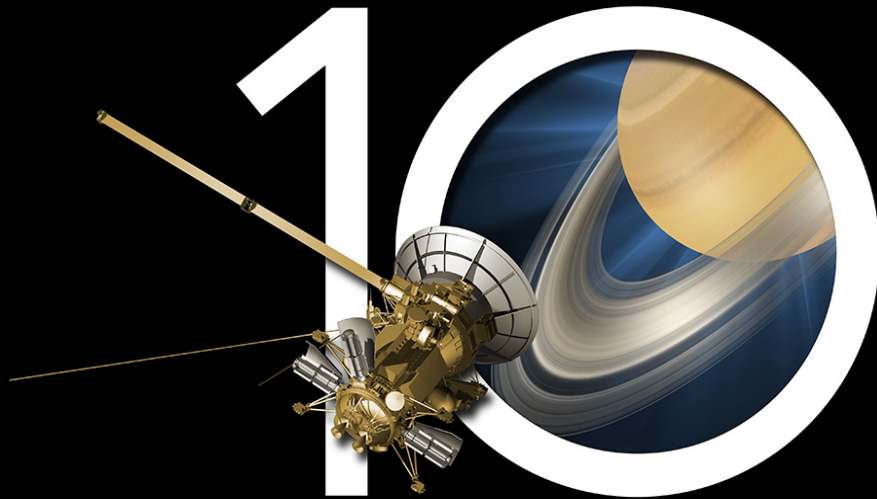
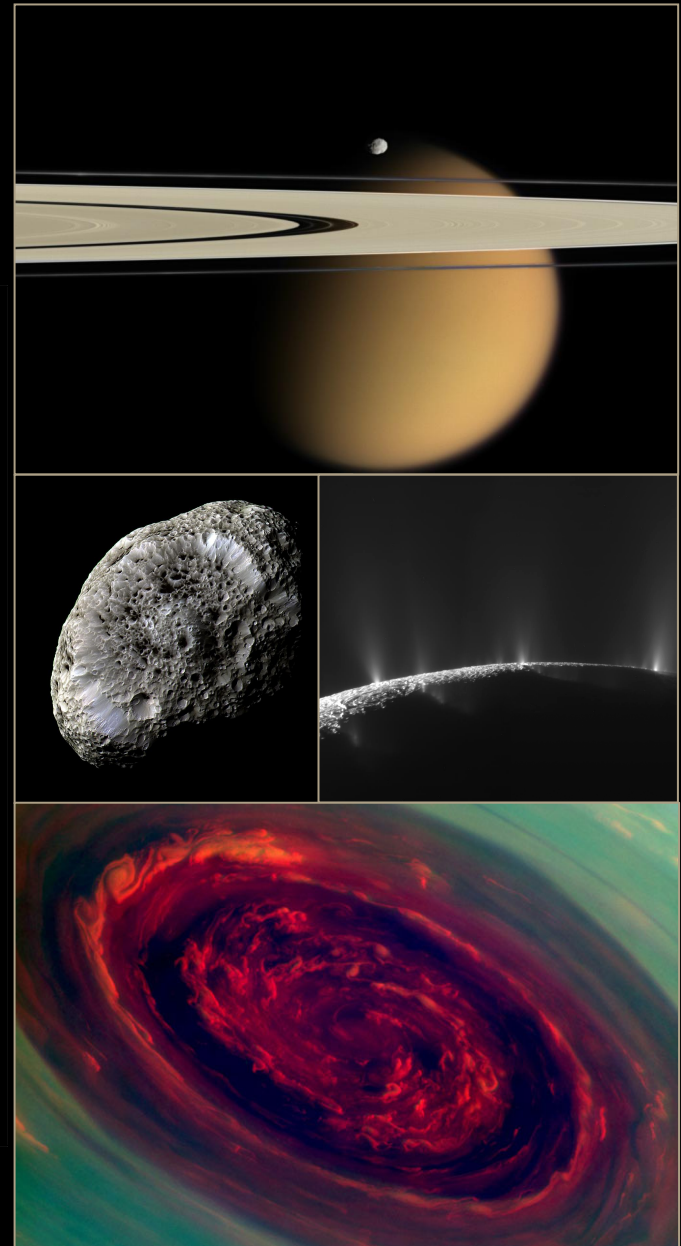


# 10 years at Saturn and More Surprises on the Way



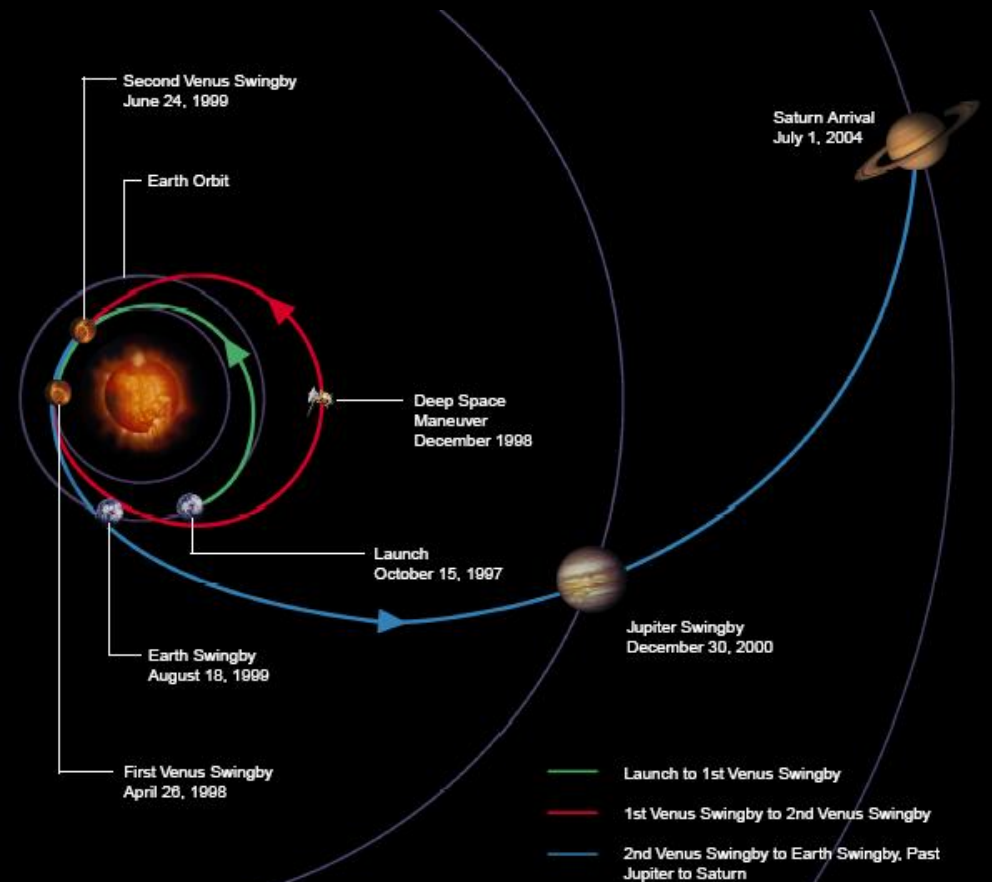
**YEARS** at SATURN

Dr. Linda Spilker  
Cassini Project Scientist

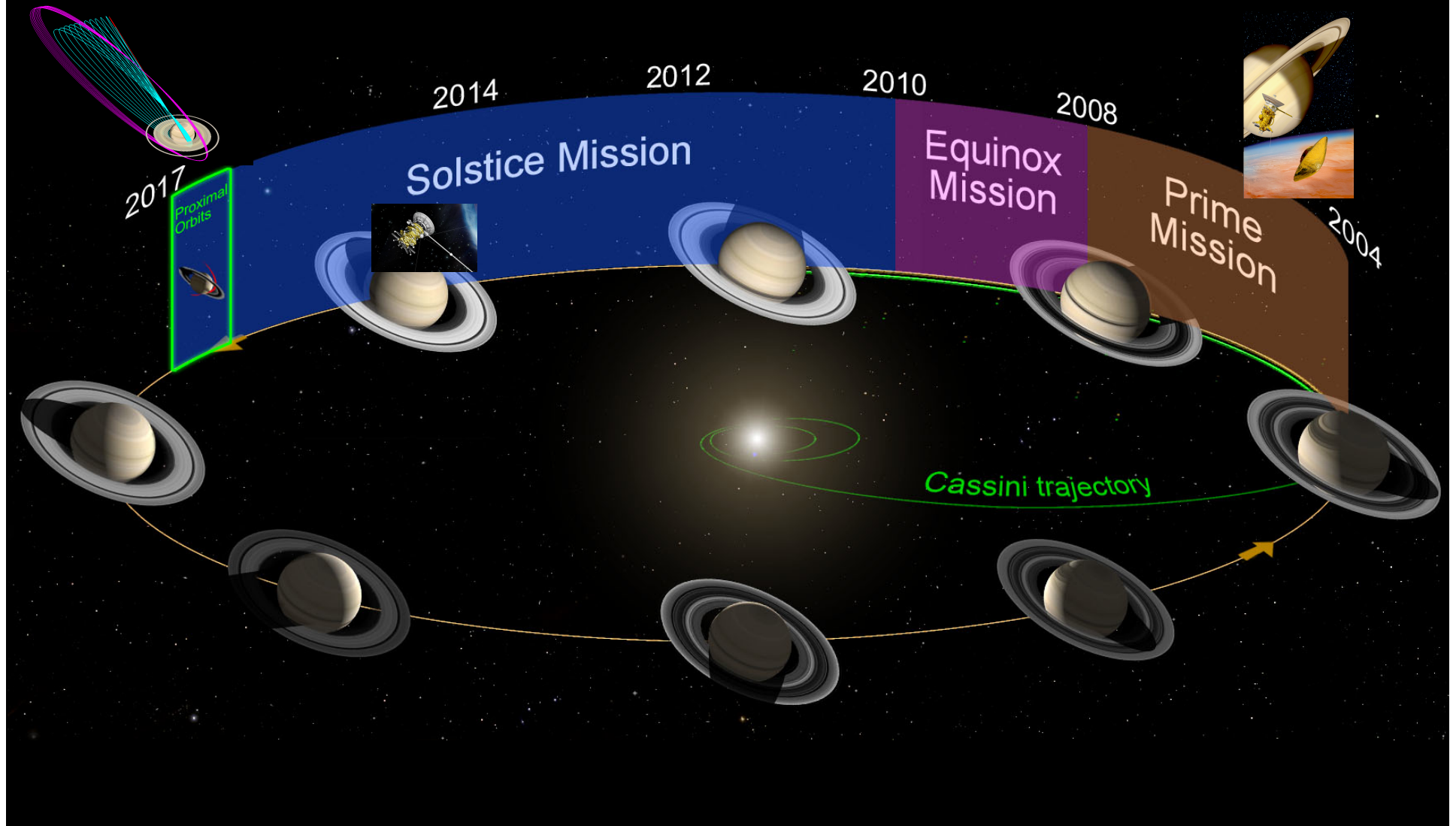


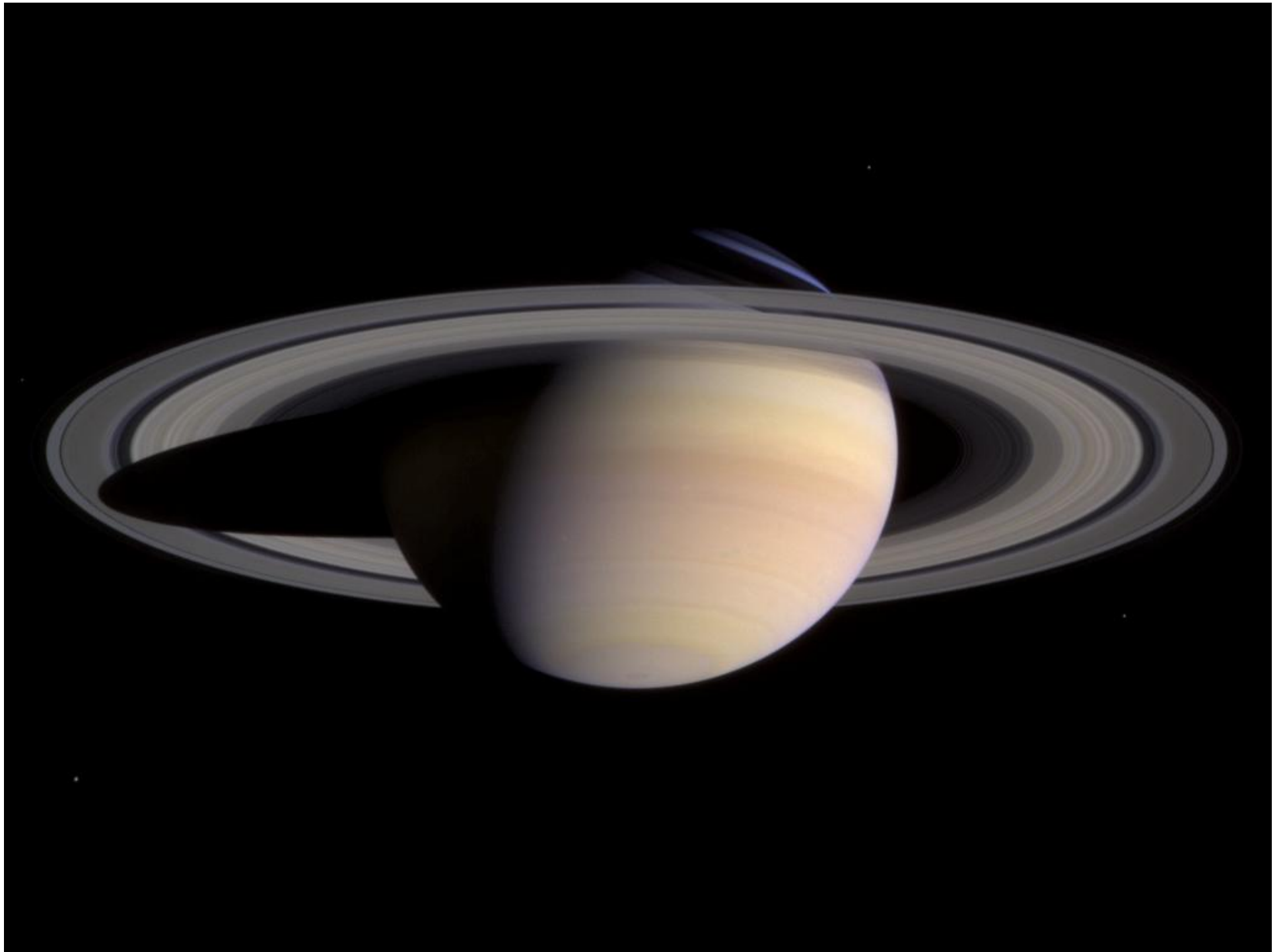
# Launched on October 15, 1997 from KSC

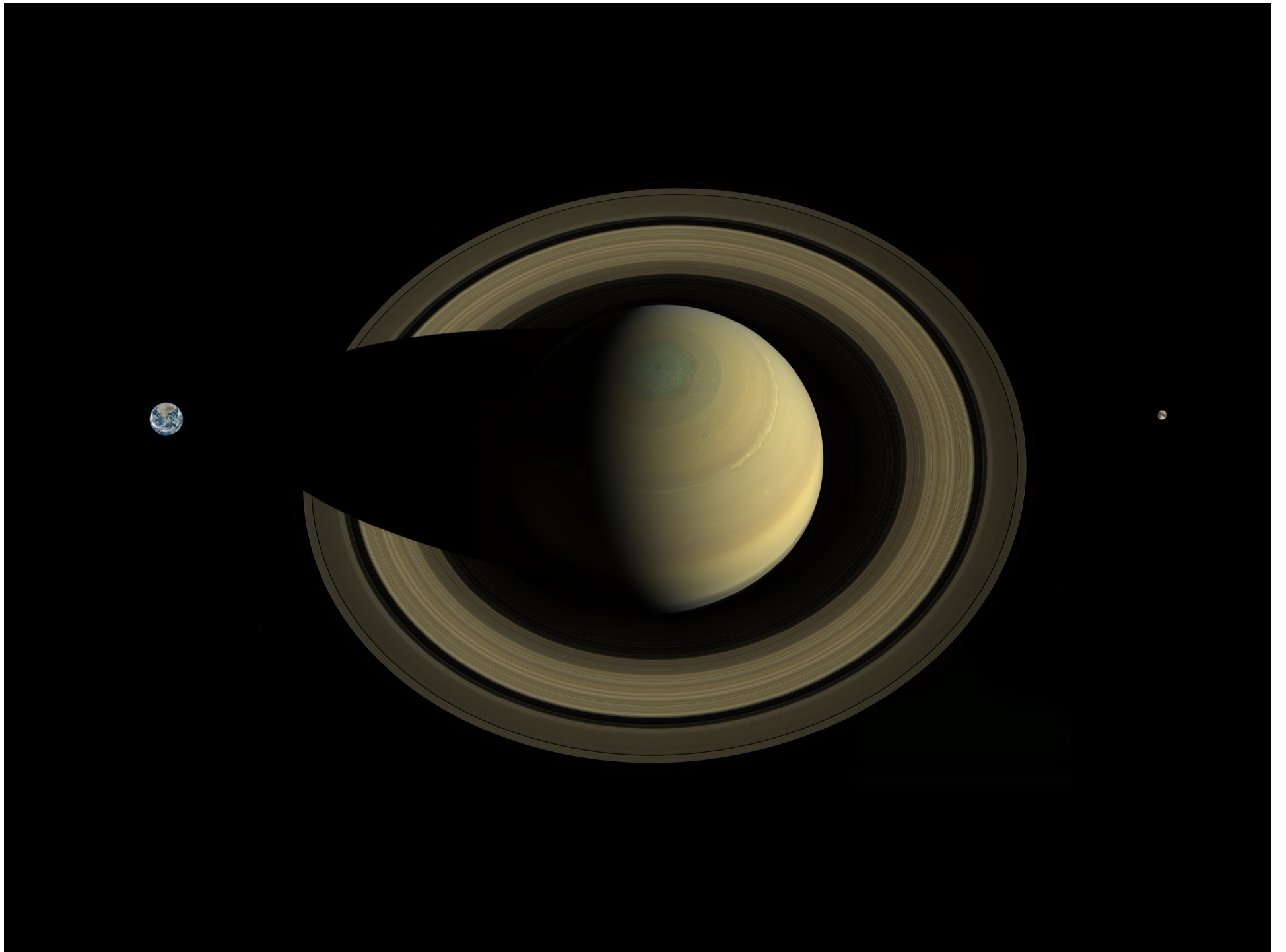
- 7 Year cruise
- Venus-Venus-Earth-Jupiter Gravity Assist trajectory

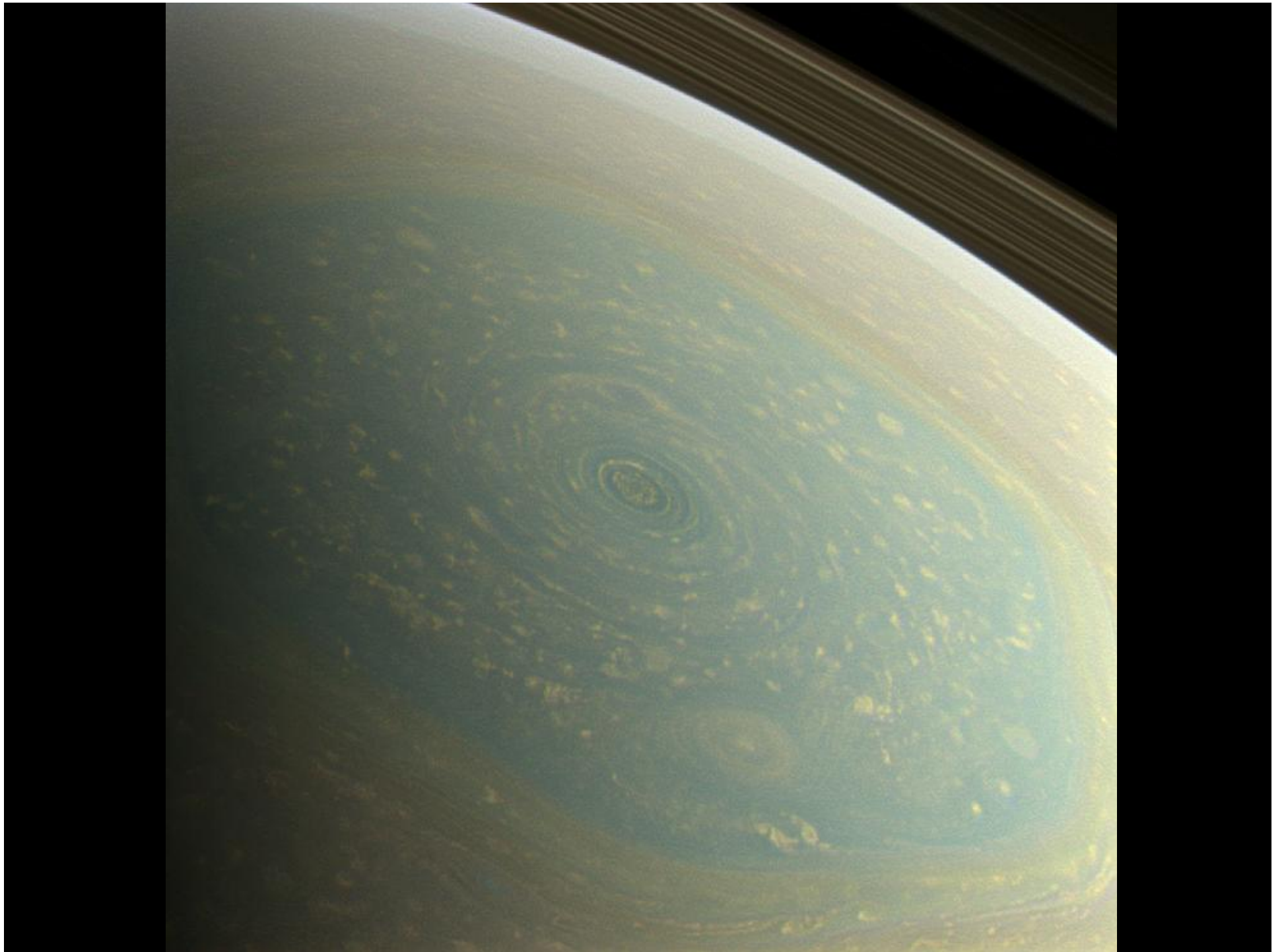


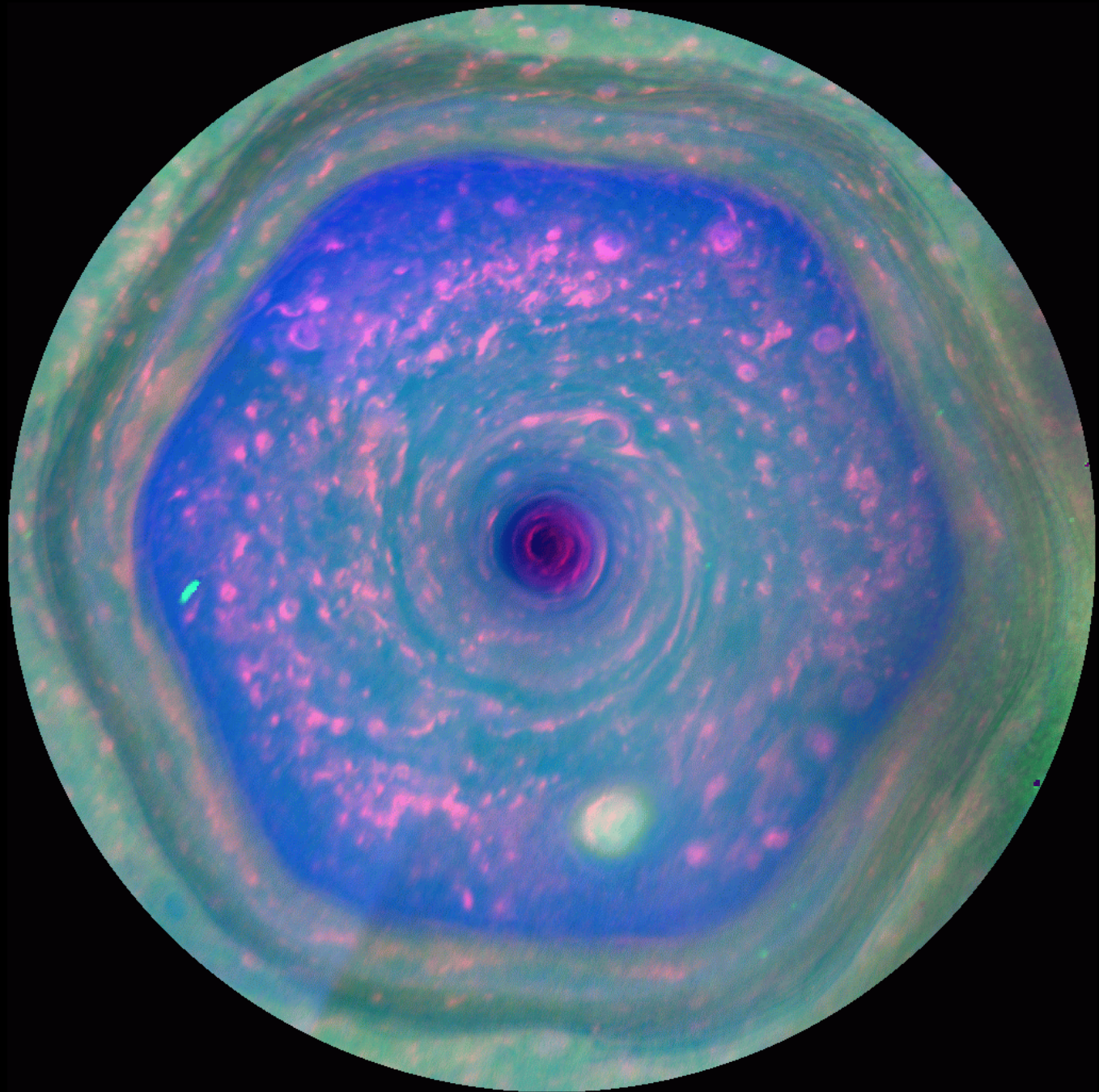
# Cassini-Huygens: Mission to Saturn

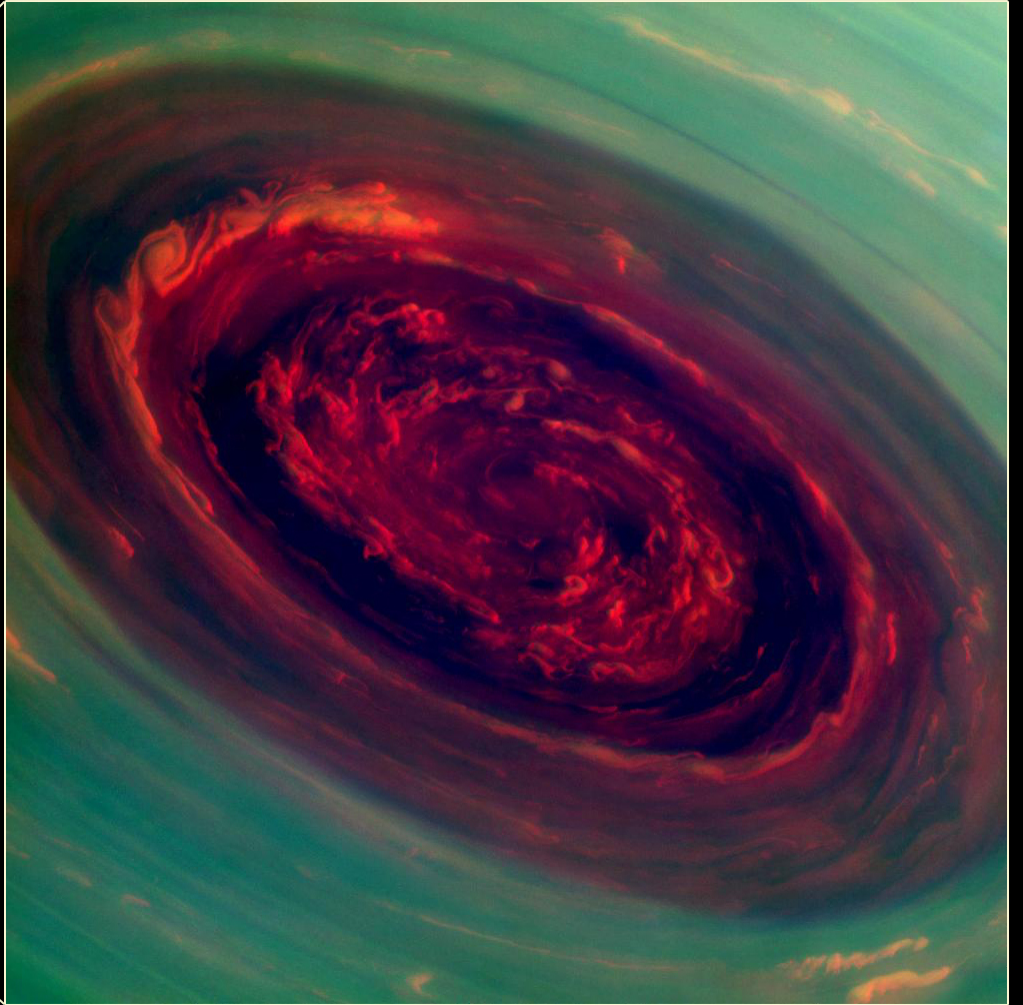
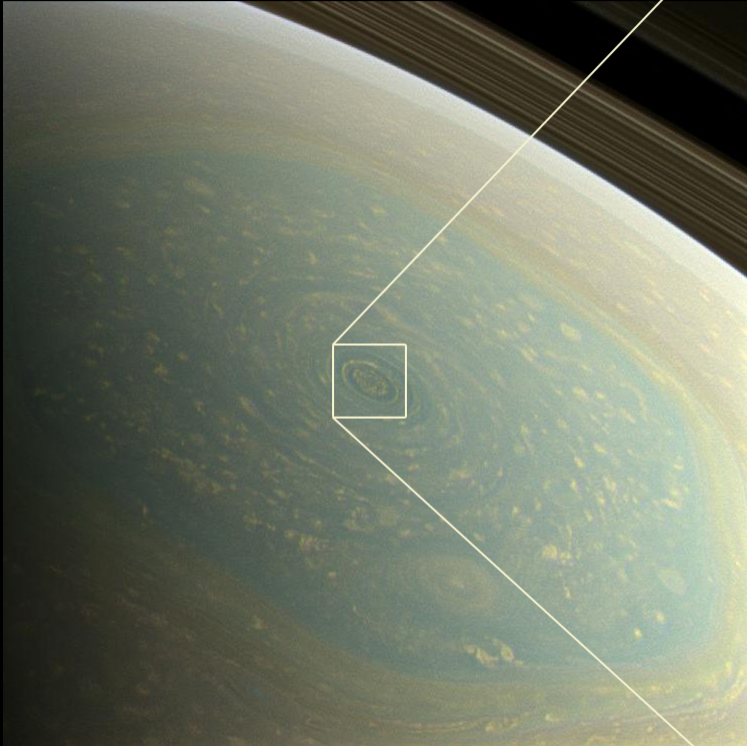








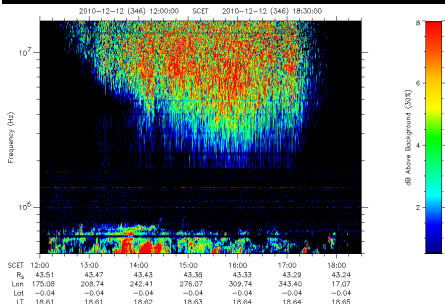




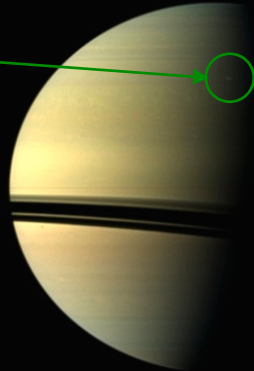


# Chronicles of Northern Storm

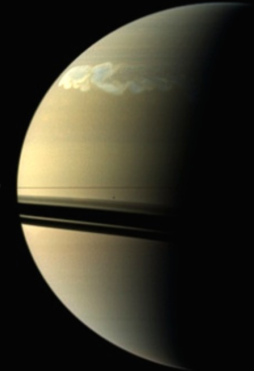
- Largest observed storm on Saturn in the past 21 years
- Longest ever seen on Saturn: 200 days



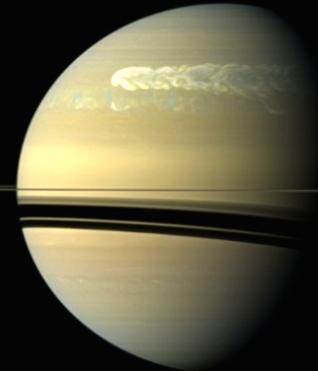
Dec 5, 2010



Jan 2, 2011



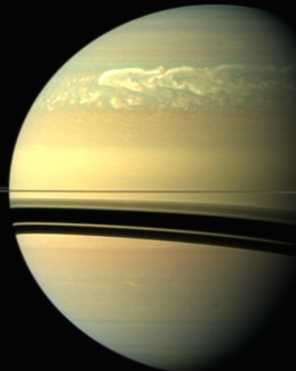
Feb 25, 2011



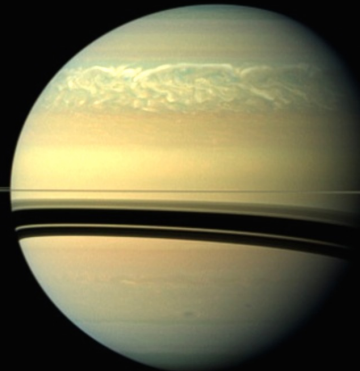
- Intense lightning activity starting on 5 Dec 2010

- A flash rate:  $> 10 \text{ s}^{-1}$ .

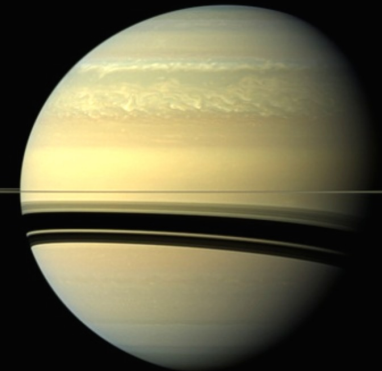
Apr 22, 2011



May 18, 2011

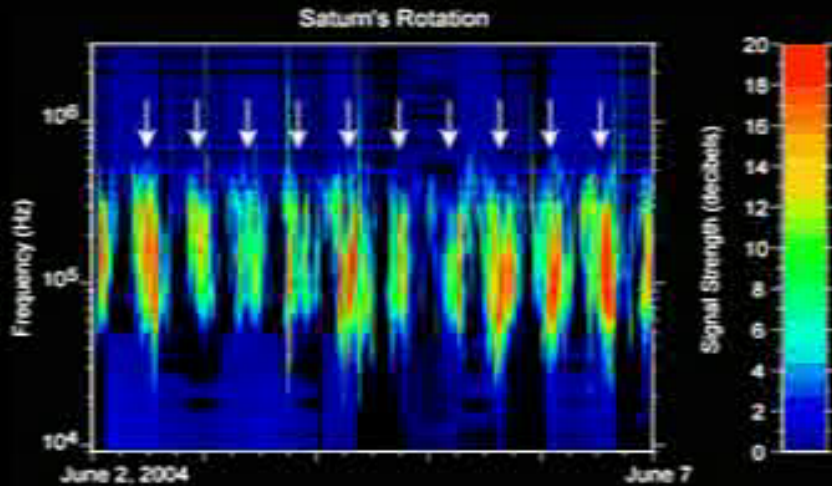


Aug 12, 2011

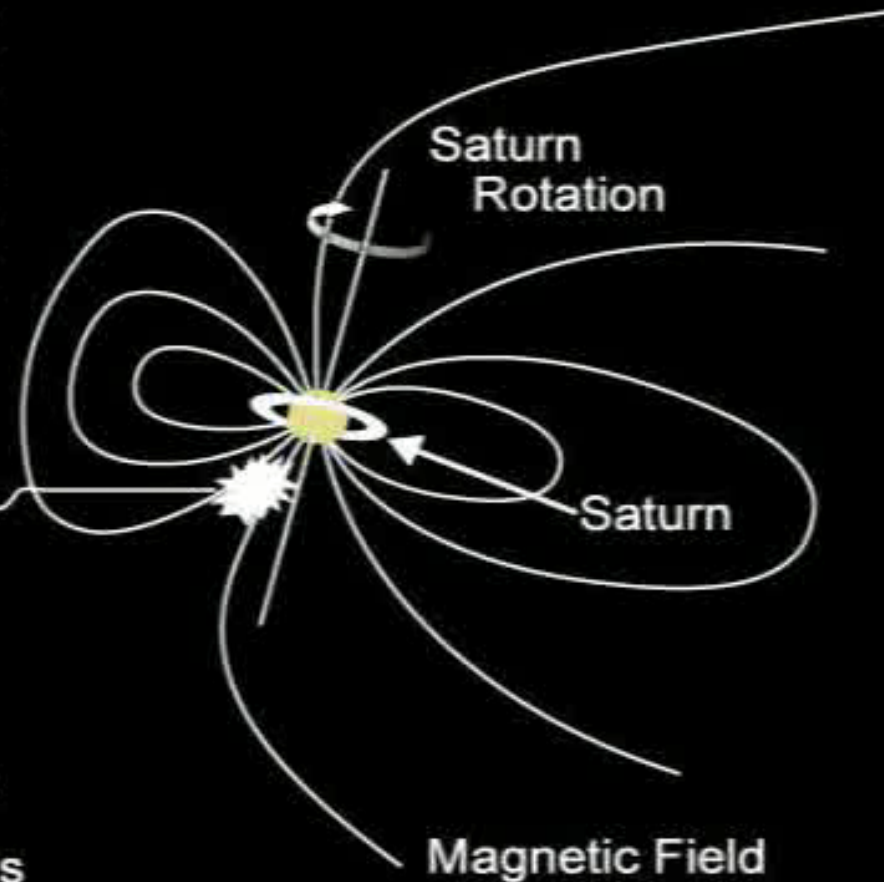


# Saturn's Kilometric Radio Emission

A-D04-208-6



Radio Emission

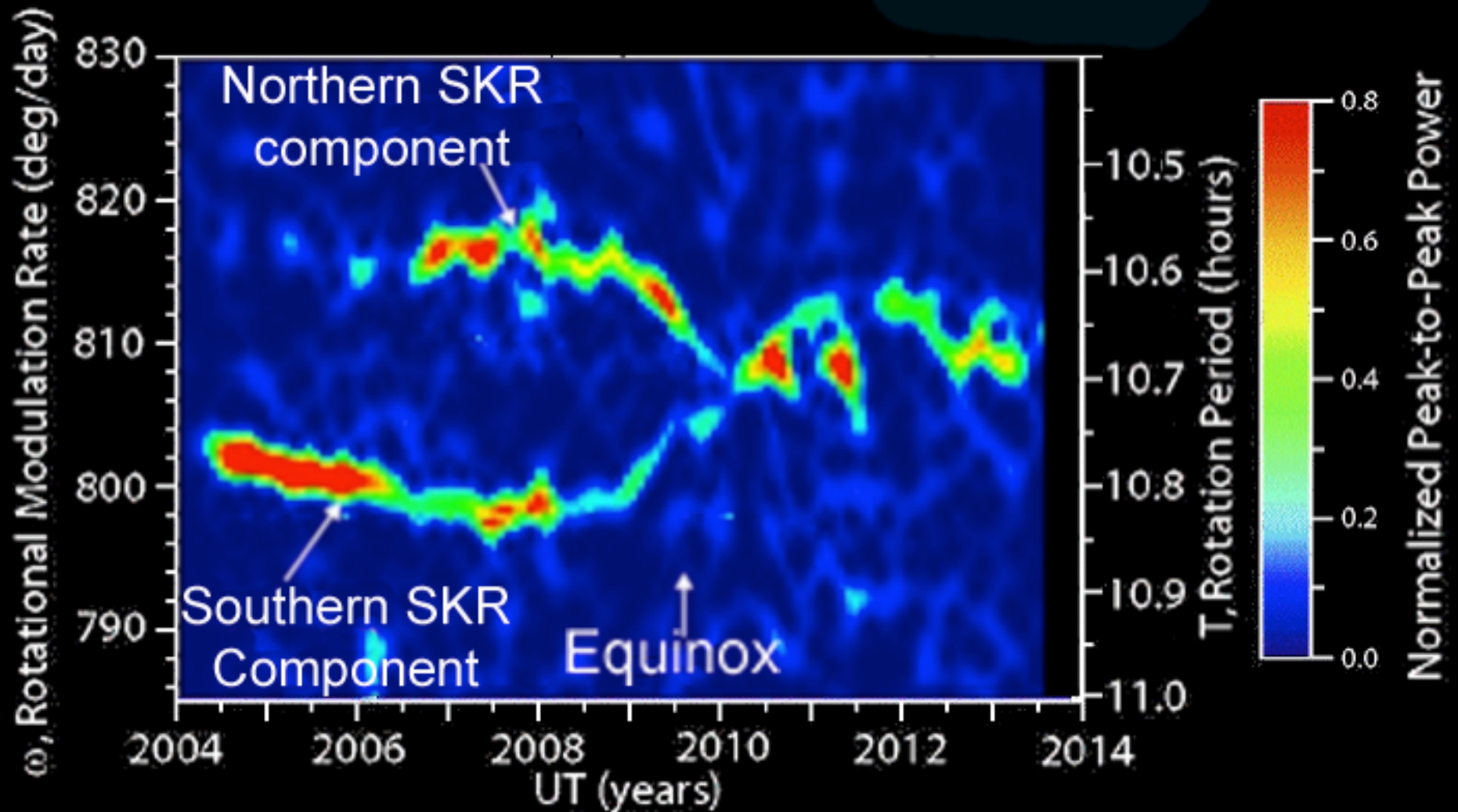


Radio Rotation Period

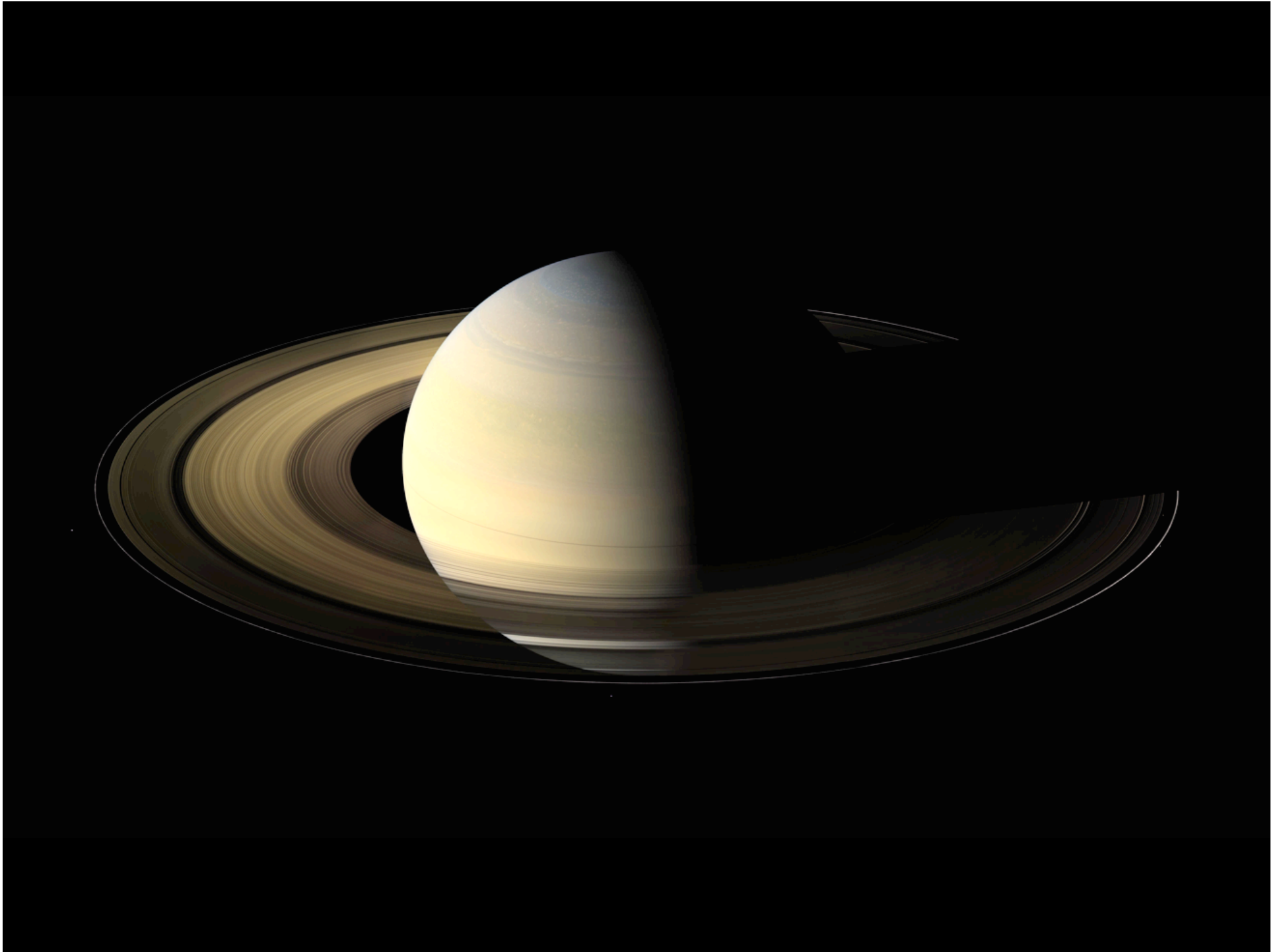
Voyager 1 and 2: 10h 39m 24±7s

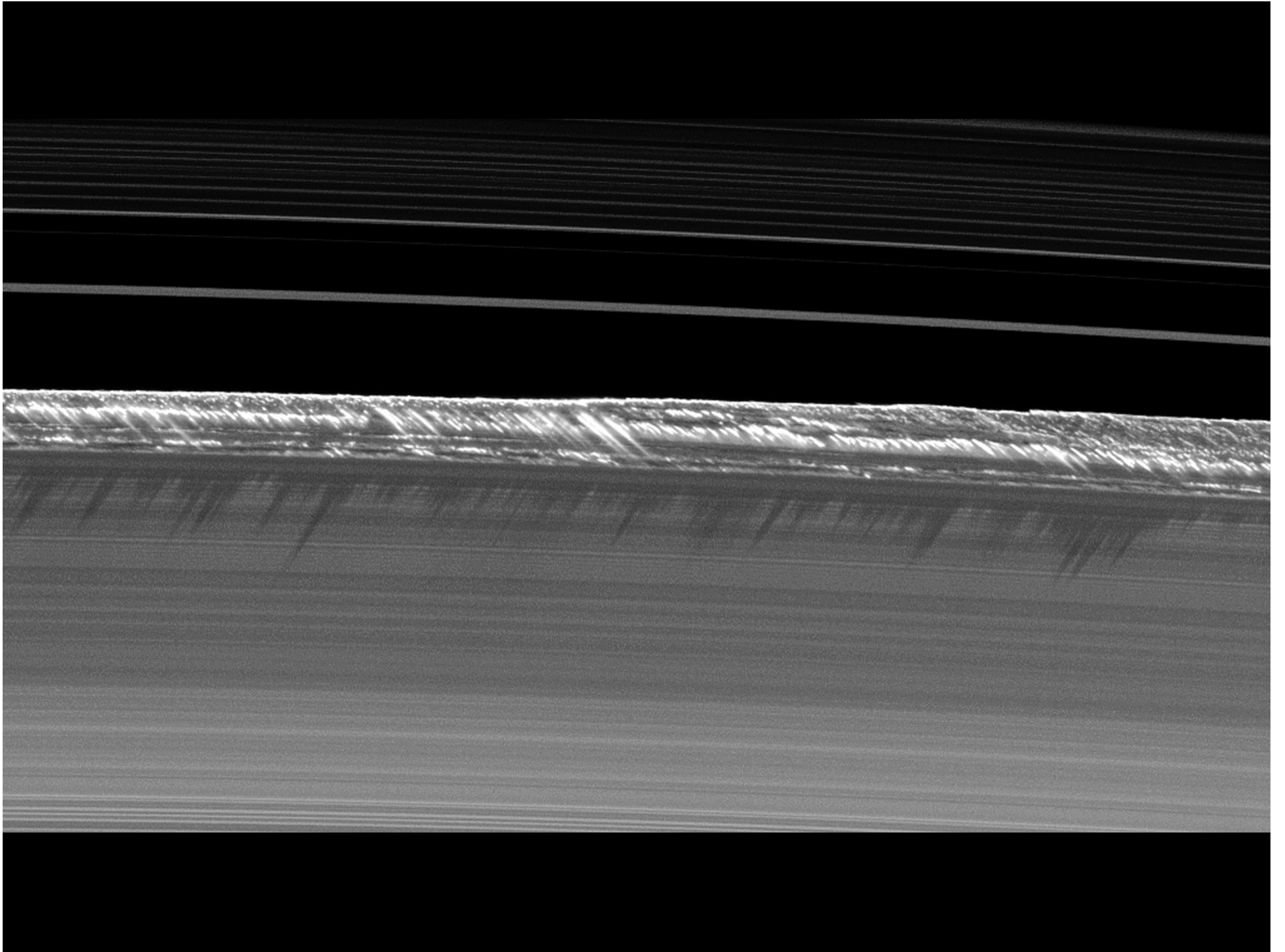
Cassini: 10h 45m 45±36s

# Saturn Kilometric Radiation Periods Converged after Storm



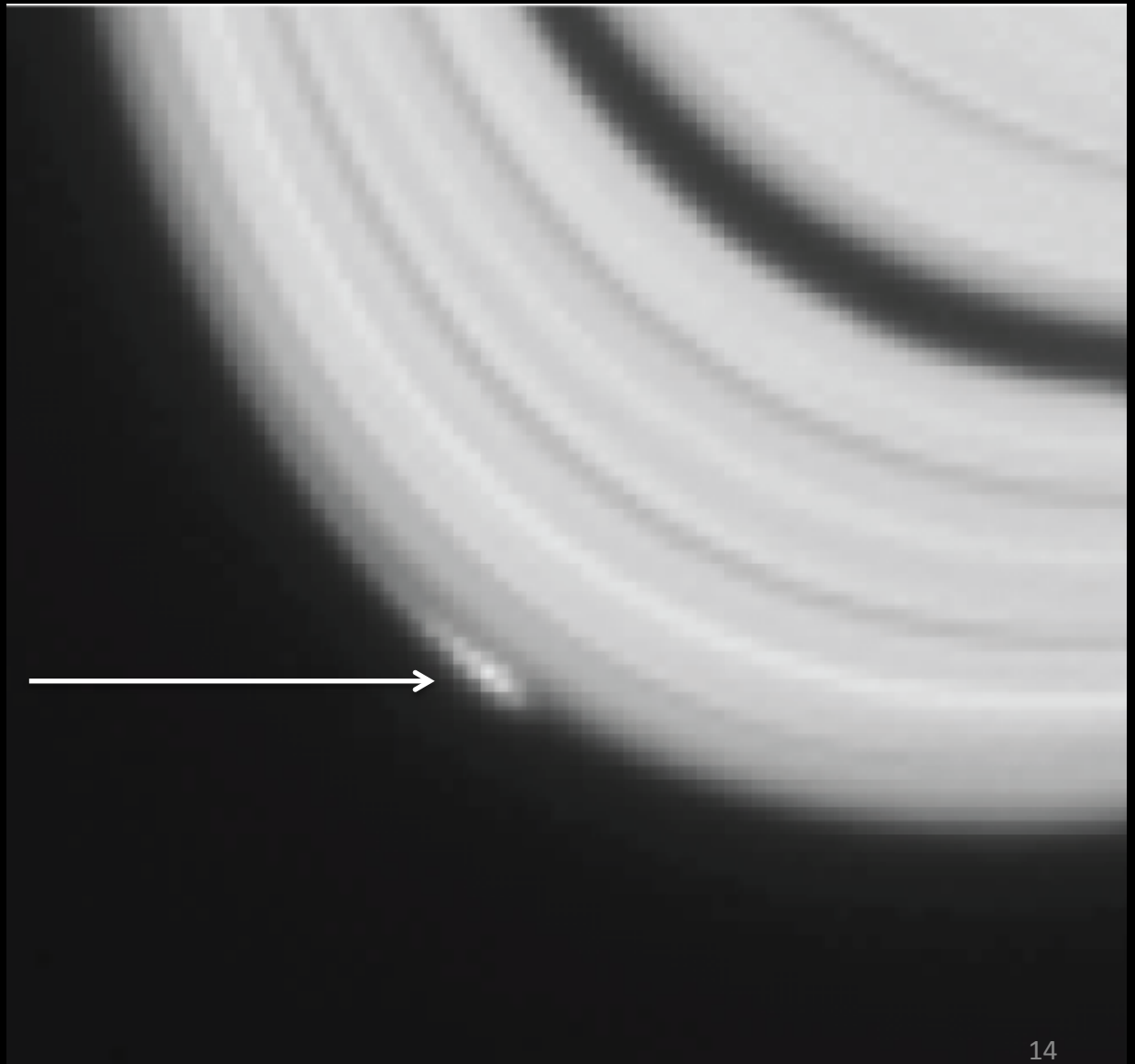
Saturn exhibited dual rotation periods for North and South, that have now merged.



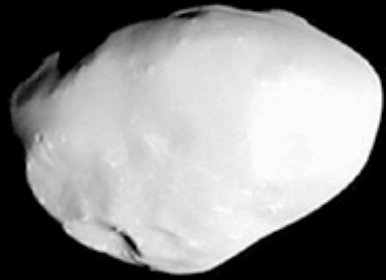


# *A New Moon is Born???*

Bright ring feature  
appears to be  
associated with the  
birth of a small, icy  
infant moon  
nicknamed Peggy



Helene



Telesto



Epimetheus

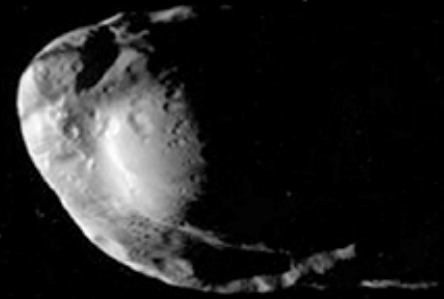
Calypso



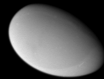
Epimetheus



Janus

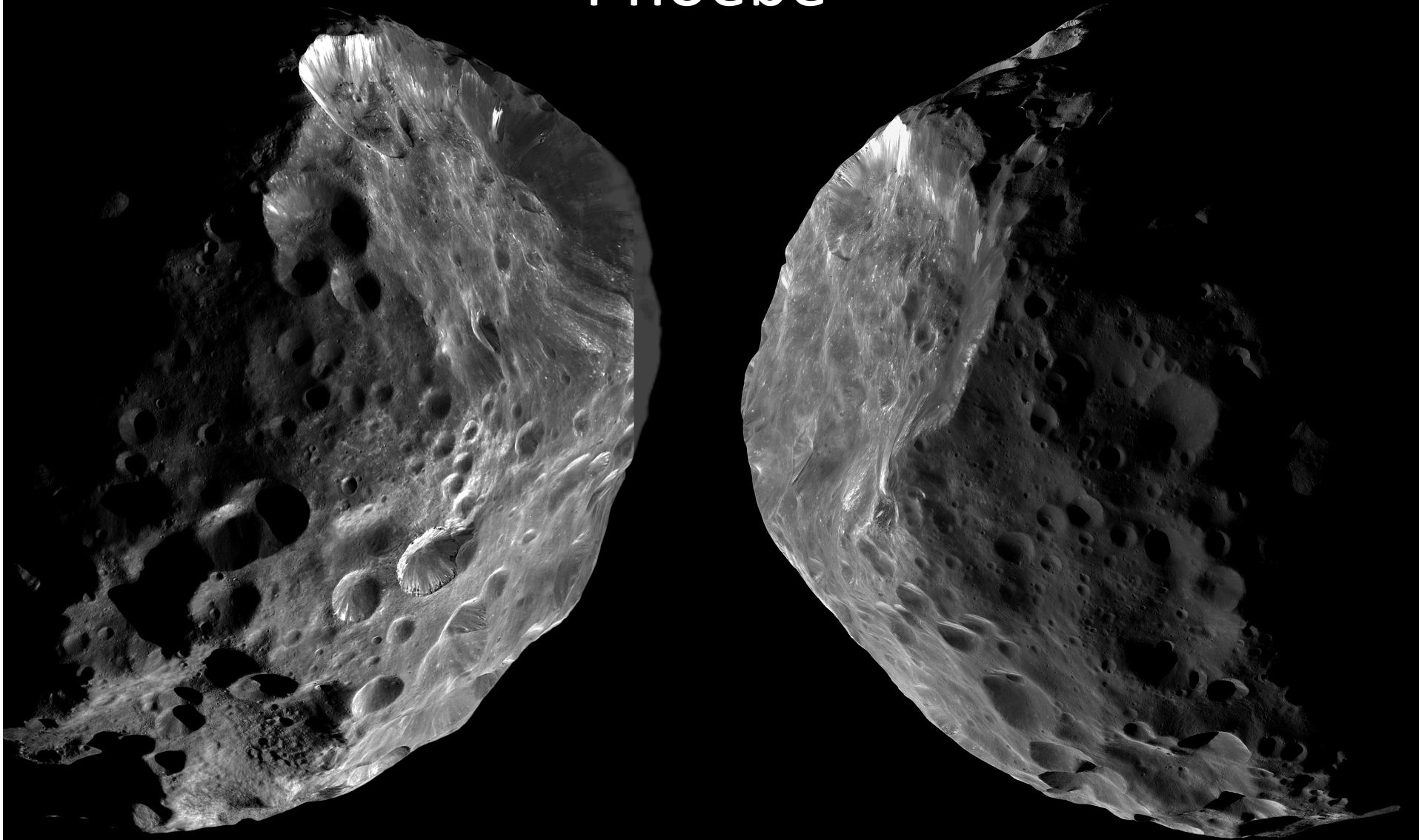


Prometheus



Methone

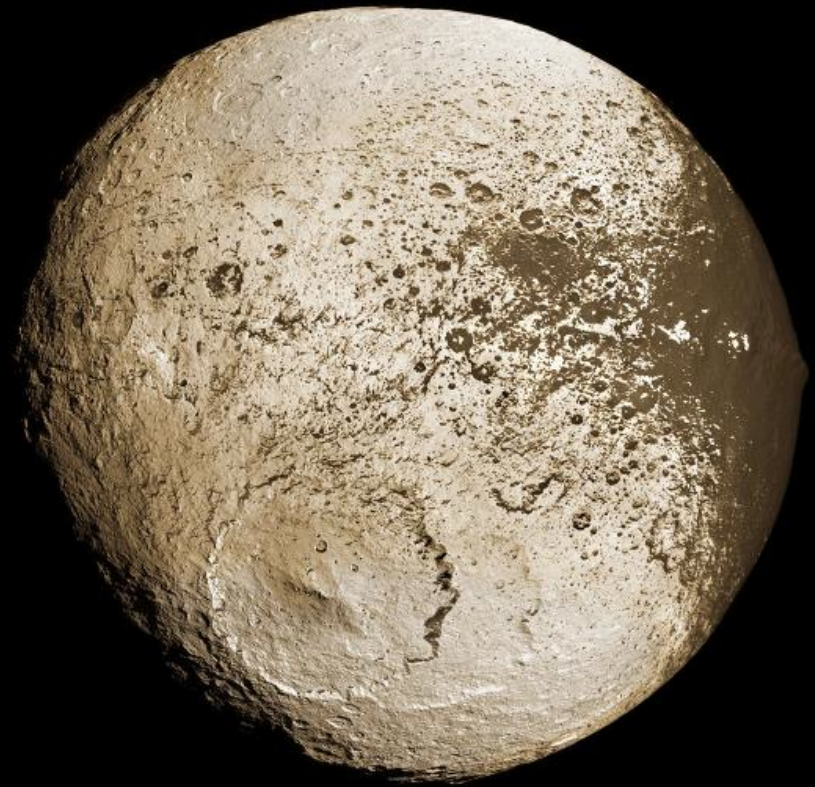
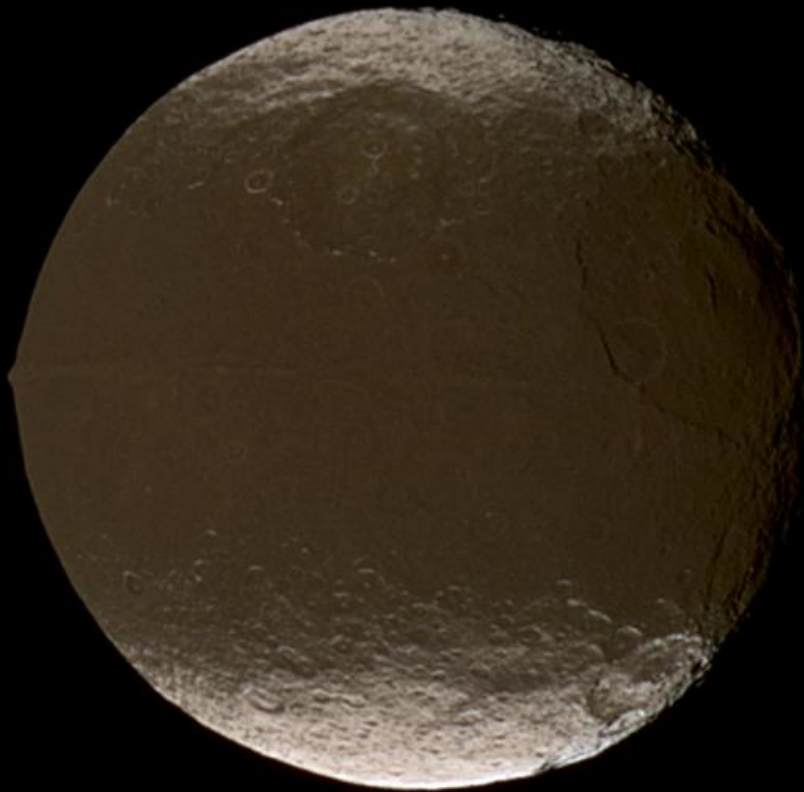
# Phoebe

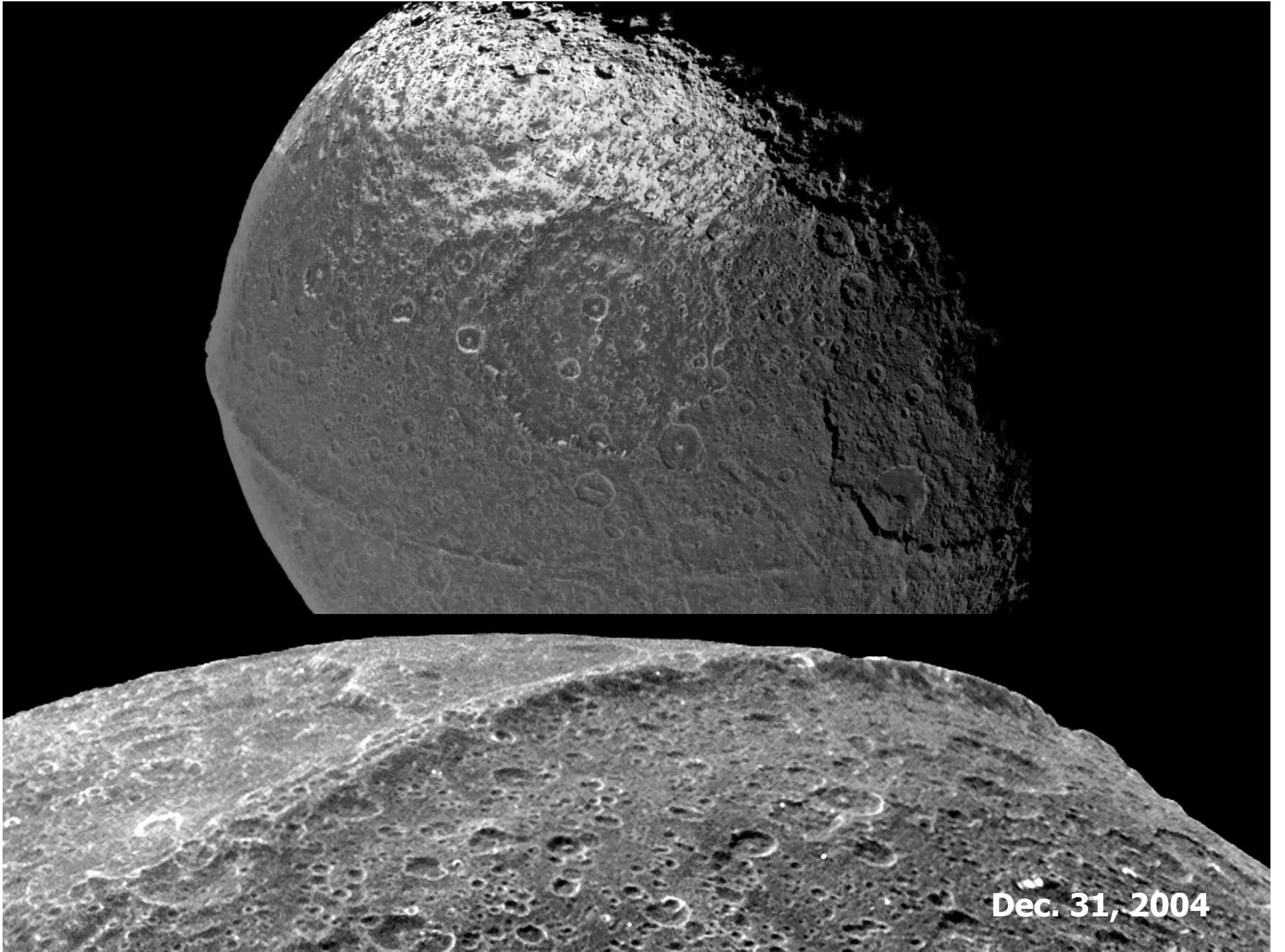


June 11, 2004



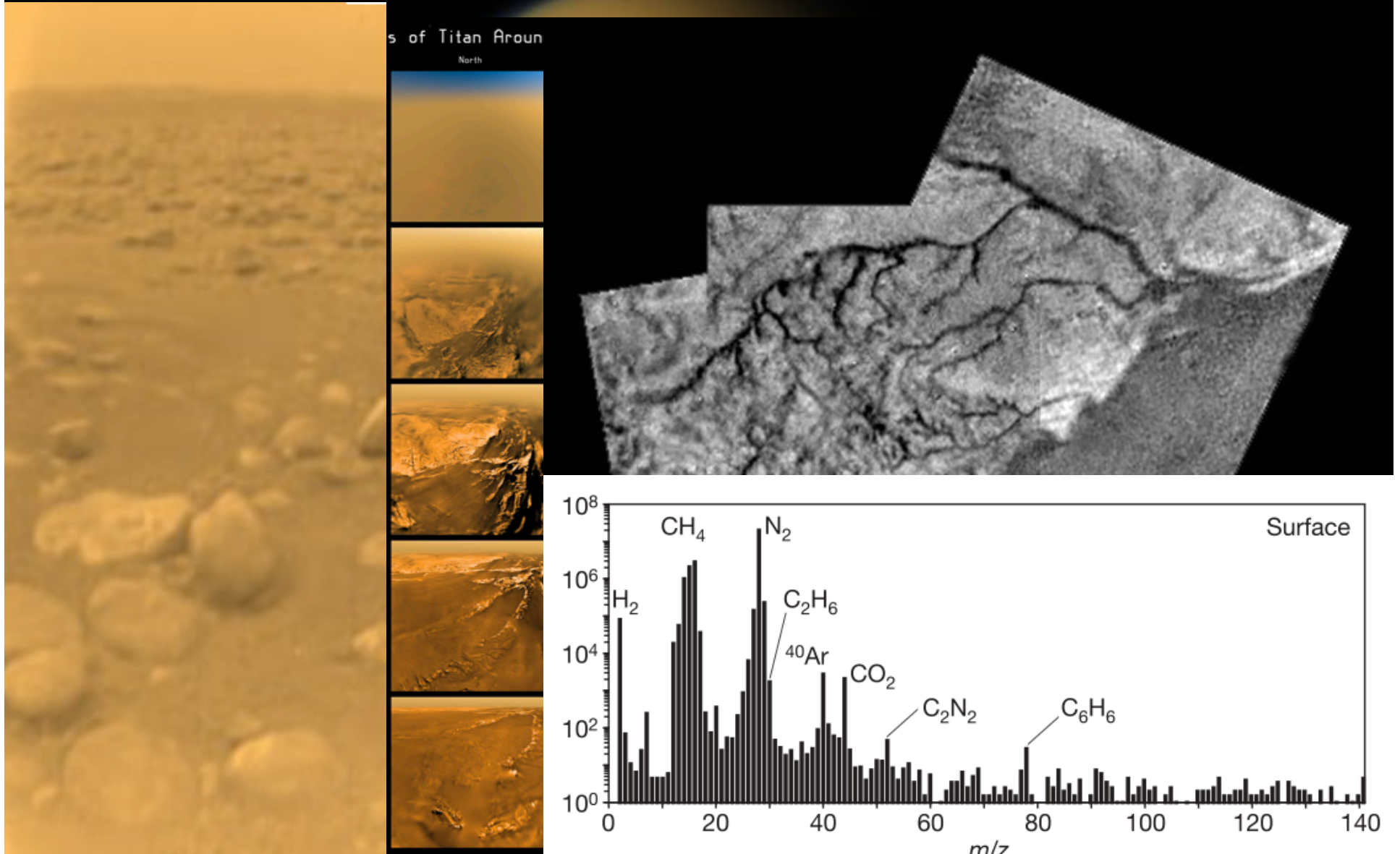
Iapetus: Coated with Phoebe dust!

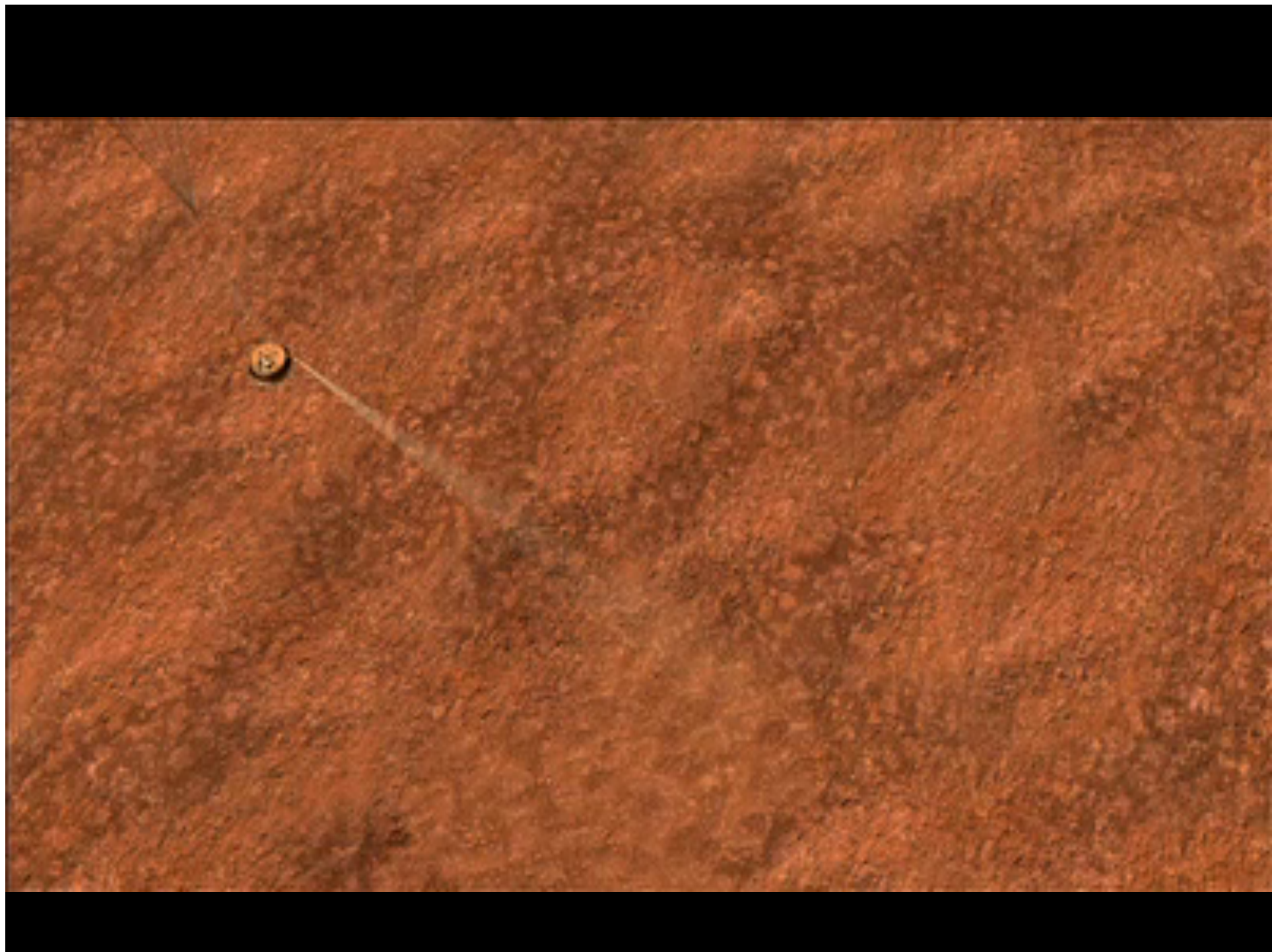


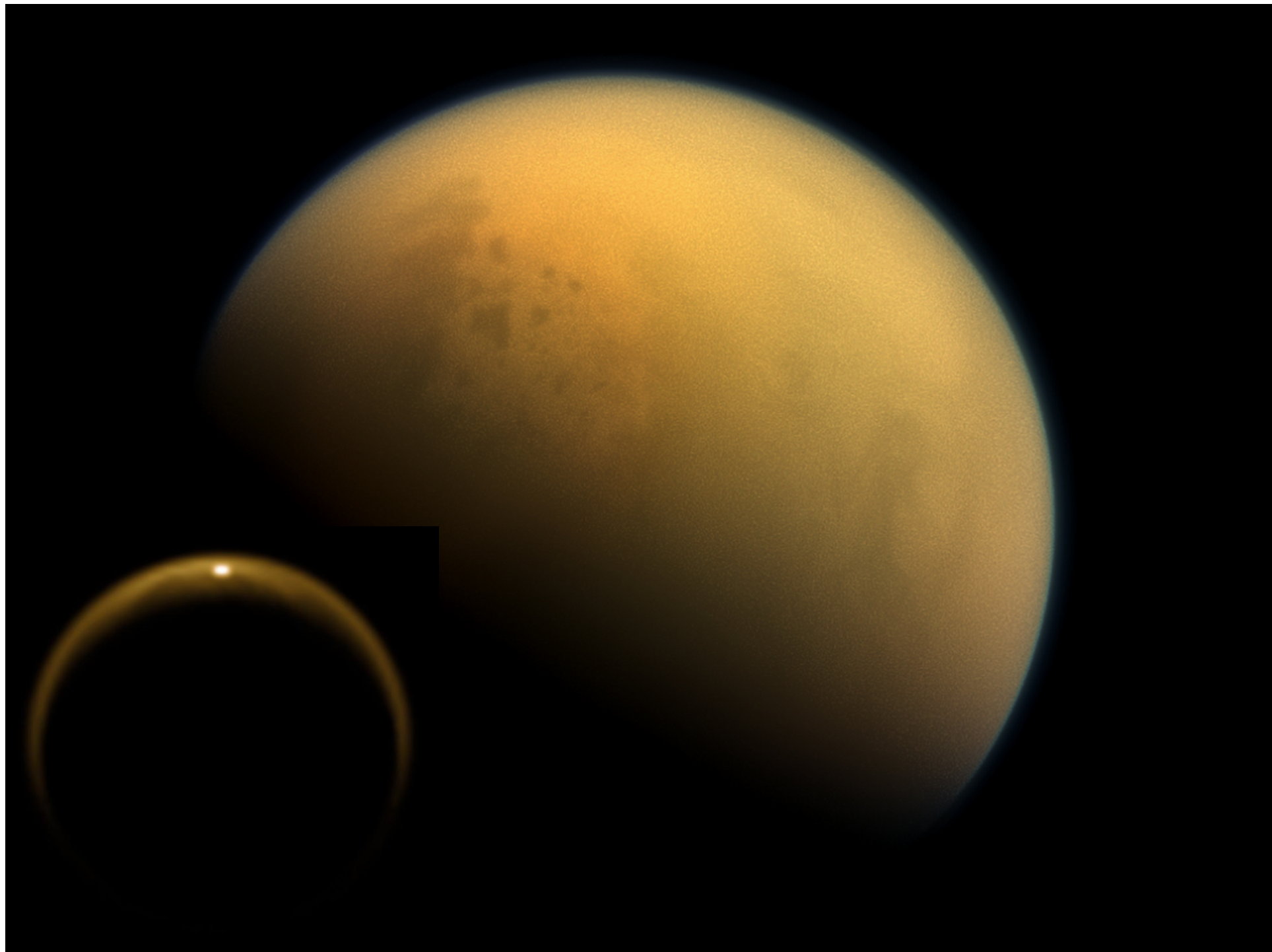


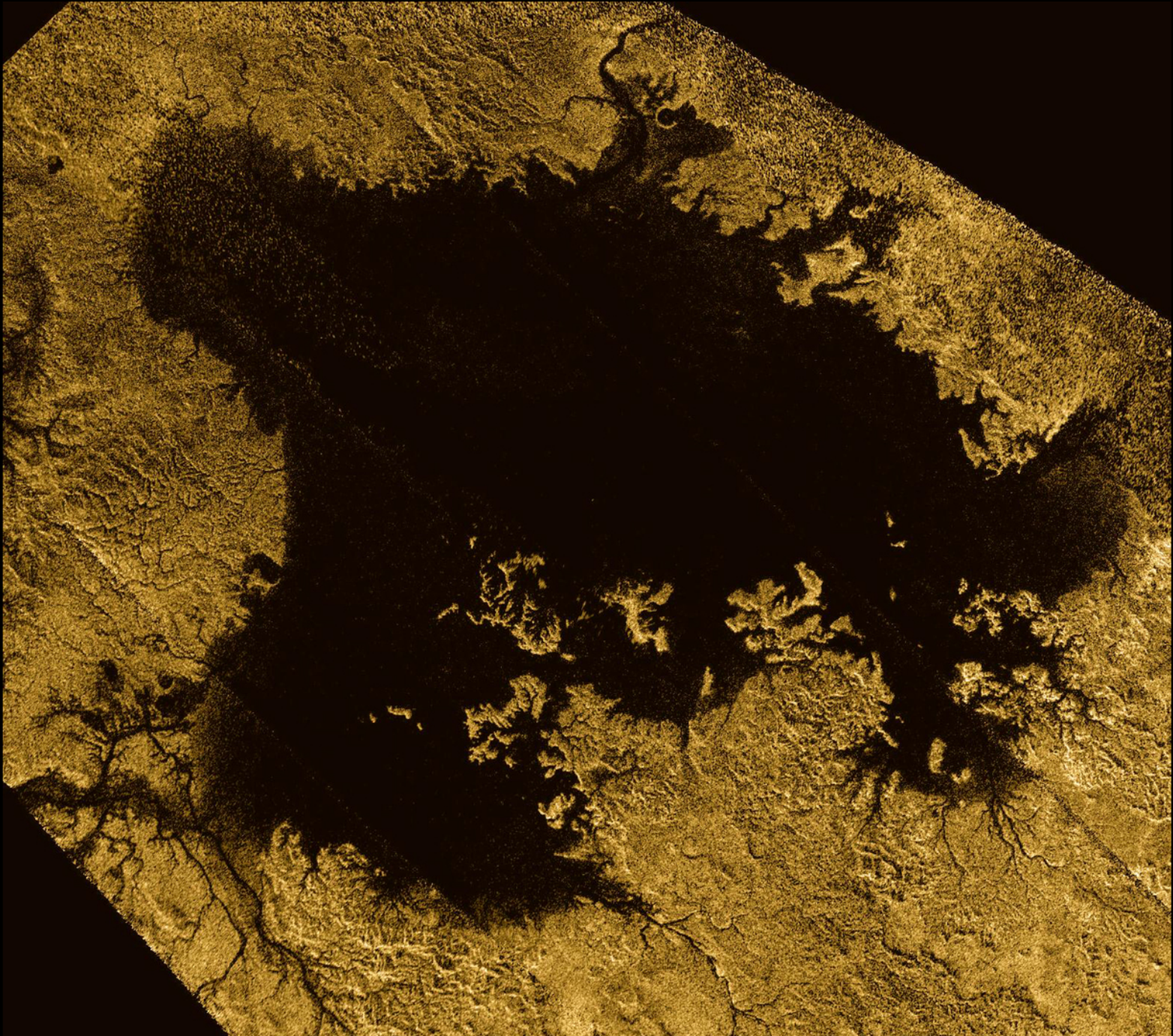
Dec. 31, 2004

# Huygens Landing: lifting Titan's veil

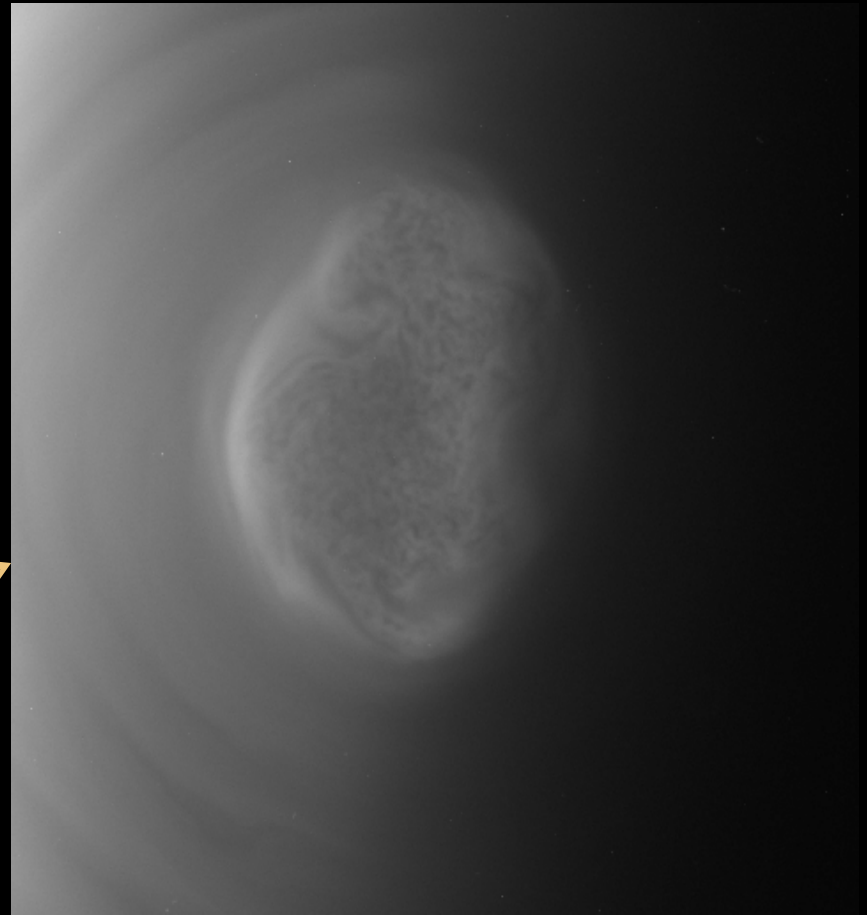
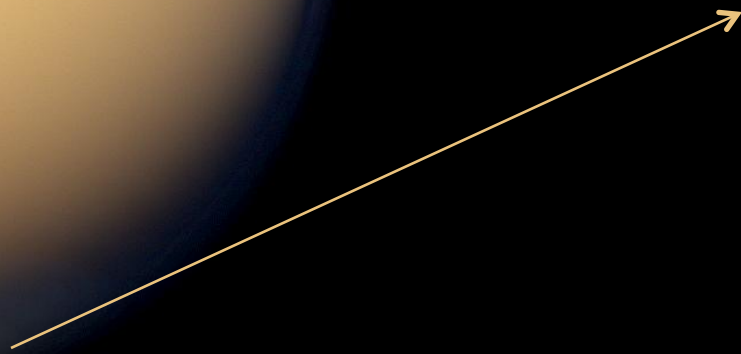


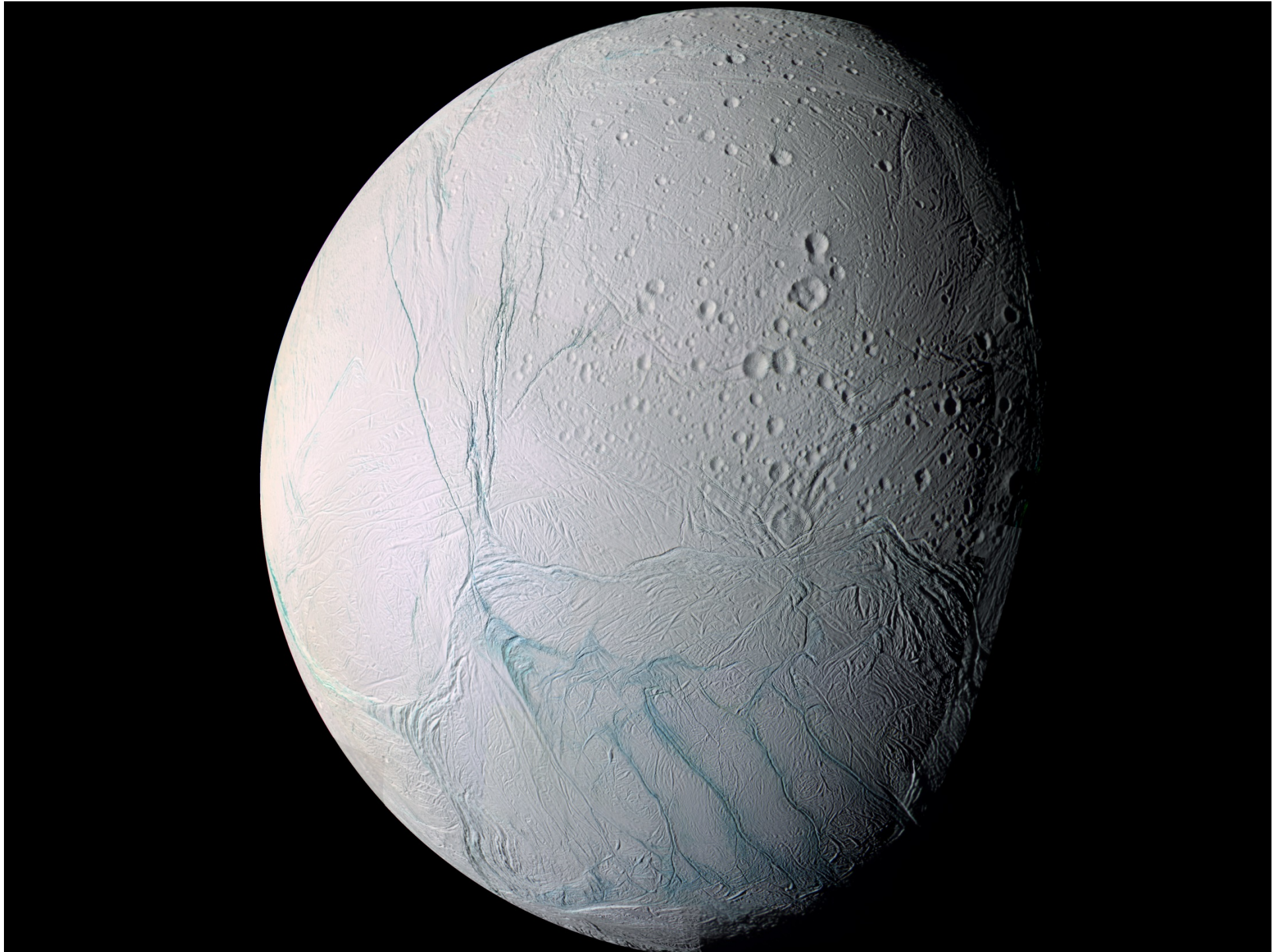




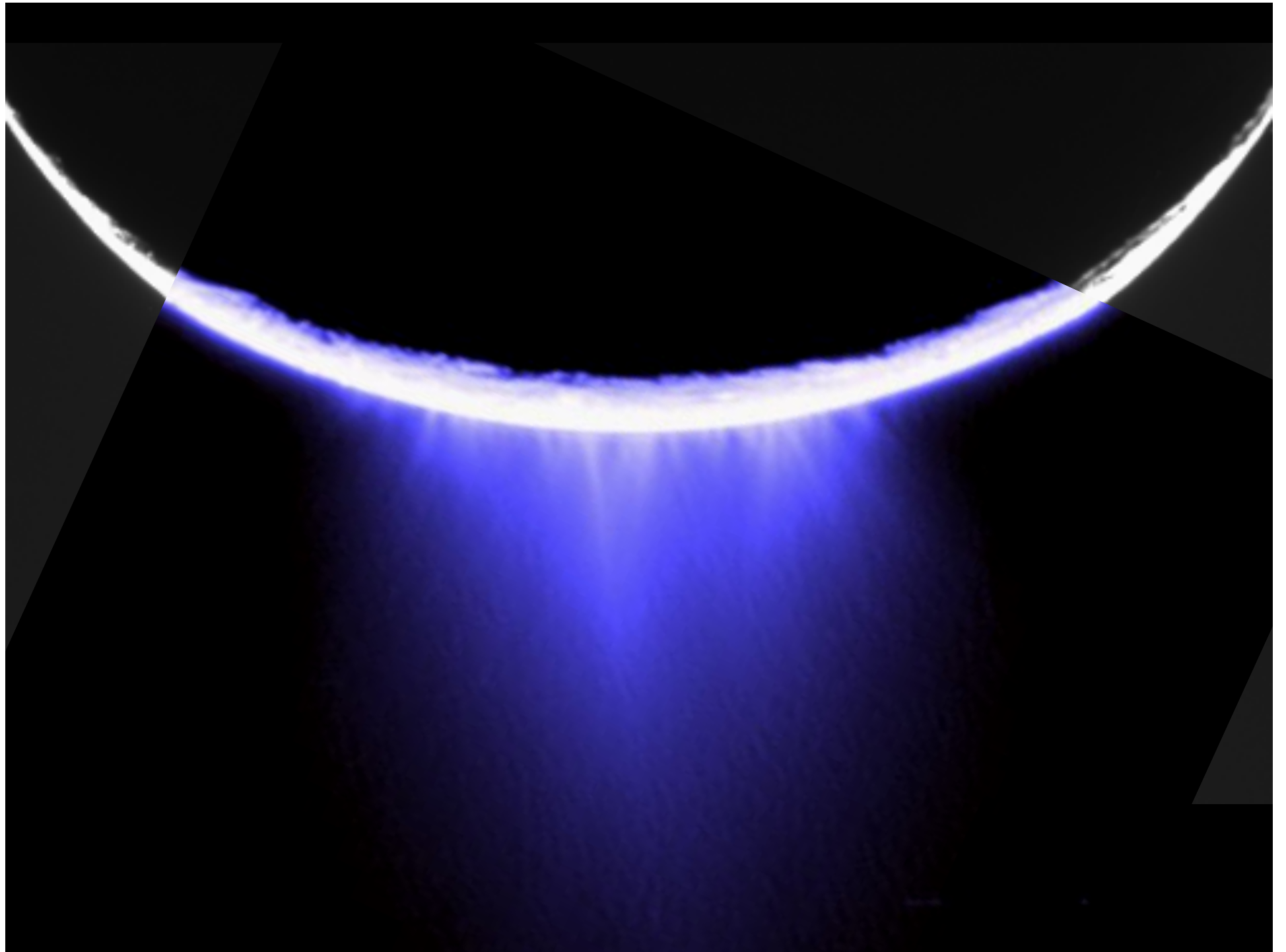


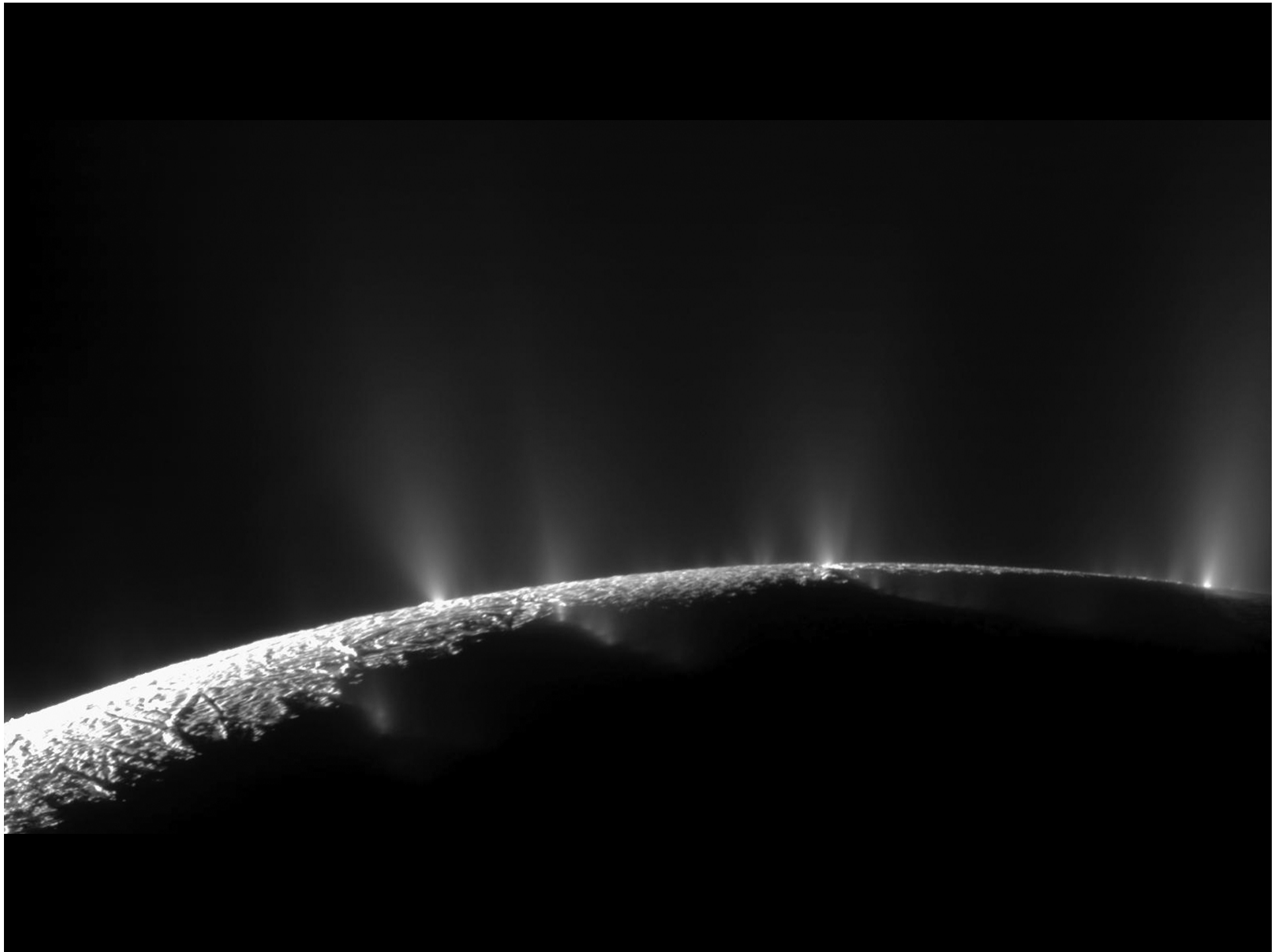
# Seasonal Change

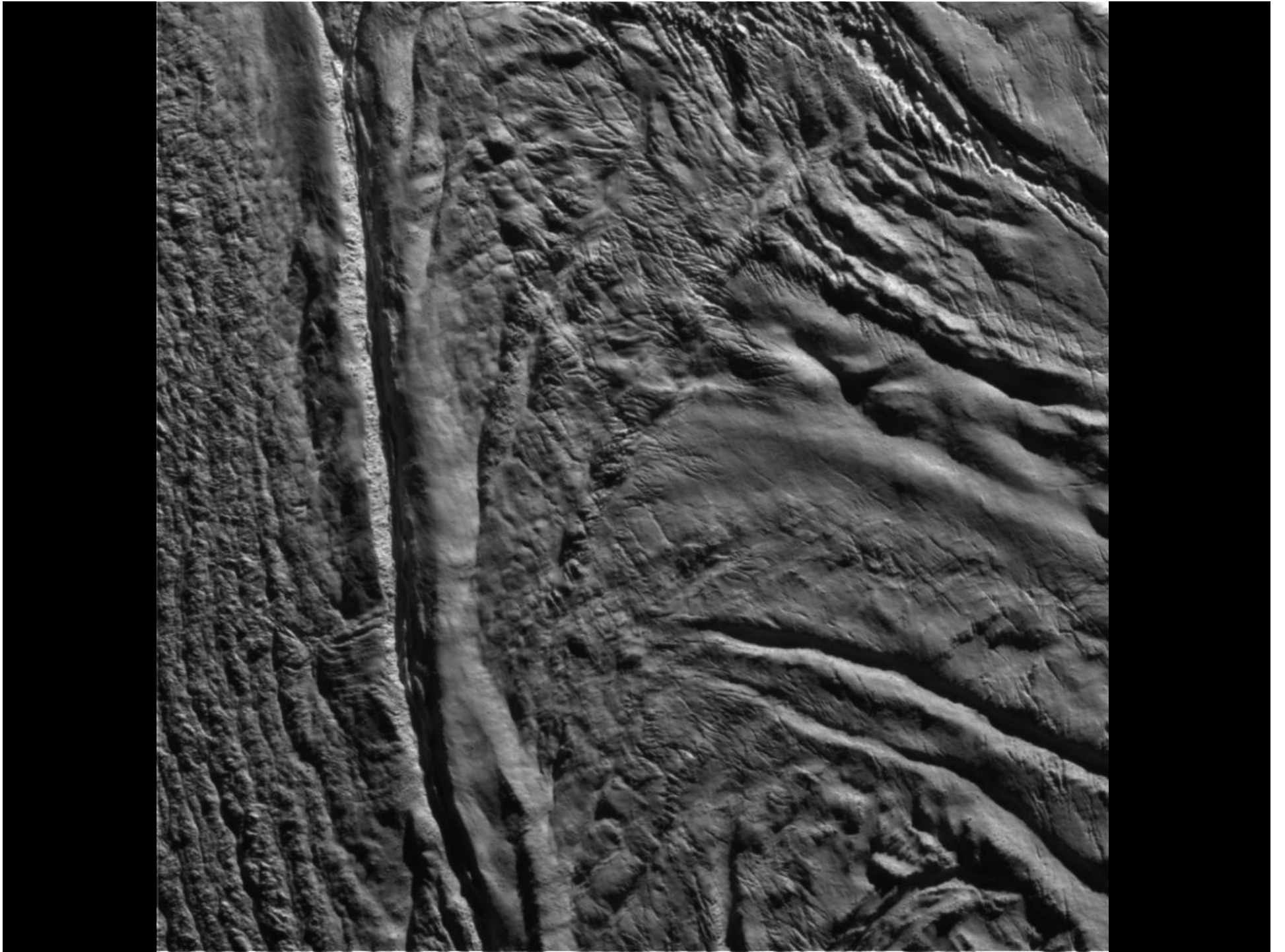


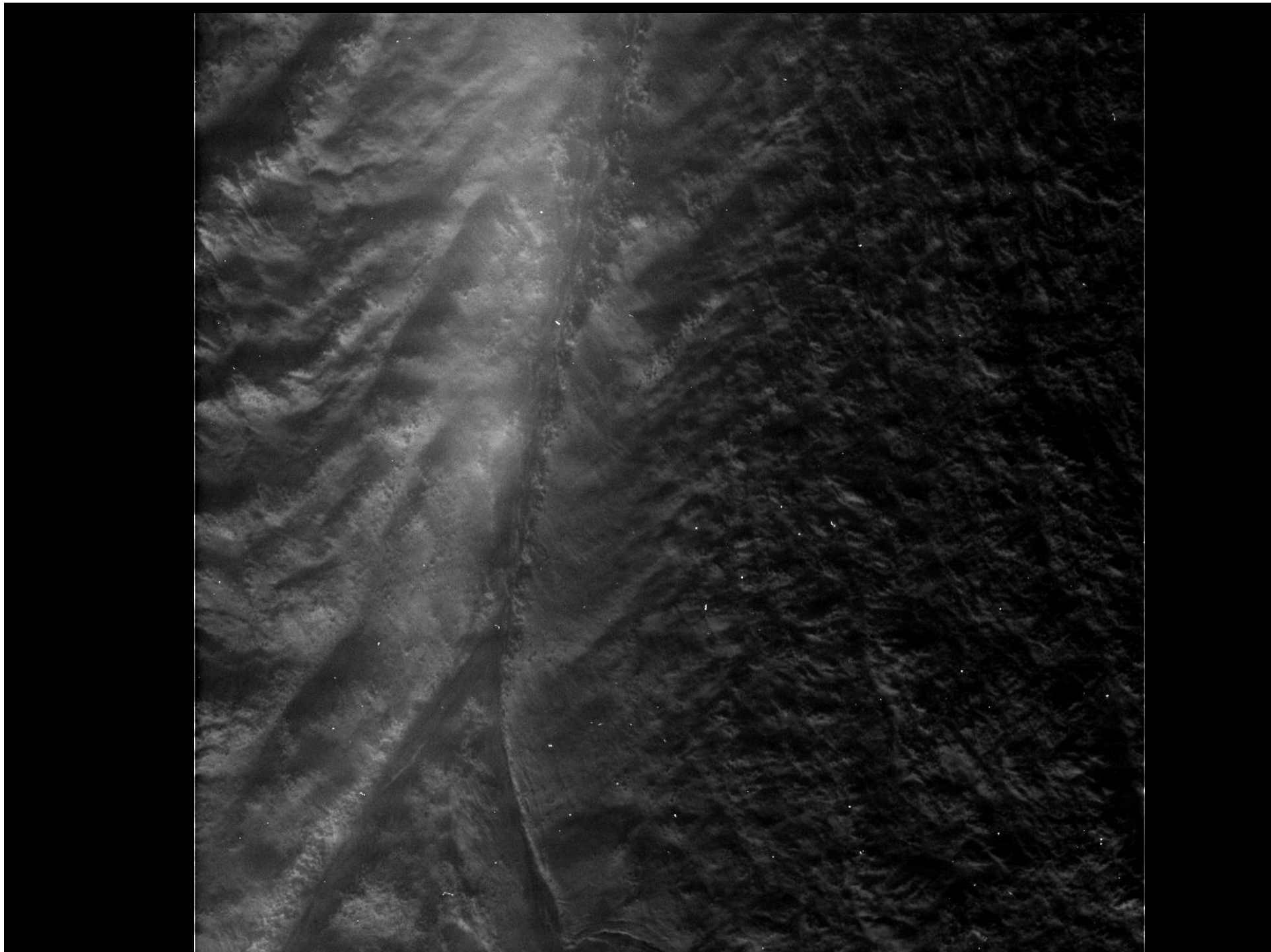




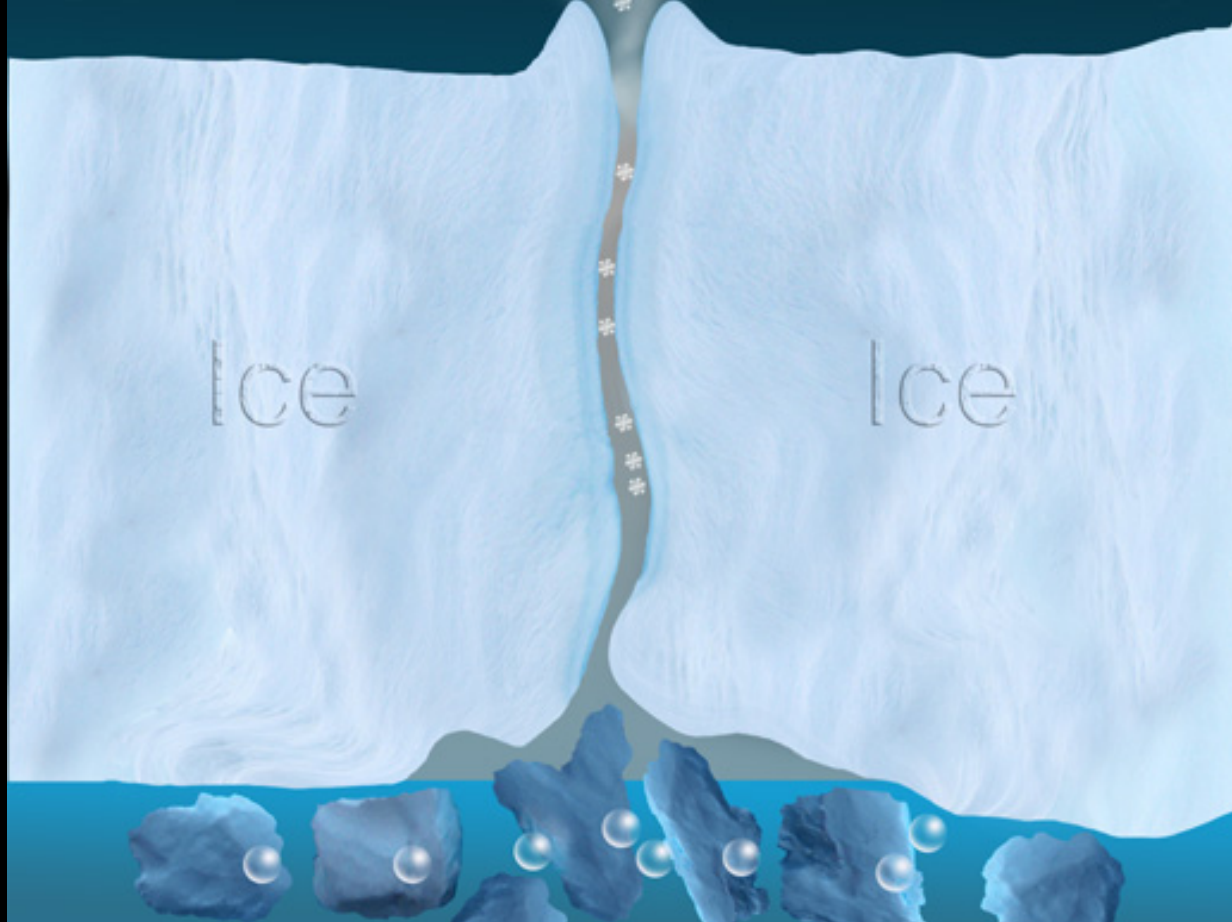








Gas  
and  
Icy Grains

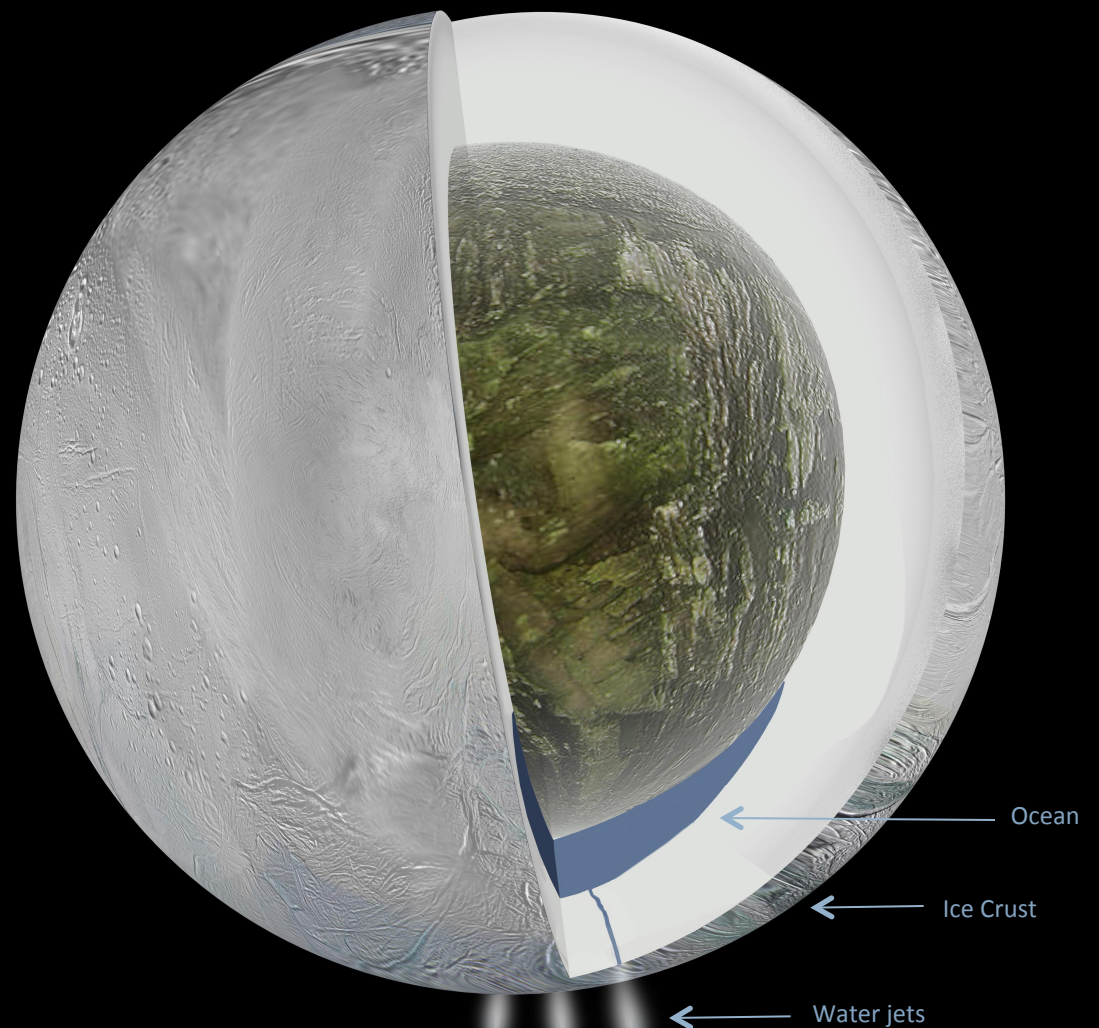


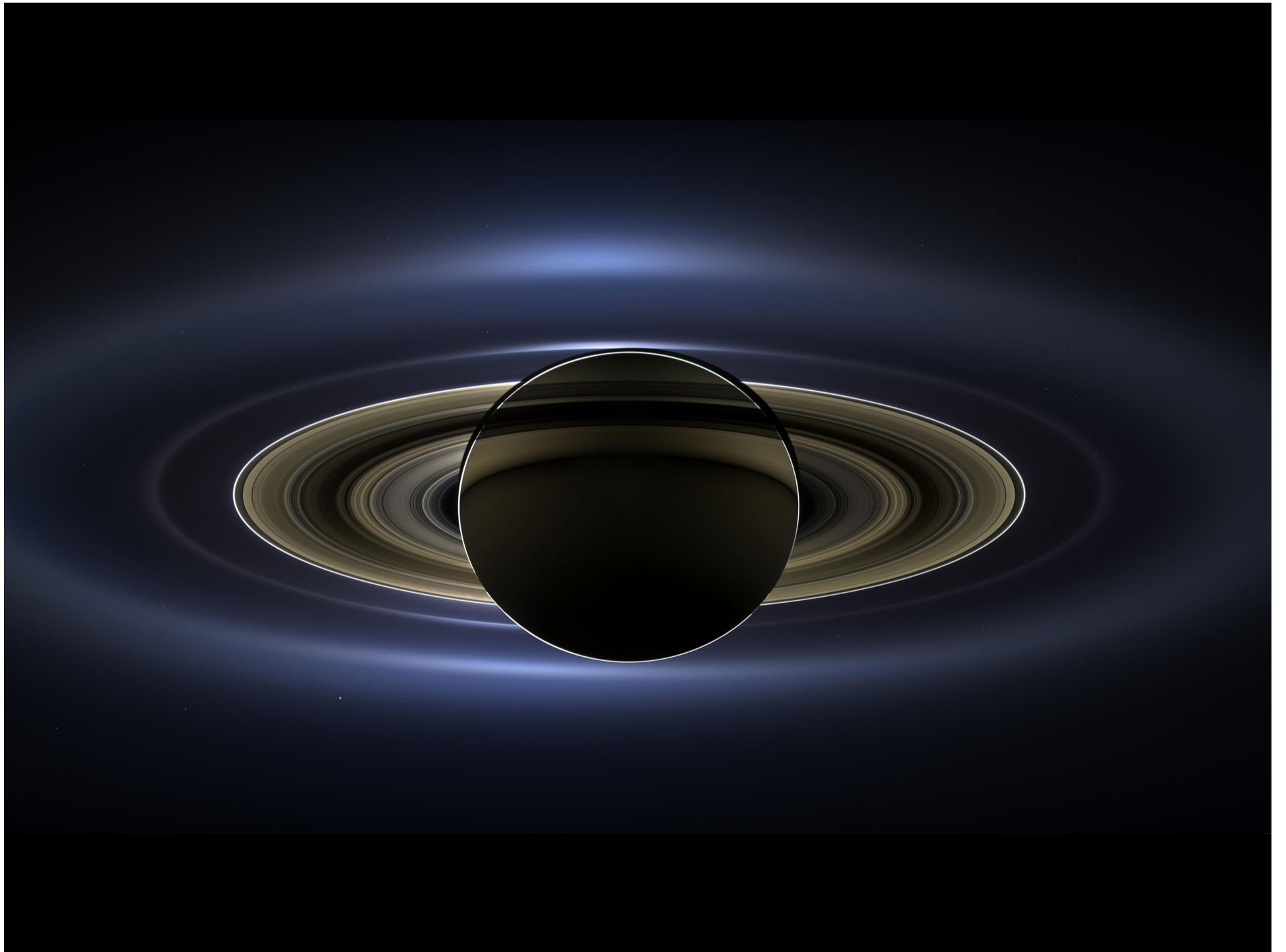
Ice

Ice

# Cassini Detects Enceladus Ocean: A Habitable World?

Saturn's moon Enceladus harbors a large, 6-mile deep underground ocean of liquid water!





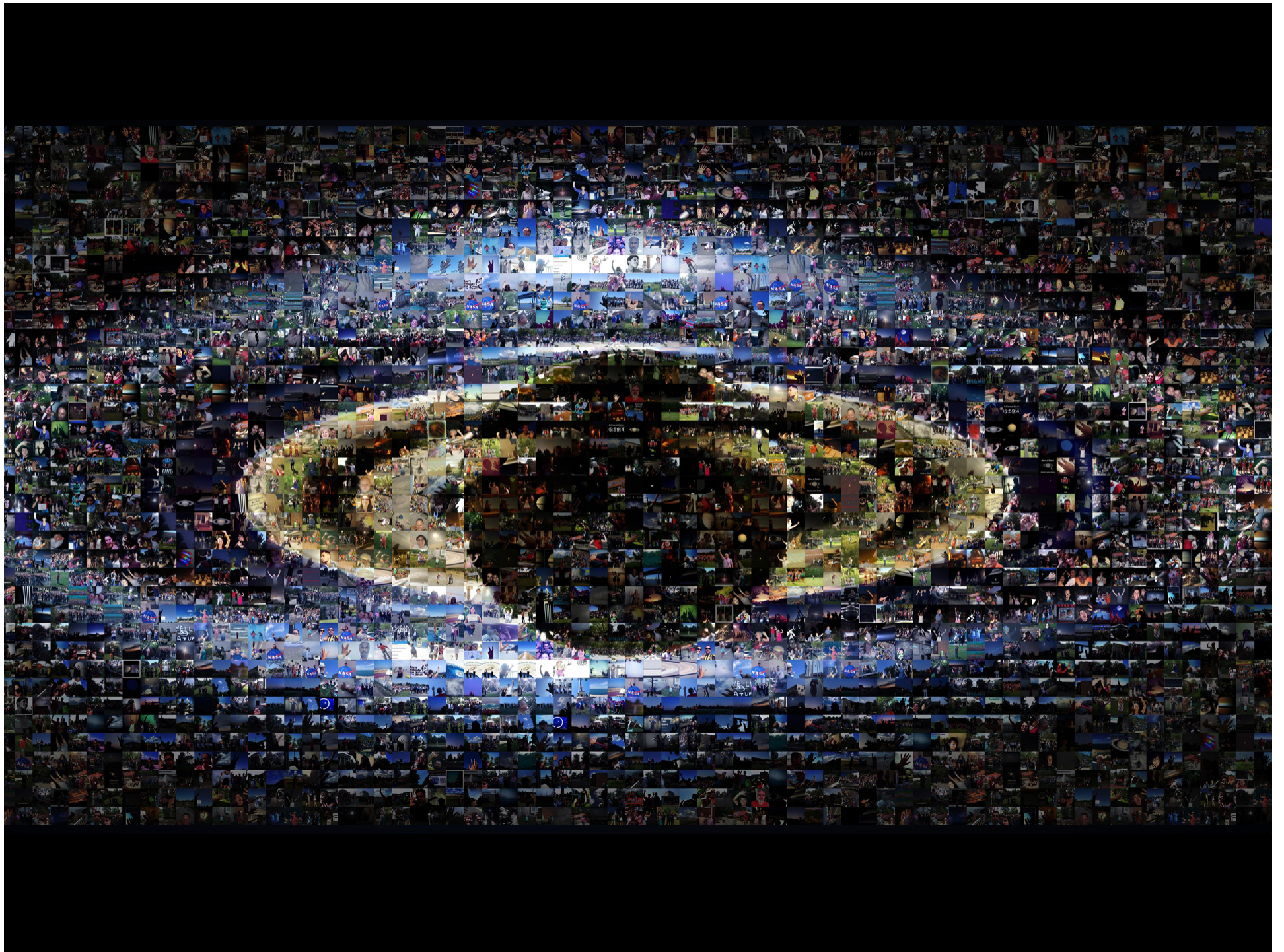
Mars

Venus

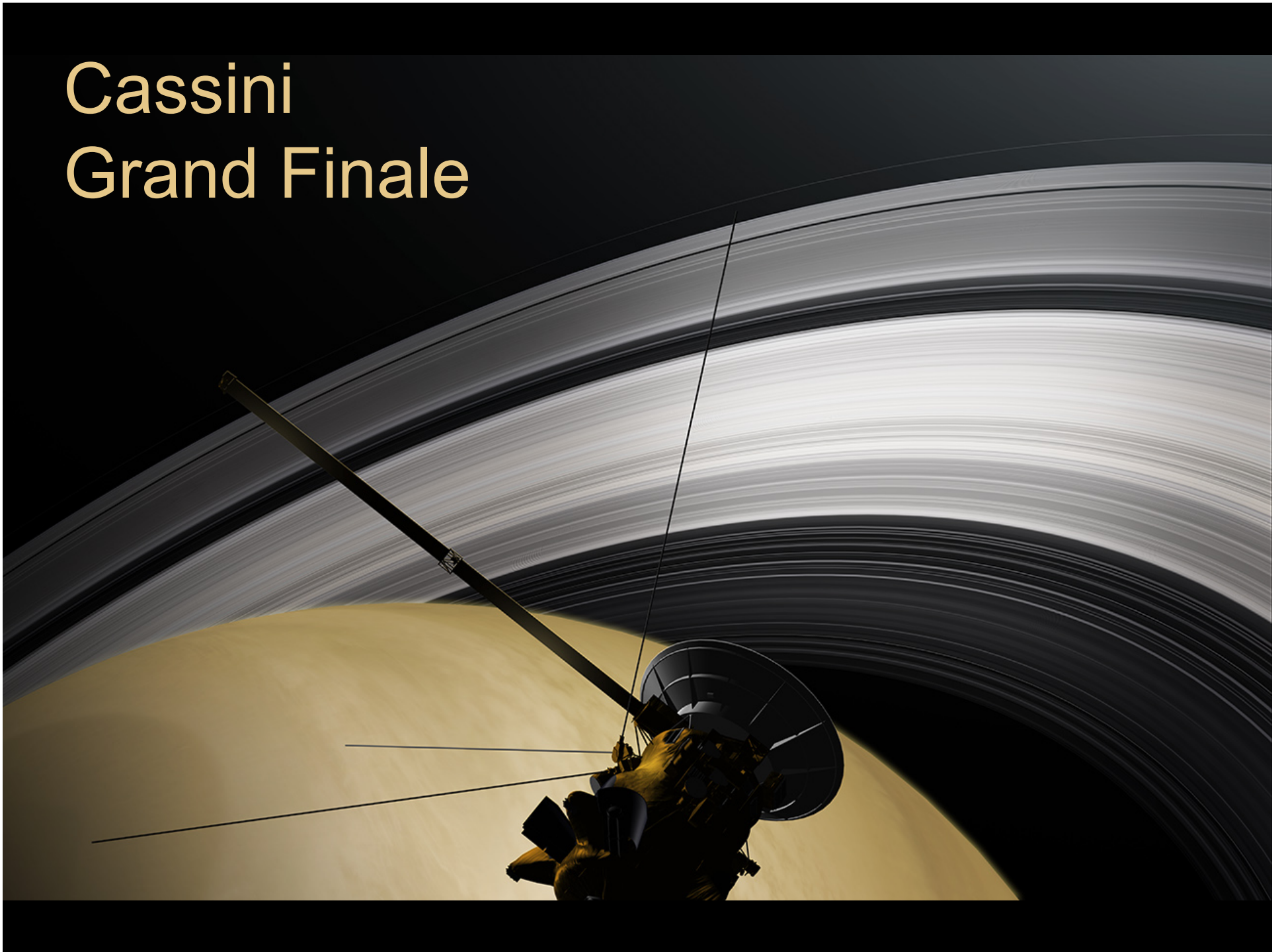
Earth and moon



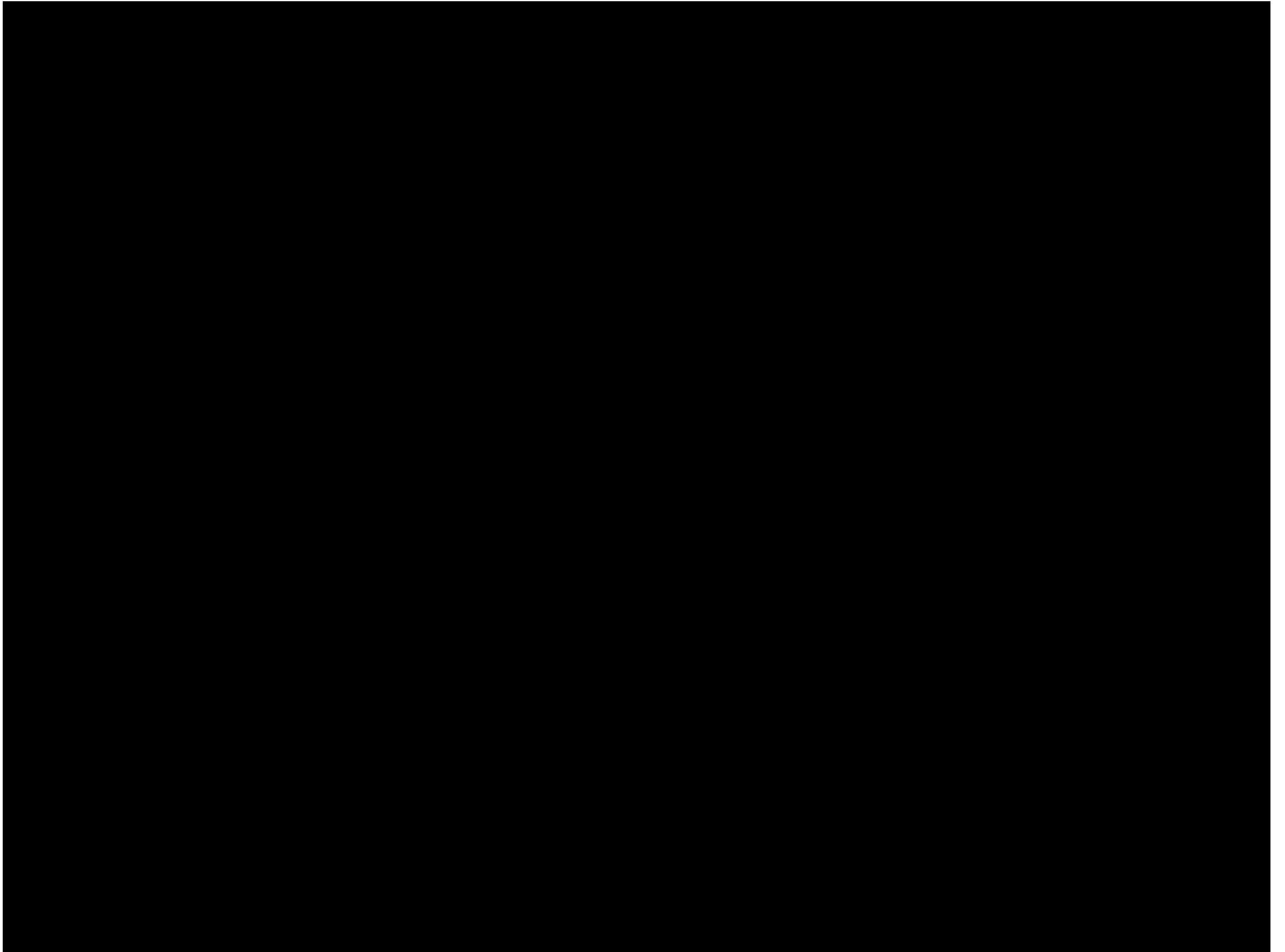




# Cassini Grand Finale



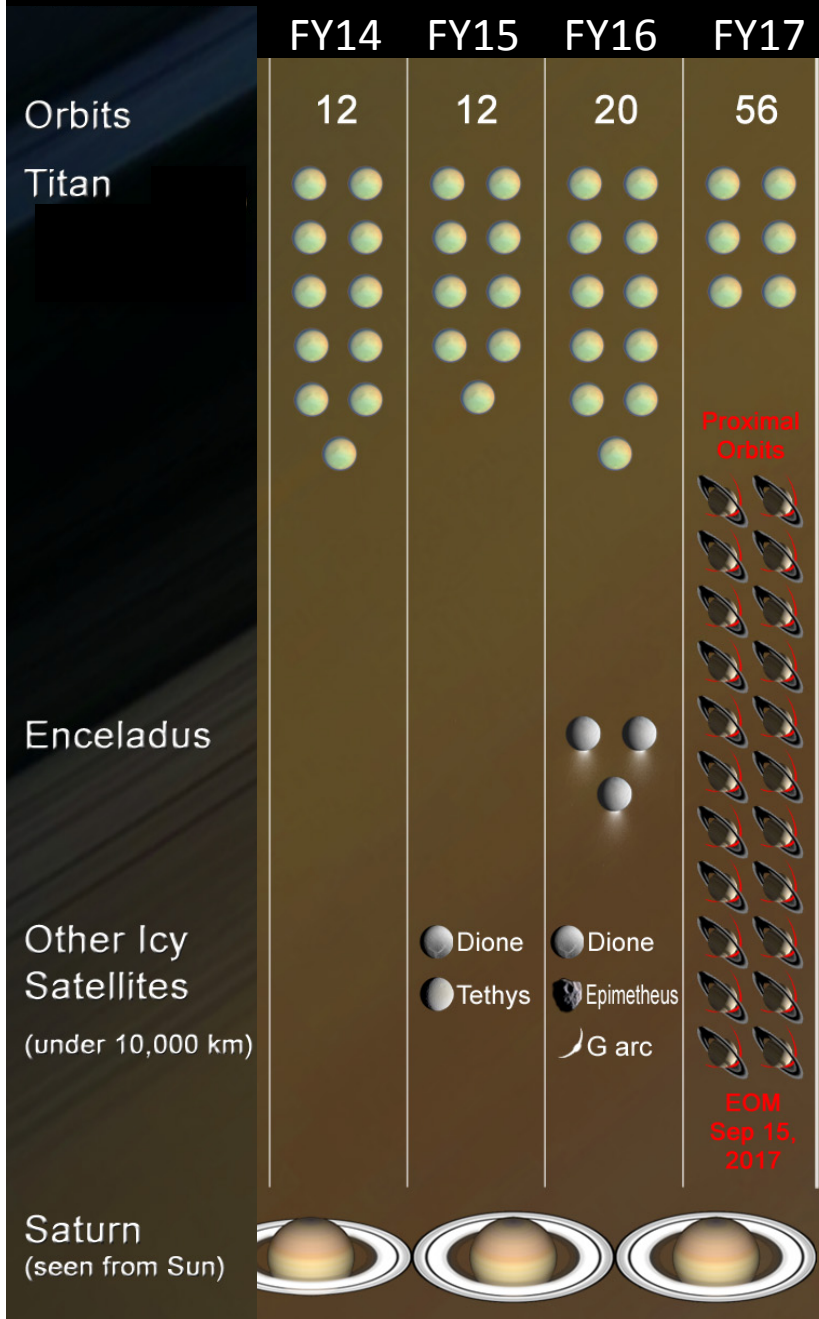




END

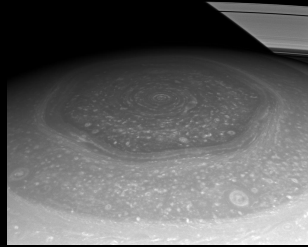
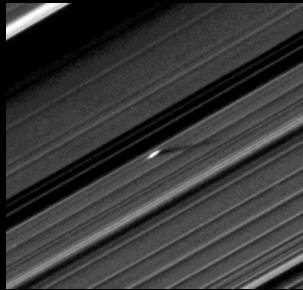
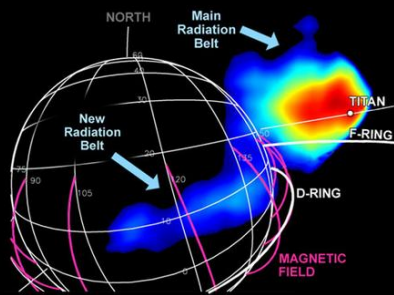


# Cassini's Final Four Years: Unique Science

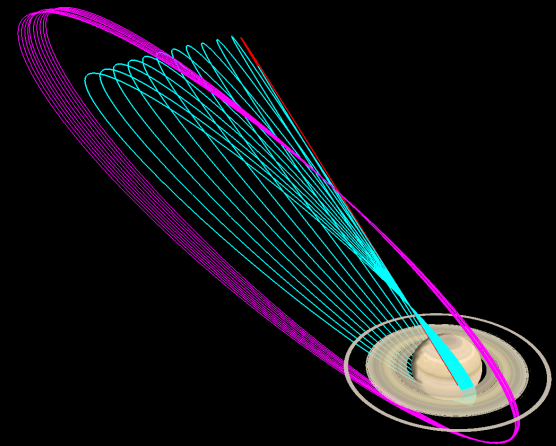
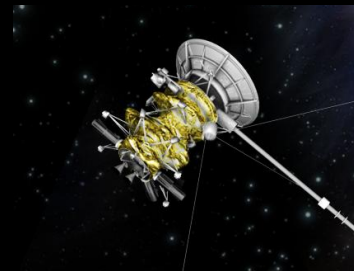


- Explore new seasons at Saturn and Titan until northern summer solstice
- Titan: Look for waves on lakes and seas; measure depth of largest lake
- Enceladus: Sample plume at maximum emission for first time; best high resolution view of north pole
- Rings: Best lighting angle on lit rings (spring 2015 onward)
- Late, close orbits provide *completely new, in-situ* measurements
- 2014-2016 accomplishes great science while setting up proper orientation of final orbits
- Without Cassini, these types of observations could not be fulfilled for decades to come

# Unique Cassini End-of-Mission Science



- Saturn internal structure
  - Gravitational & Magnetic Fields
  - Rotation rate of Saturn's interior
- Ring mass
  - Address age of main rings
- Saturn's ionosphere, innermost radiation belts, & inner D ring particles
- Highest resolution main ring observations
- Highest resolution Saturn polar observations and aurora



*Cassini Saturn science complements that from Juno mission to Jupiter*



# Cassini 7-year Solstice Tour

