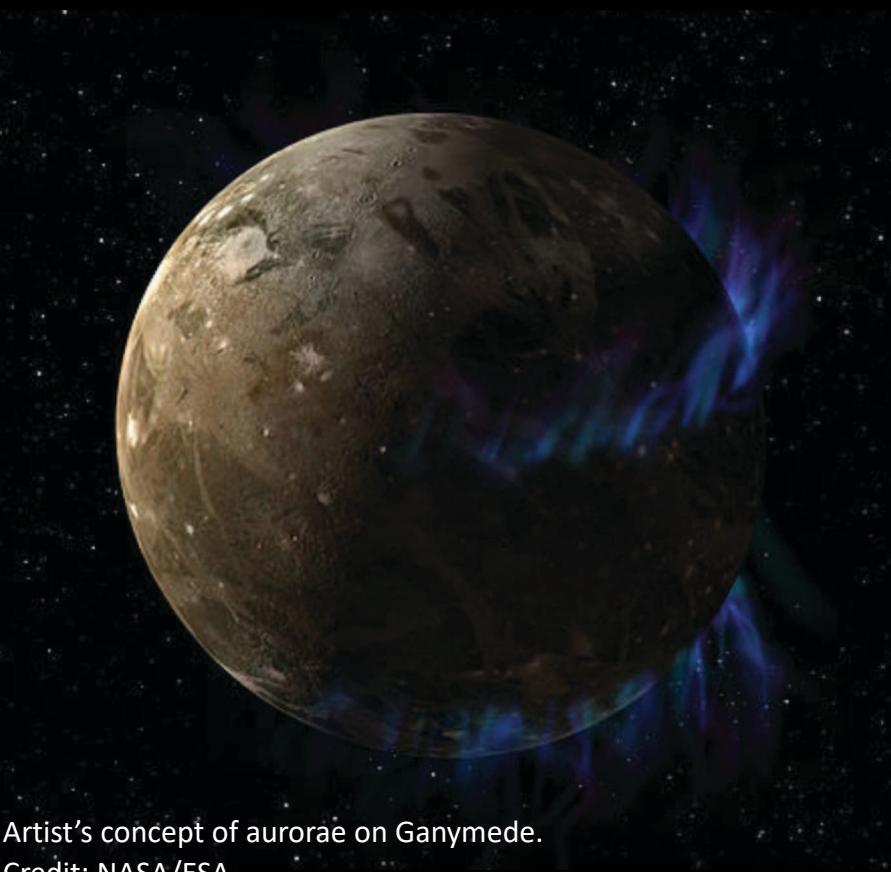
# Volcanic Io



NASA / JPL-Caltech / SwRI / ASI / INAF / JIRAM / Roman Tkachenko



# Giant Ganymede



Artist's concept of aurorae on Ganymede.  
Credit: NASA/ESA

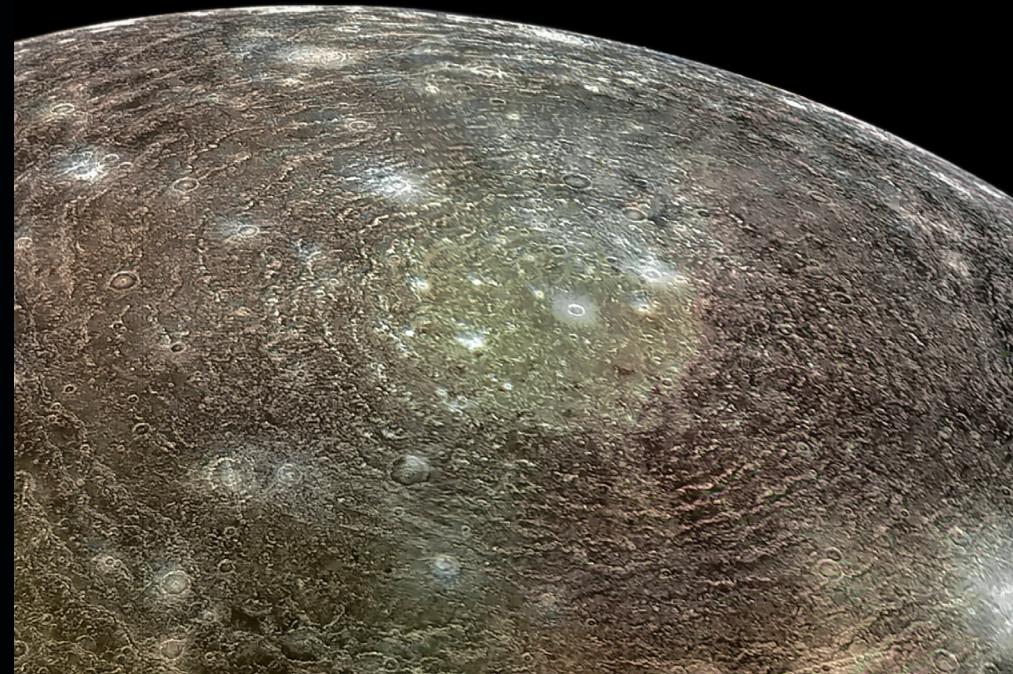


Nicholson Regio/Arbela Sulcus region  
Credit: NASA/JPL/Brown University/Doug Ellison

# Battered Callisto



Credit: NASA/JPL



Credit: NASA/JPL-Caltech/Kevin M. Gill/Jason Major

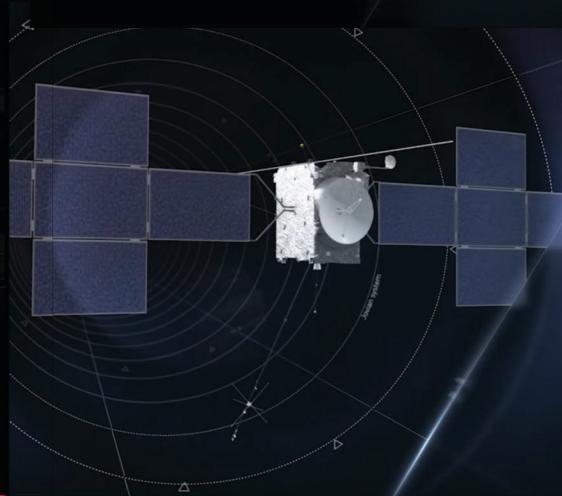


The 1<sup>st</sup>  
**European mission**  
to Jupiter

Ariane 5 launch in 2022



A  
**7.5-year**  
journey



and  
**3.5-year tour**  
of the Jovian system

1<sup>st</sup> orbiter of an icy moon:  
**Ganymede**



Exploring **three**  
potentially ocean-bearing  
**icy moons**



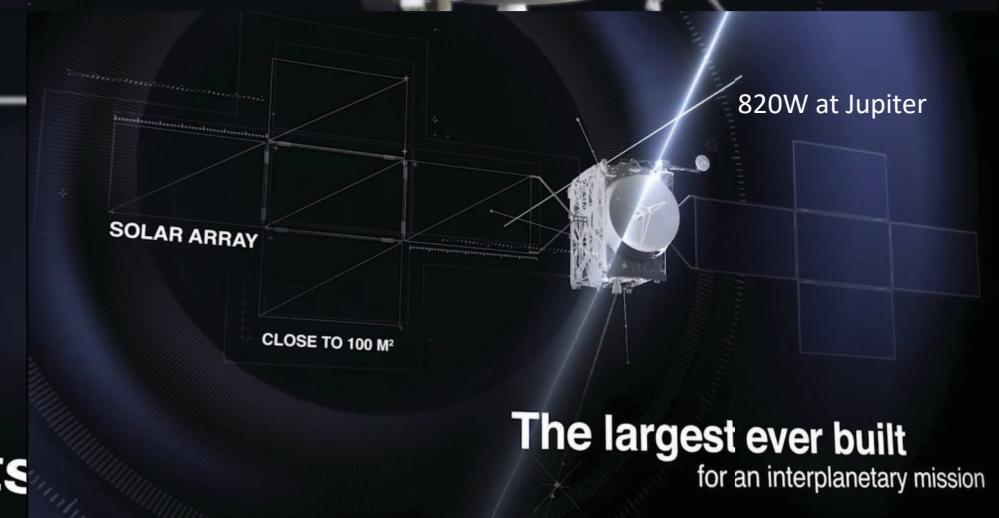
Europa

Callisto



Ganymede

5.3 tonne spacecraft



# JUICE Tour

eesa

Oct 2030

Europa flyby

Date	Event or phase
June 2022	Launch from Kourou with Ariane 5
May 2023	Earth flyby #1
October 2023	Venus flyby
September 2024	Earth flyby #2
February 2025	Mars flyby
November 2026	Earth flyby #3
October 2029	Jupiter orbit insertion
October 2029-October 2030	Energy reduction phase
October 2030	2 Europa flybys
October 2030-August 2031	Jupiter inclined phase - Callisto flybys
September 2031-November 2032	Phase "transfer to Ganymede"
December 2032	Ganymede orbit insertion
December 2032-September 2033	Elliptical and circular orbits (5000/500 km)
September 2033	End of mission

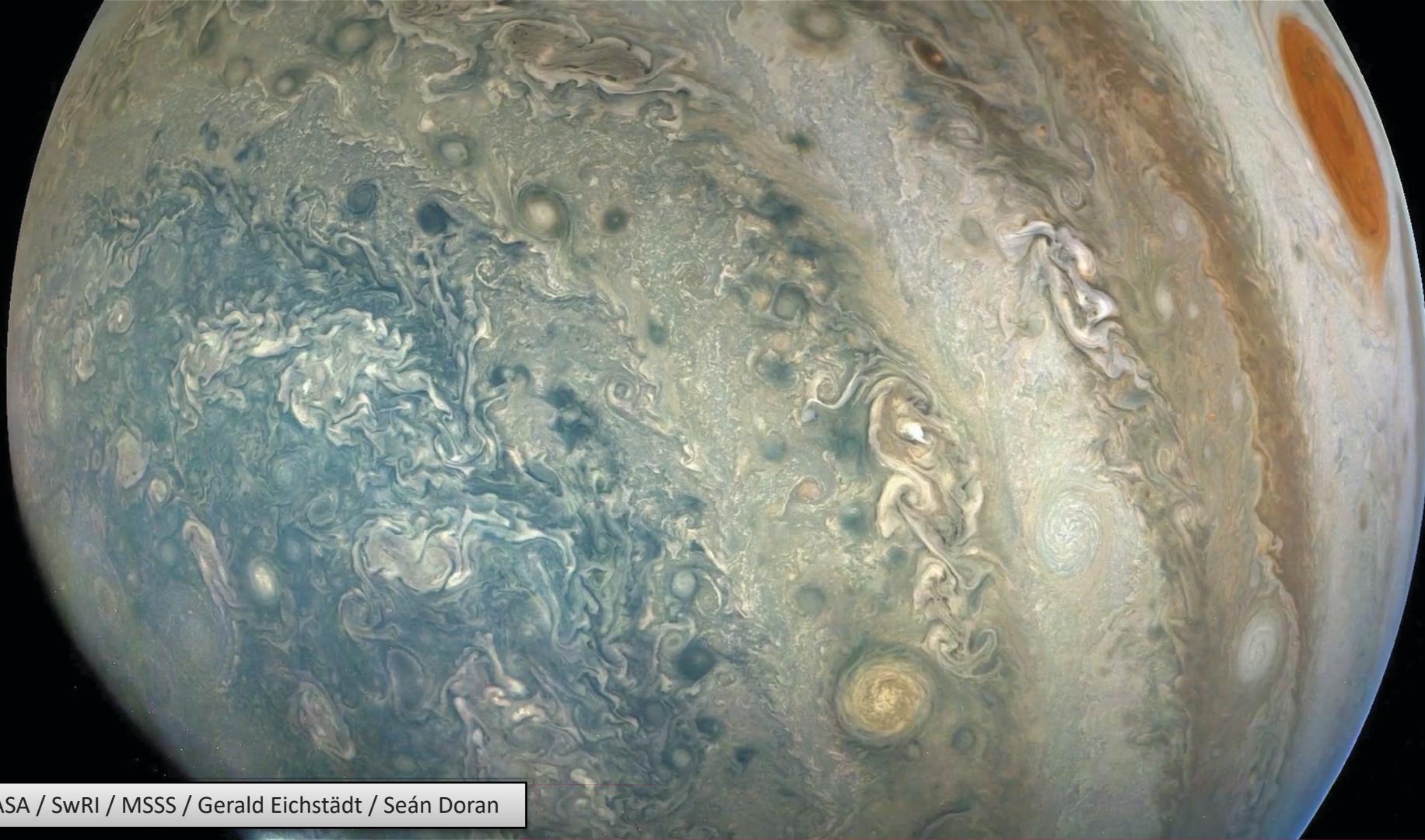


eesa



Feb 2033

Circular orbit 500 km  
around Ganymede



NASA / SwRI / MSSS / Gerald Eichstädt / Seán Doran