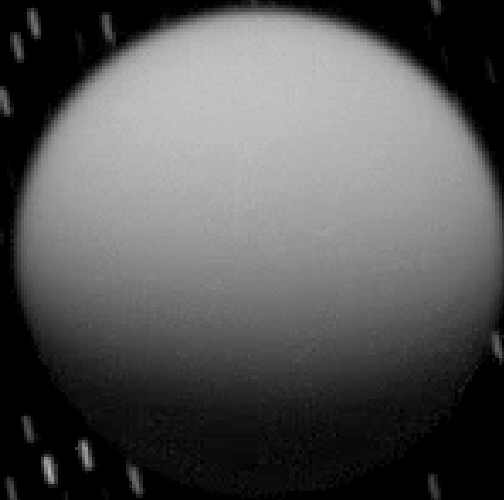


# Cassini's Fifth Year at Saturn: Titan and Icy Satellite Highlights

Zibi Turtle

Johns Hopkins Univ. Applied Physics Lab.

# Titan Highlights

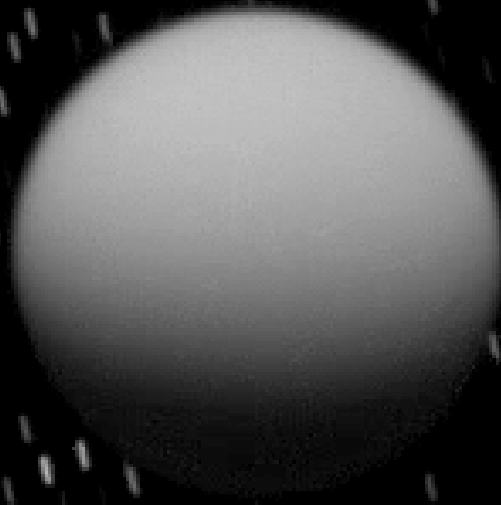


# Cassini Mission Overview

Four-Year Prime Tour + Two-Year Extended Mission (Proposed), July 2004 - July 2010



# Titan Encounters



T45, 31 July 2008

T46, 3 Nov 2008

T47, 19 Nov 2008

T48, 5 Dec 2008

T49, 21 Dec 2008

T50, 7 Feb 2009

T51, 27 March 2009

T52, 4 April 2009

T53, 20 April 2009

T54, 5 May 2009

T55, 21 May 2009

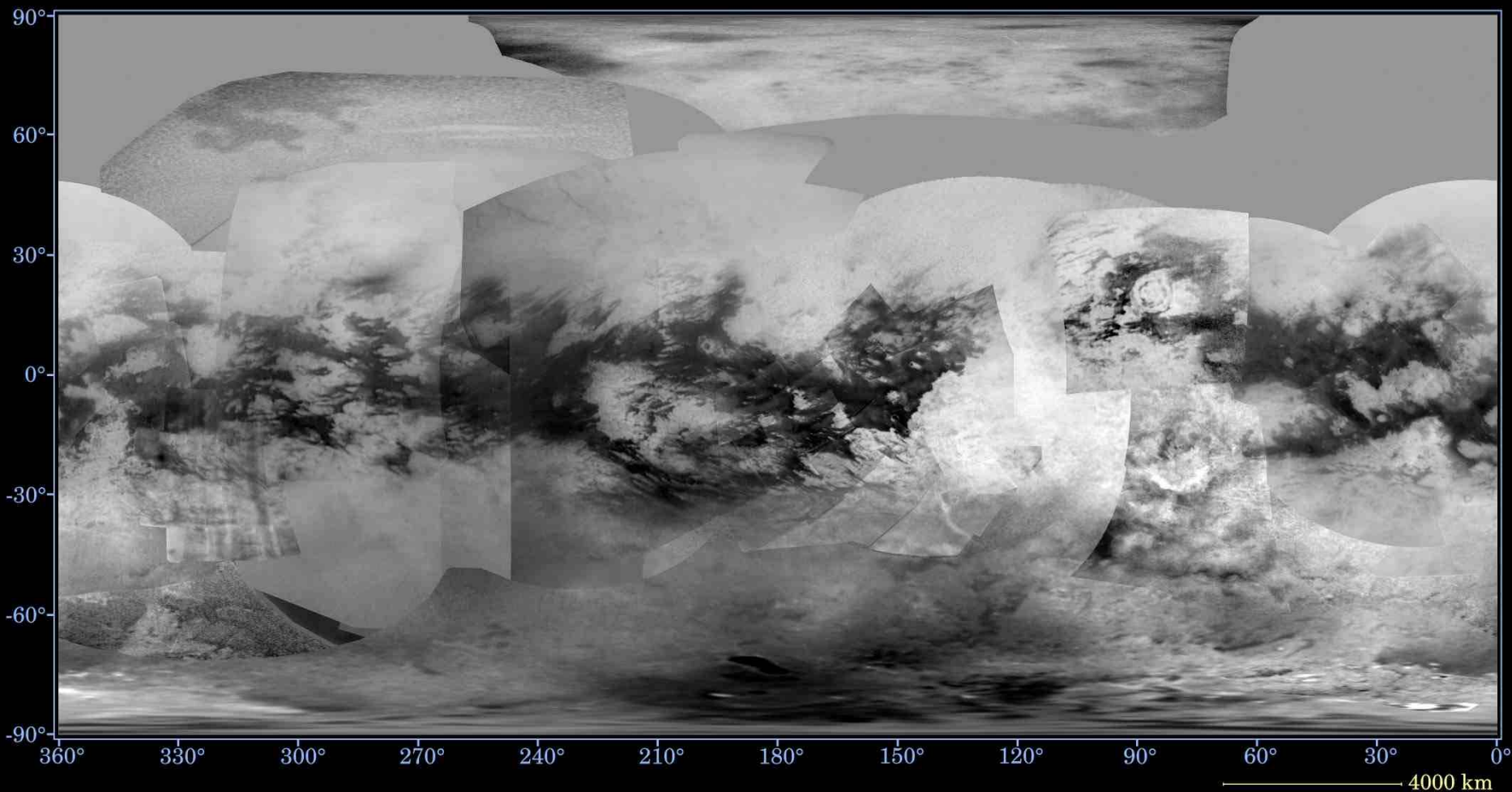
T56, 6 June 2009

T57, 22 June 2009

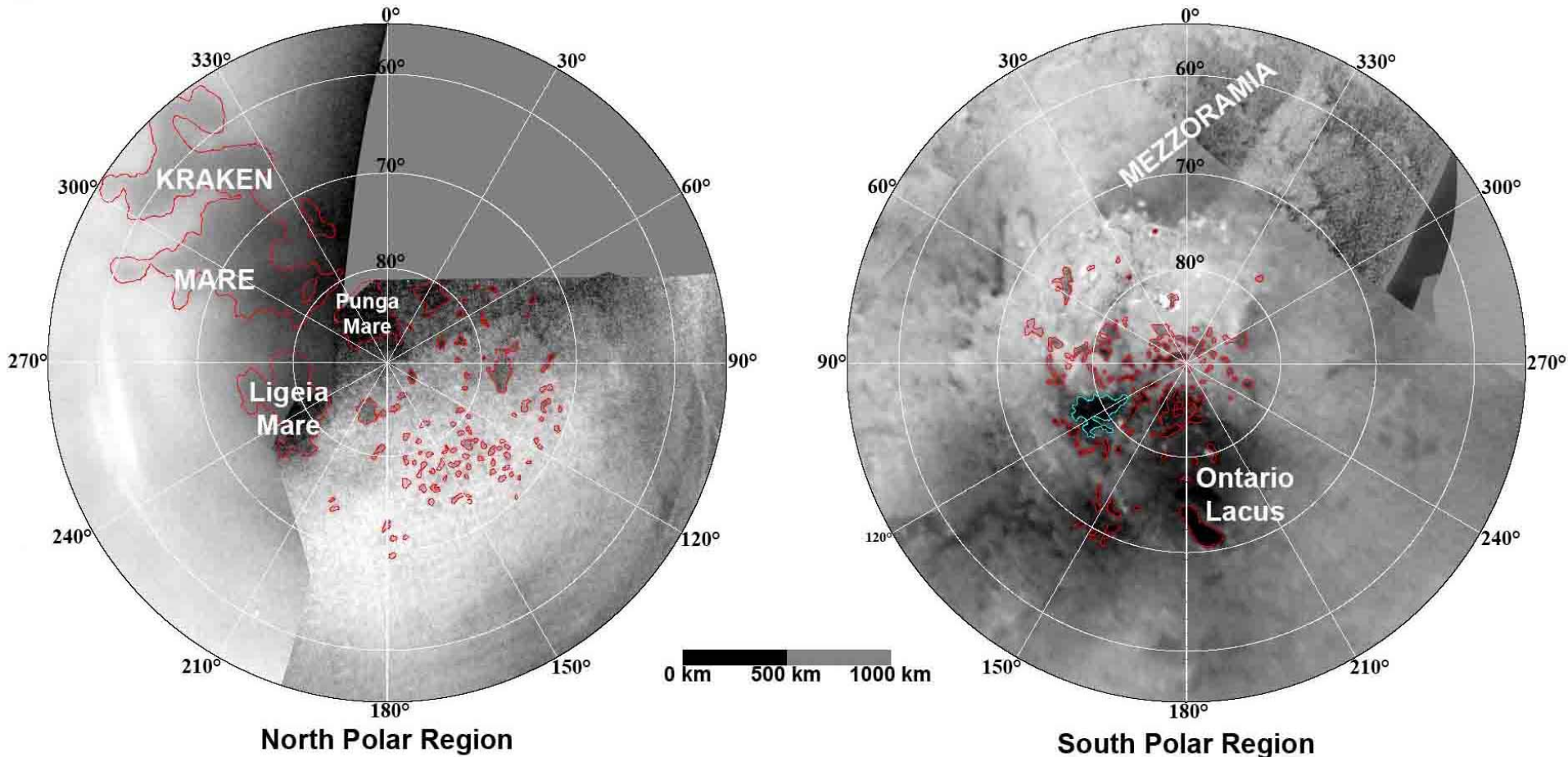


# Updated Map of Titan

Map of Saturn's Moon Titan - February 2009

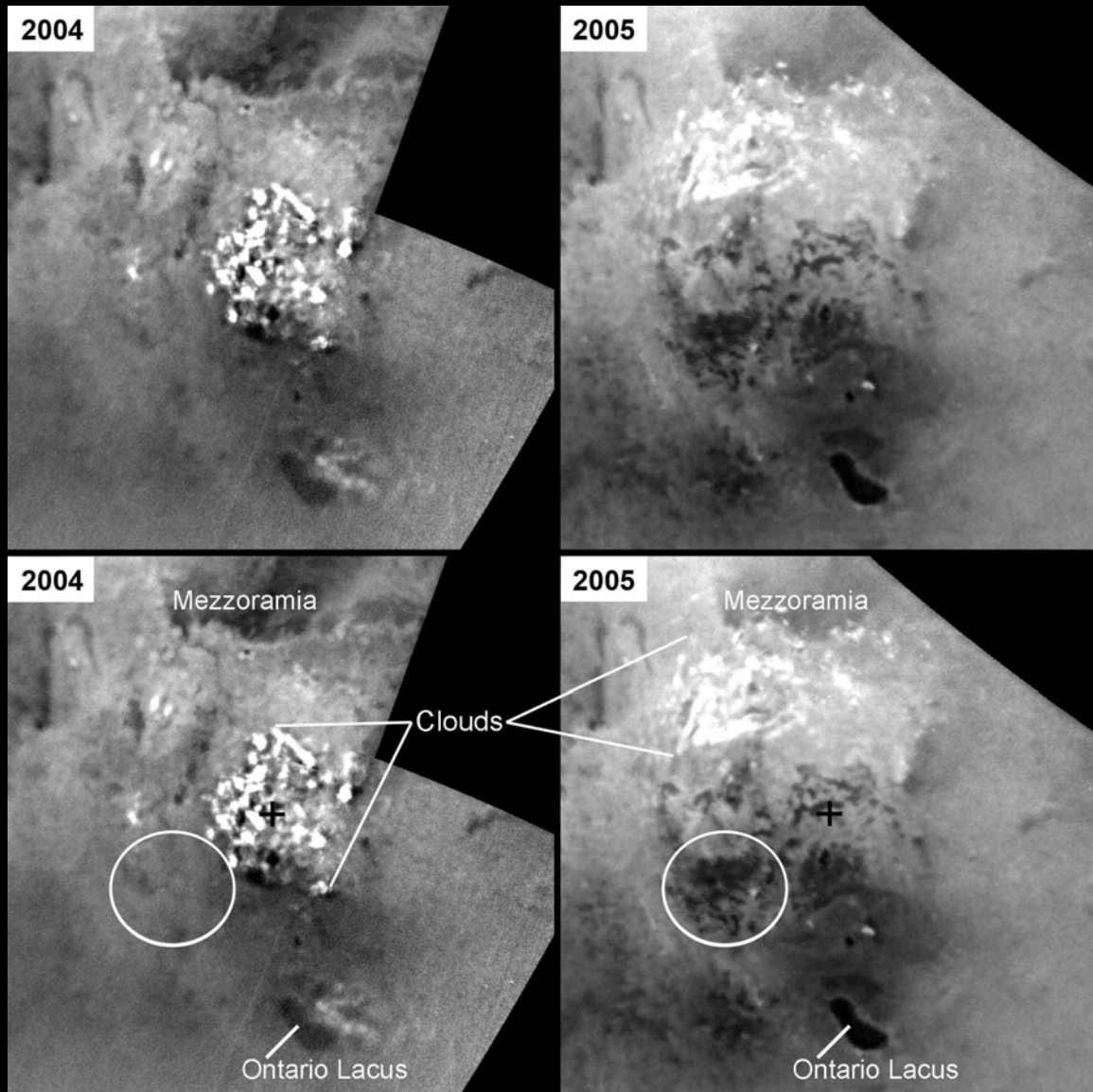


# Updated Map of Titan



(Turtle et al., 2009)

# South-polar Changes



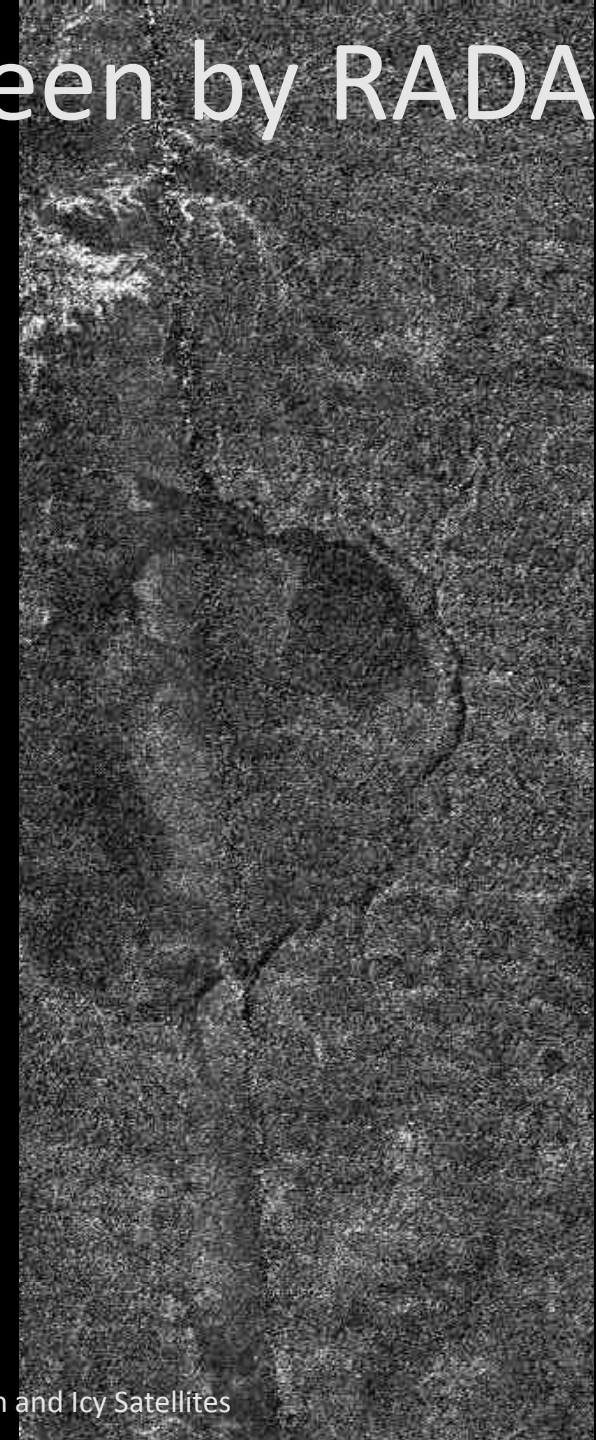
(Turtle et al., 2009)



# South-polar features seen by RADAR

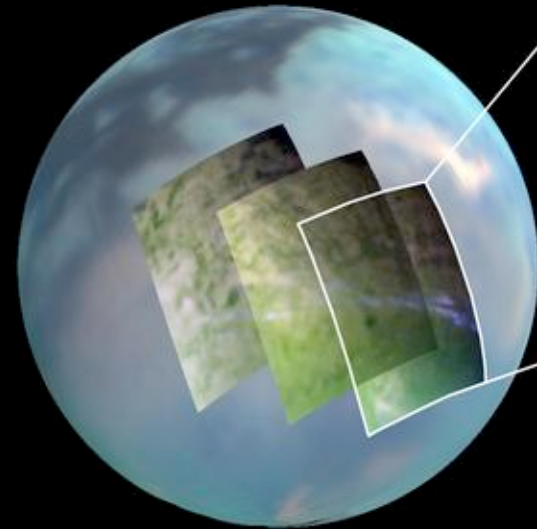
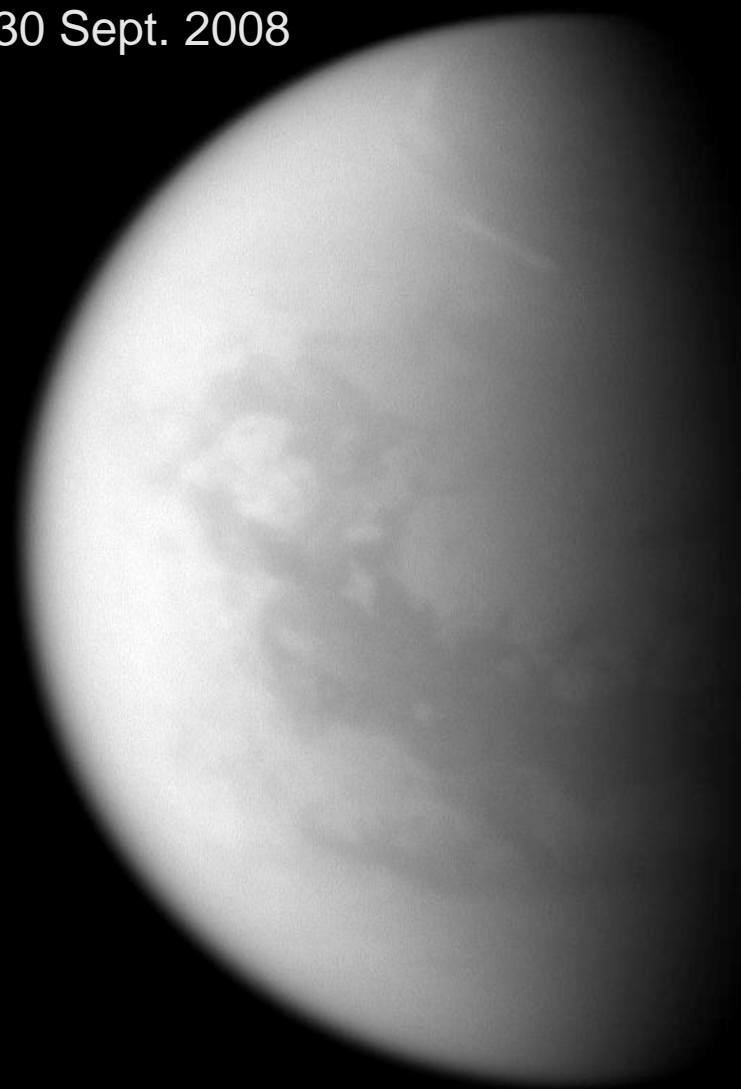


21 May 2009

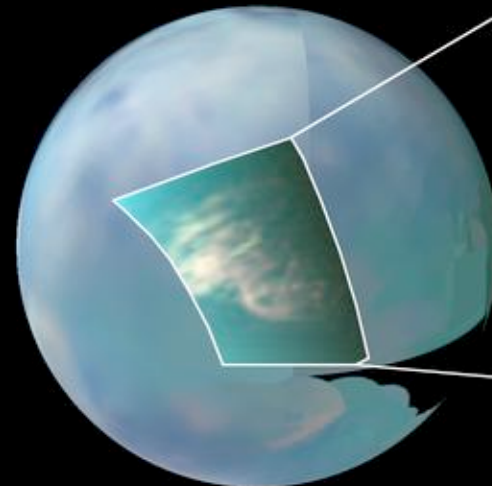


# Clouds becoming more common in the North, but also persisting into southern Fall

30 Sept. 2008

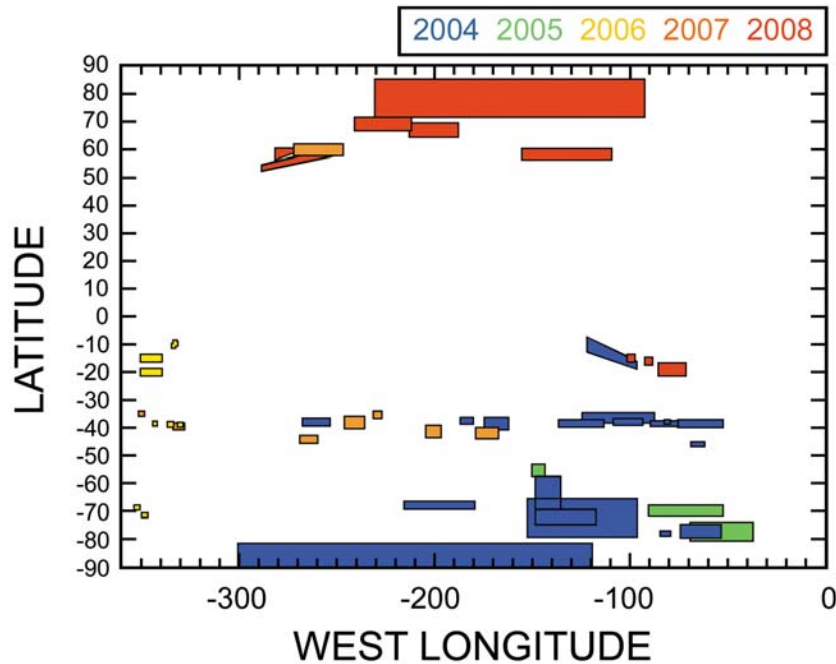


7 Sept. 2006

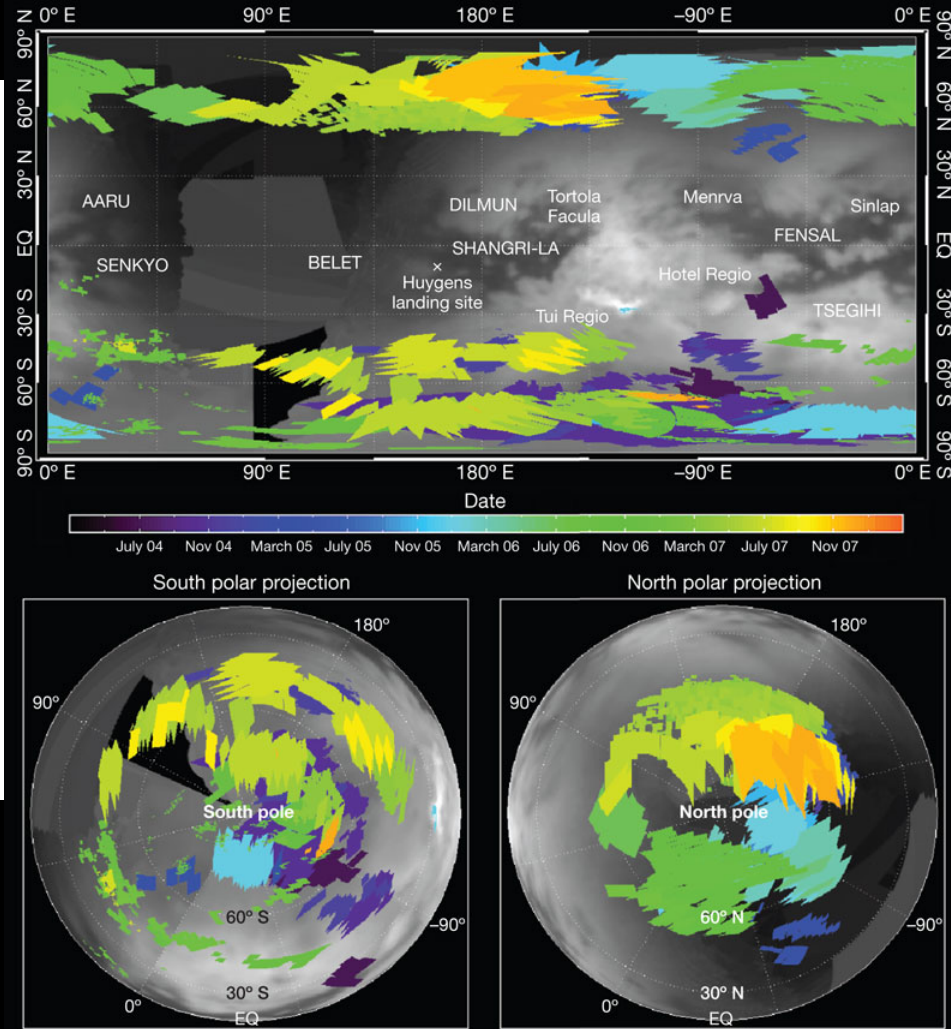


26 March 2007

# Clouds becoming more common in the North, but also persisting into southern Fall



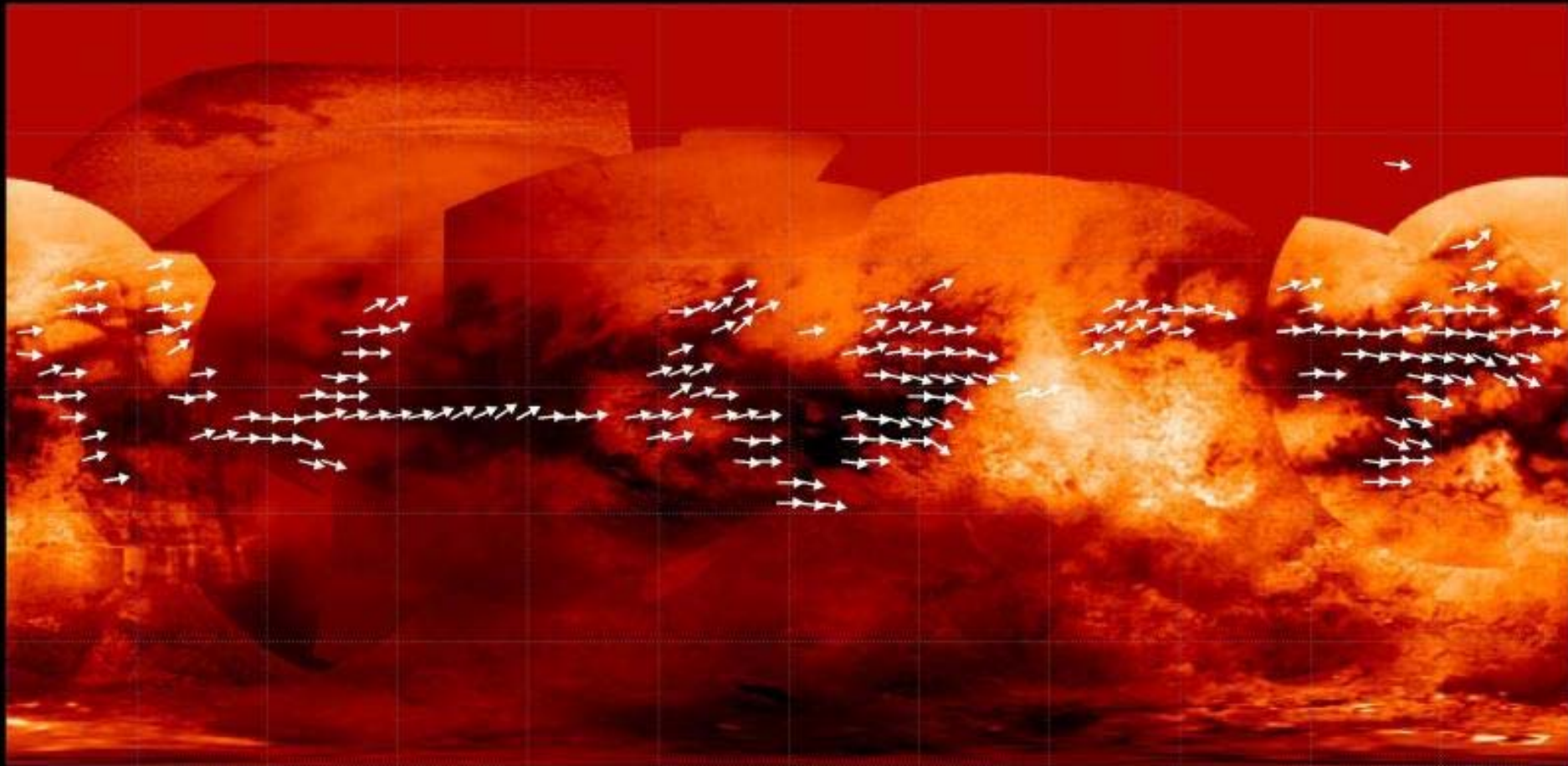
(Turtle et al., 2009)



(Rodriguez et al., 2009)



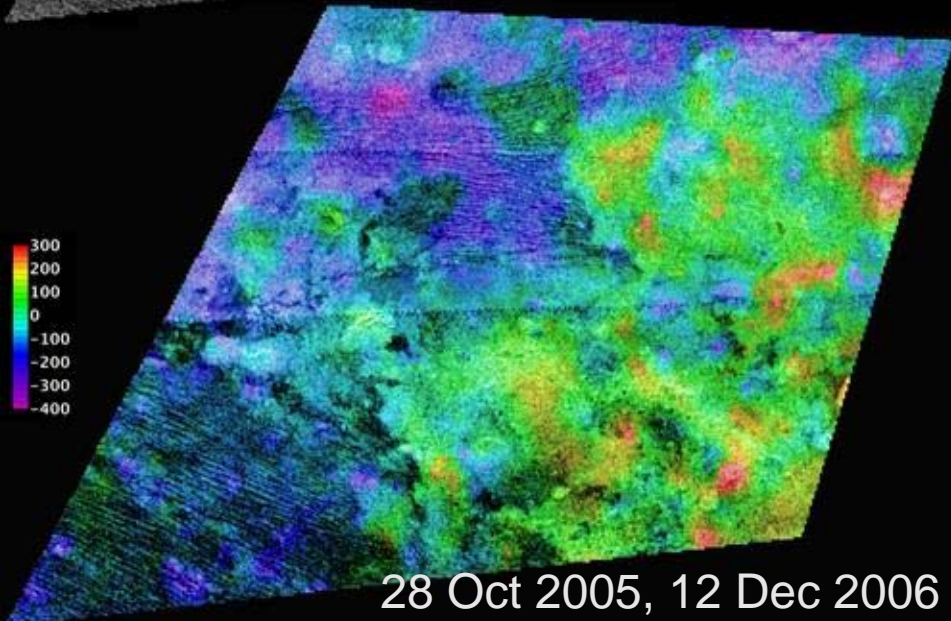
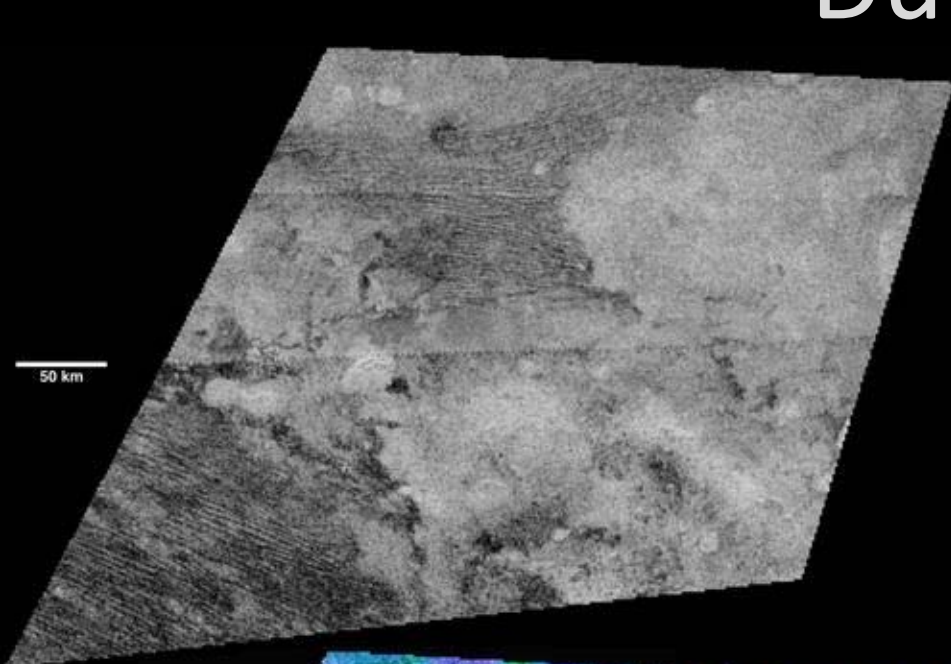
# Surface Wind Patterns



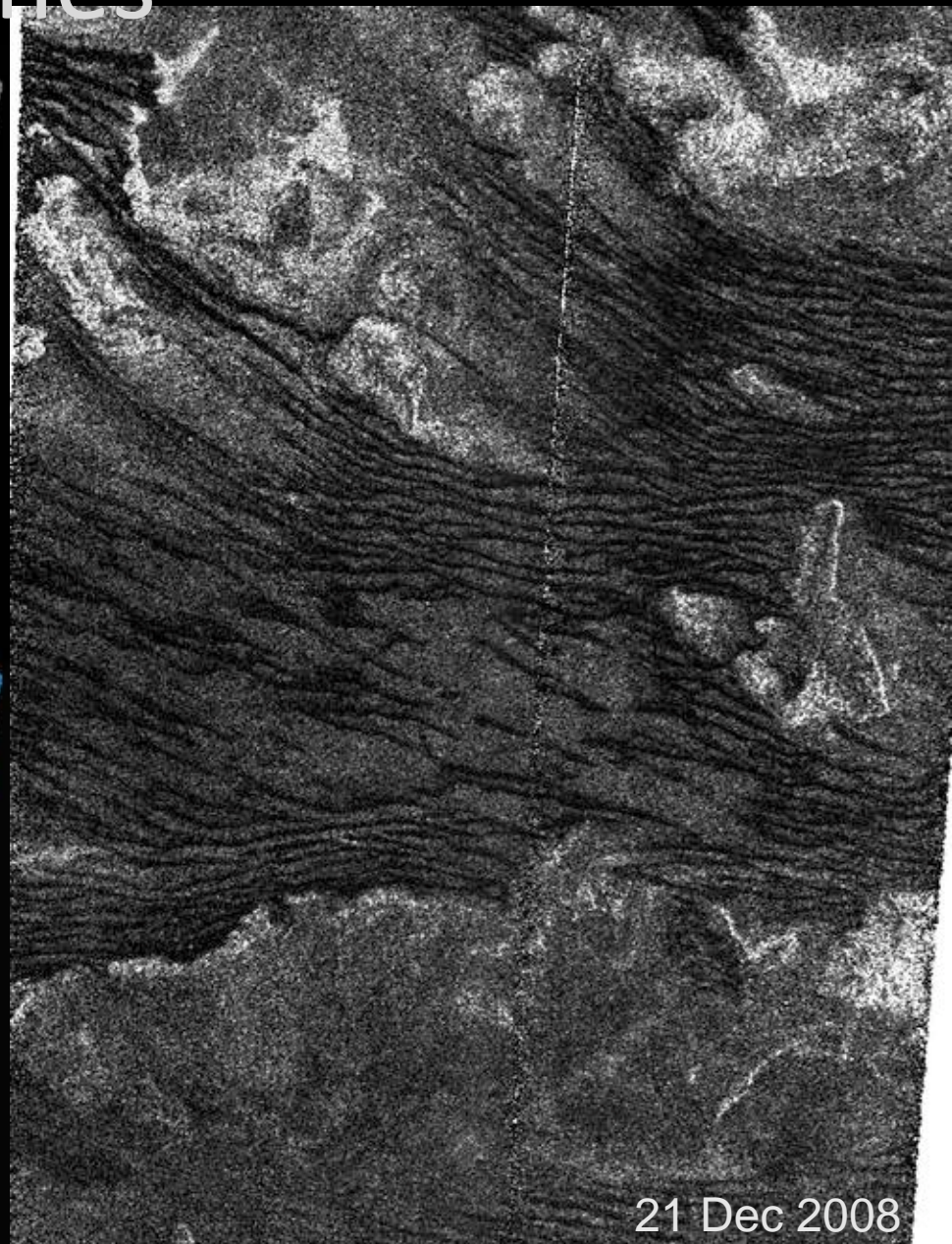
(Lorenz and Radebaugh, 2009)



# Dunes



28 Oct 2005, 12 Dec 2006

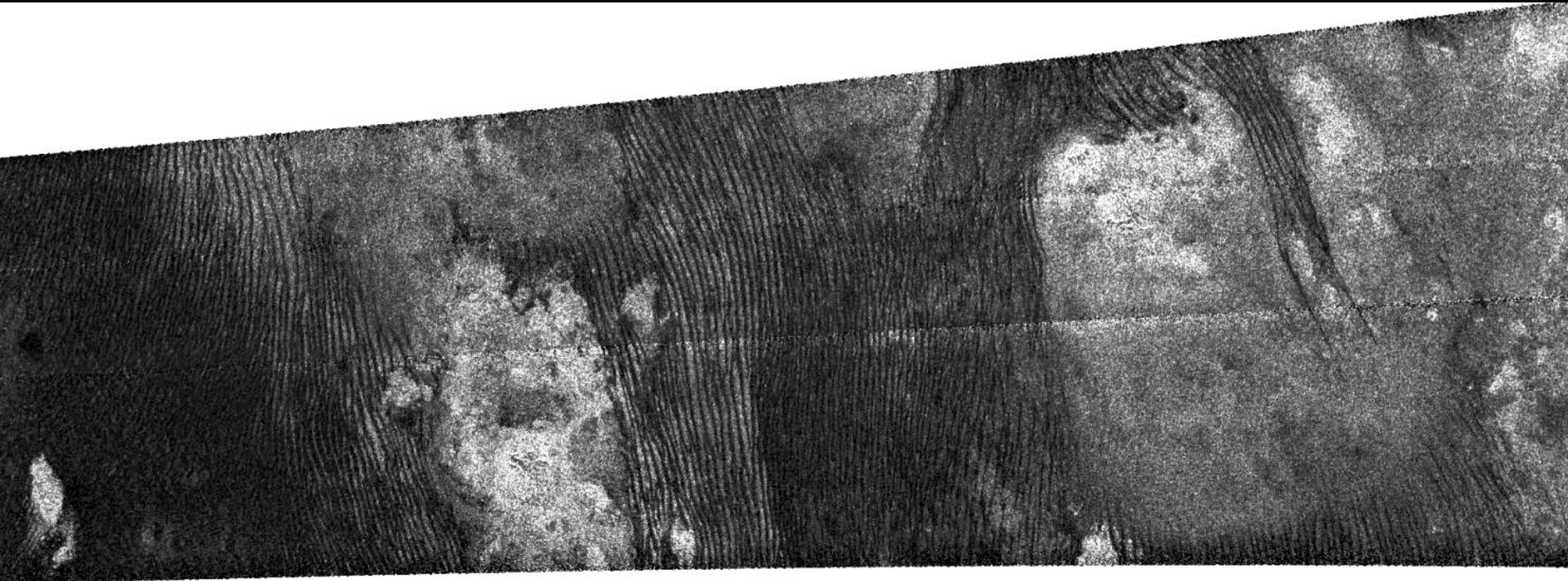


21 Dec 2008

28 July 2009



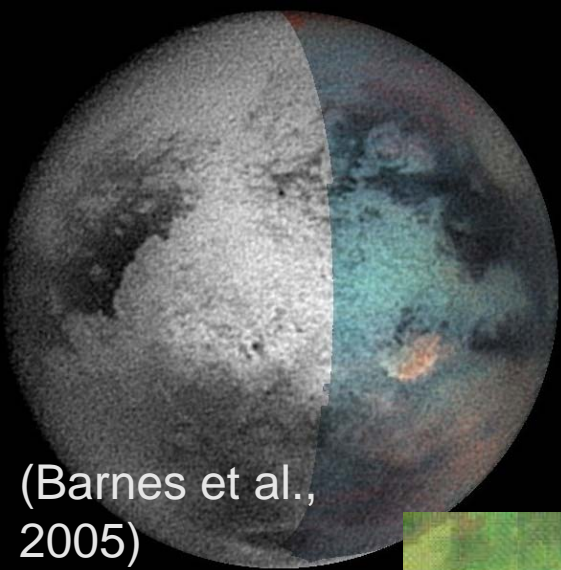
# Dunes



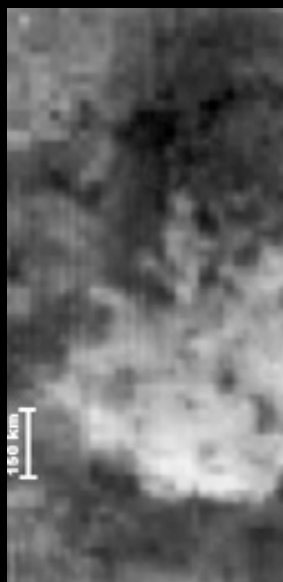
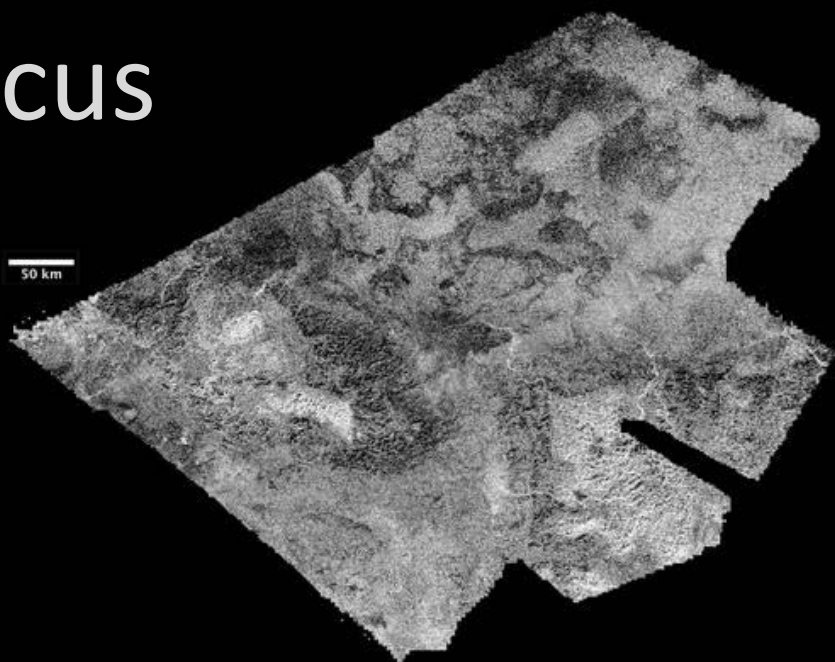
21 May 2009



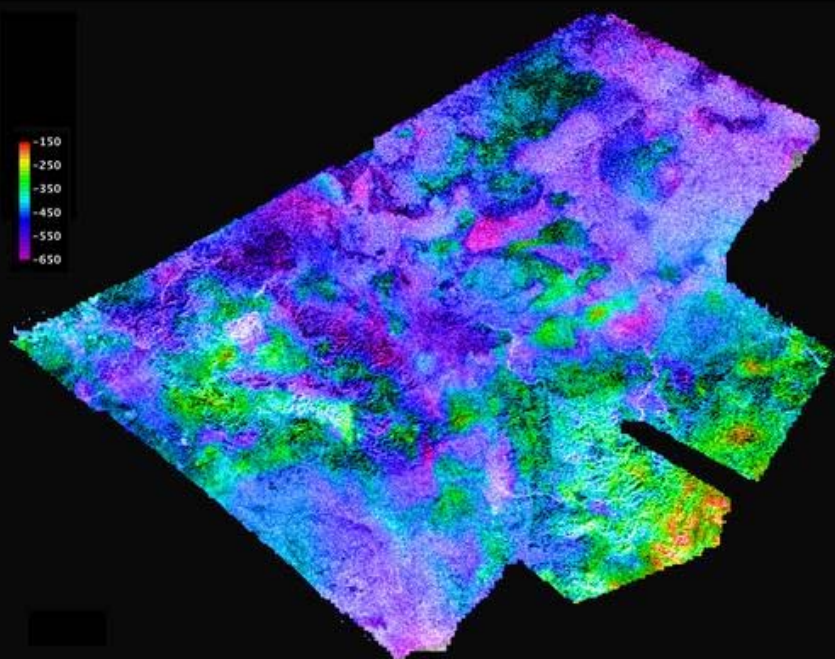
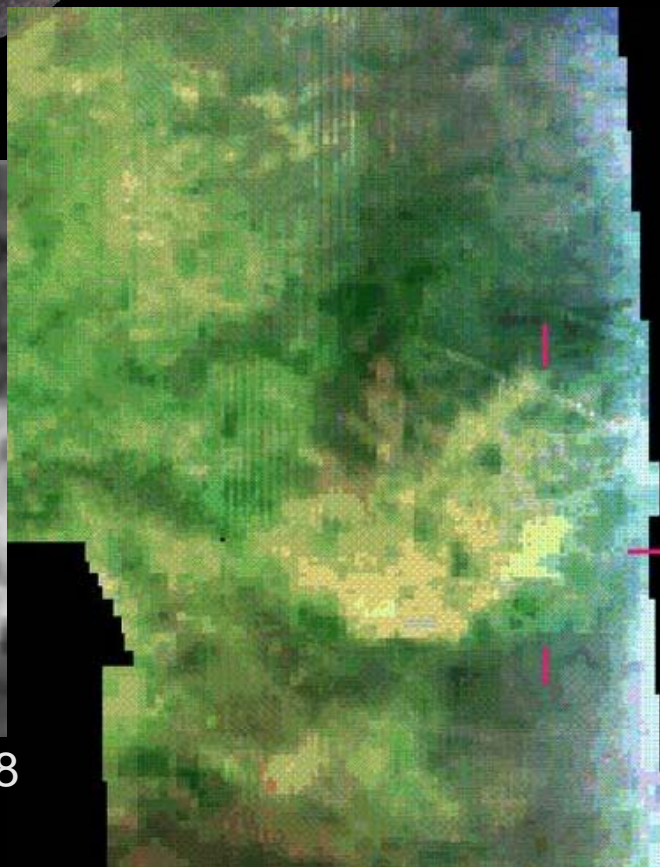
# Hotei Arcus



(Barnes et al.,  
2005)



19 Nov 2008



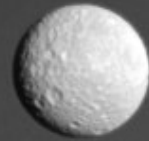
22 Feb and 12 May 2008

28 July 2009

CHARM Telecon: Cassini's 5th Year at Saturn, Titan and Icy Satellites

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# Icy Satellite Highlights



Mimas & Saturn  
26 Nov 2008

# Cassini Mission Overview

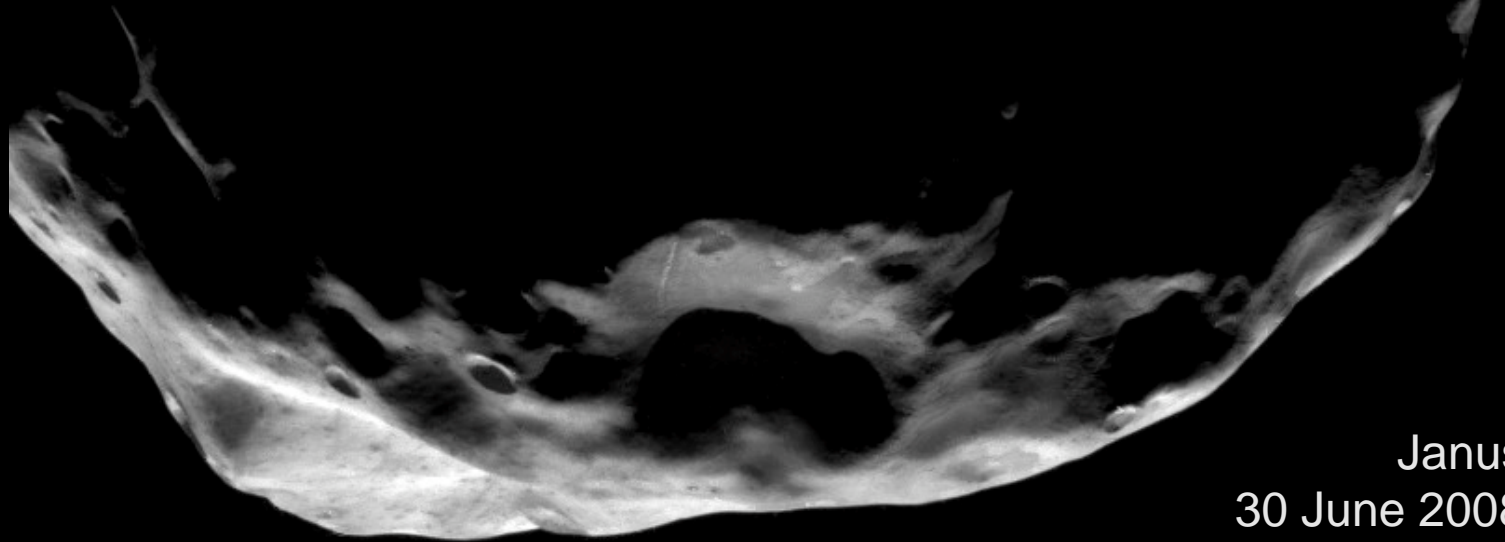
Four-Year Prime Tour + Two-Year Extended Mission (Proposed), July 2004 - July 2010



Extended Mission



# Small Satellites



Janus  
30 June 2008



Helene, trojan satellite leading Dione  
24 Nov 2008

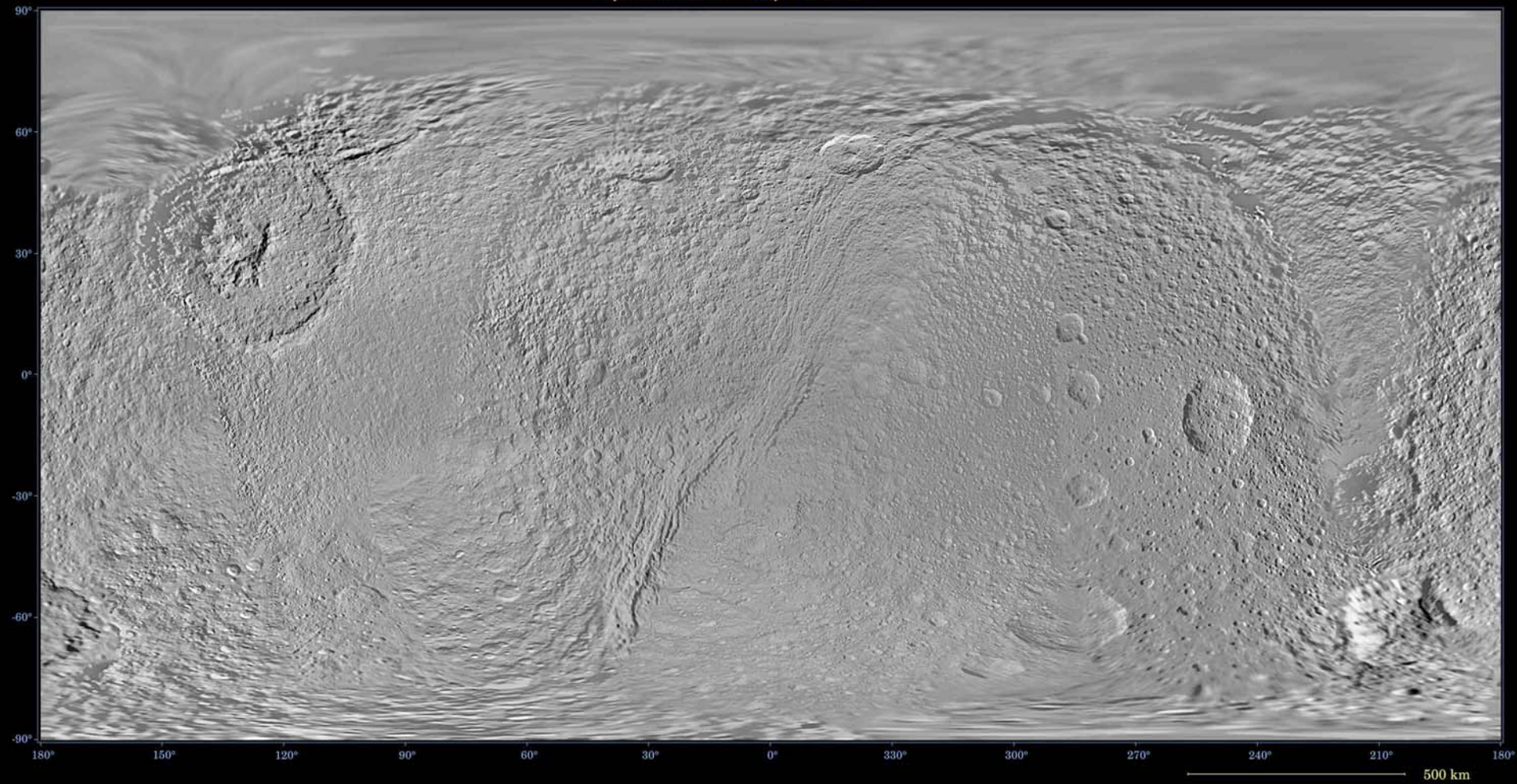
# Tethys



Penelope, left, 207 km in diameter  
Odysseus, right, 450 km in diameter  
12 April 2009,

# Tethys

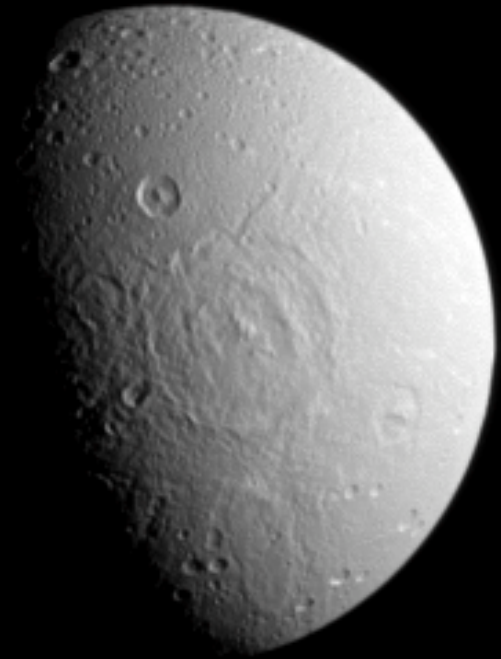
Map of Saturn's Moon Tethys - June 2008



# Dione



21 July 2008



28 Dec 2008

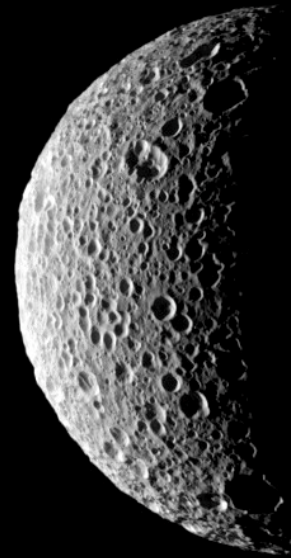


# Mimas

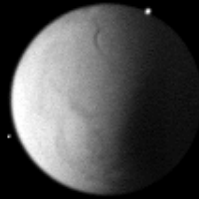
eclipsed by Saturn's rings  
4 Aug 2008



uneclipsed  
4 Aug 2008



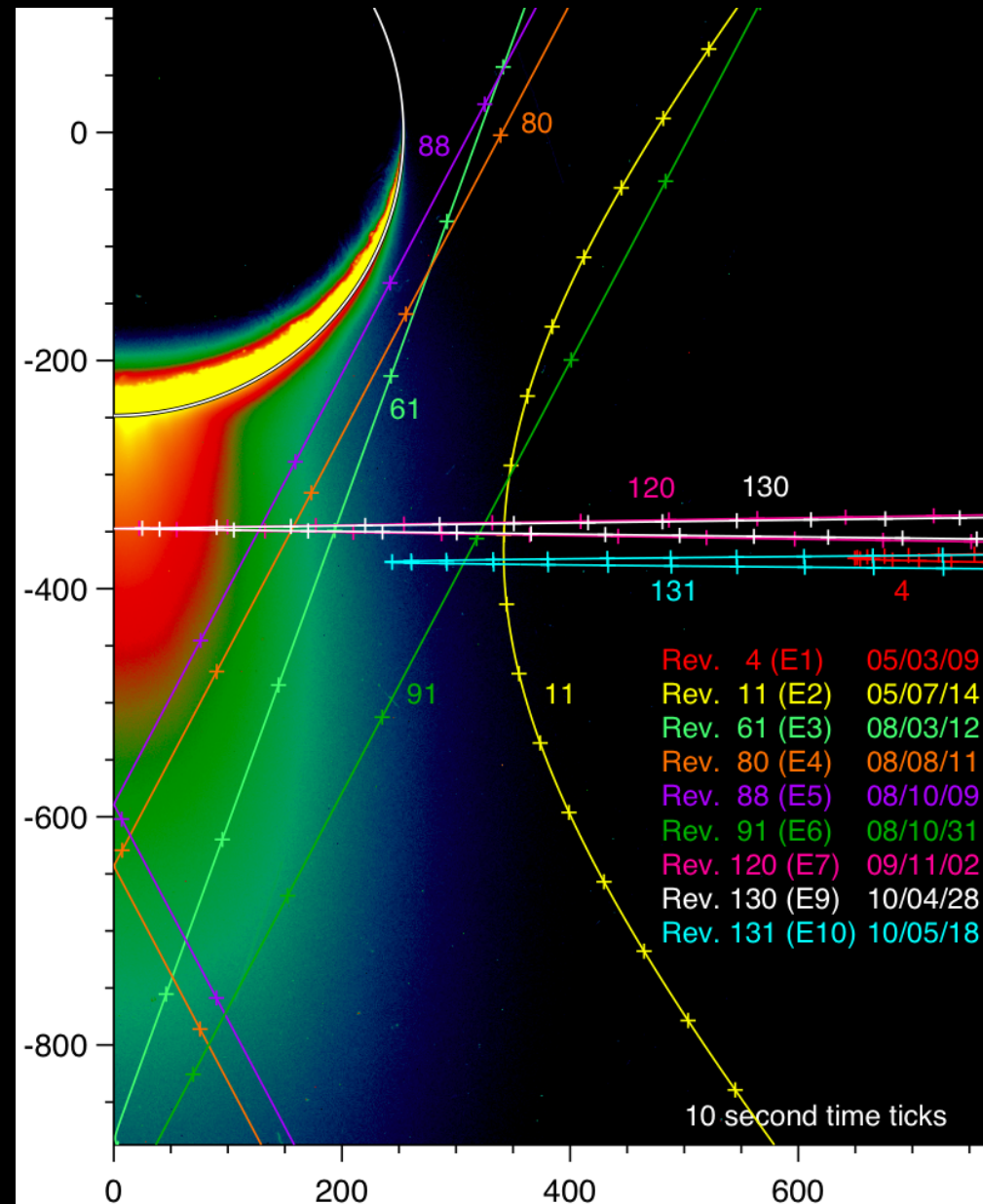
# Enceladus



# Cassini's Enceladus Encounters

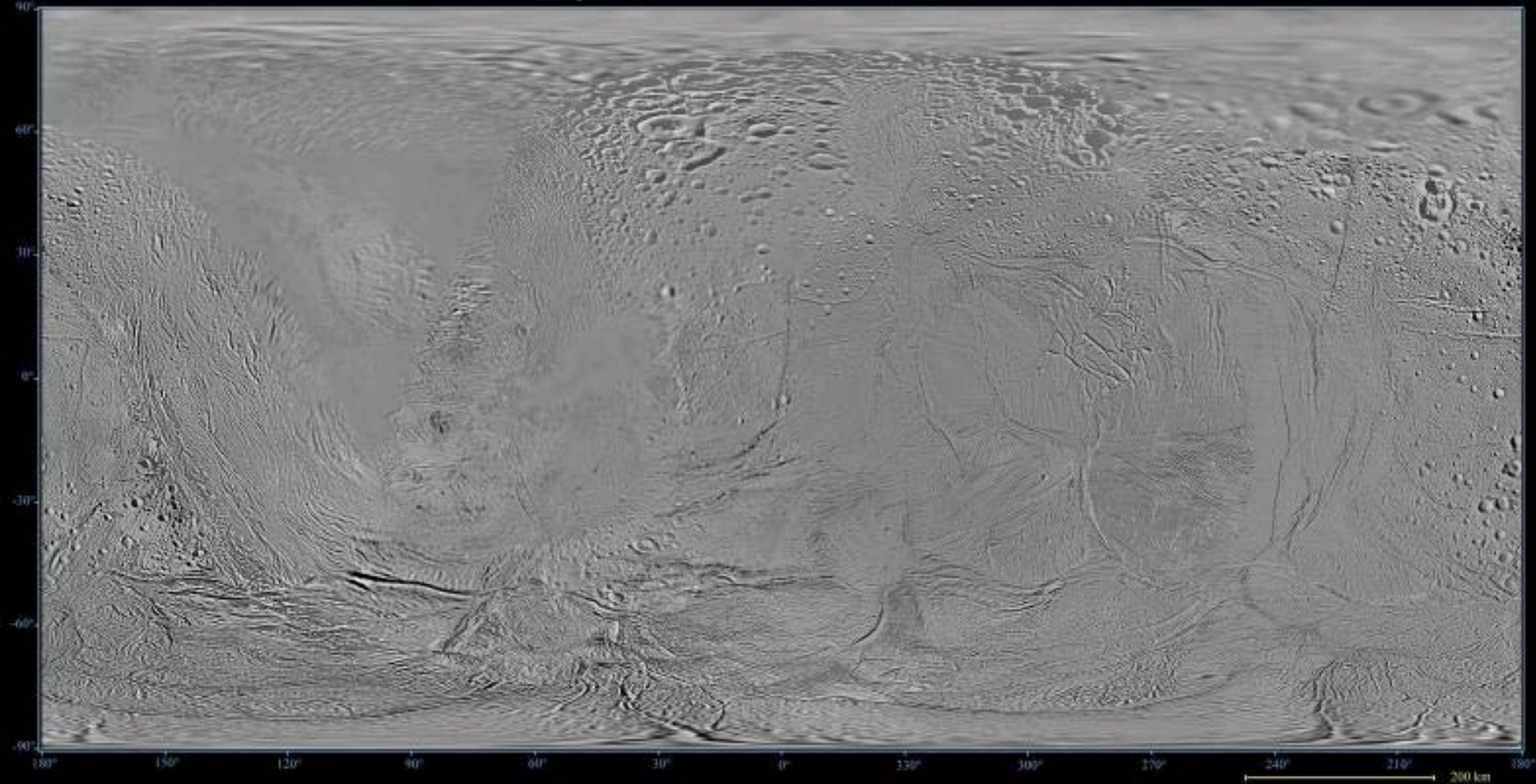
## Seven to date

<u>17 Feb 2005</u>	<u>1176 km</u>
<u>9 March 2005</u>	<u>504 km</u>
<u>14 July 2005</u>	<u>172 km</u>
<u>12 March 2008</u>	<u>52 km</u>
<u>11 August 2008</u>	<u>50 km</u>
<u>9 October 2008</u>	<u>25 km</u>
<u>31 October 2008</u>	<u>197 km</u>
<u>2 November 2009</u>	<u>99 km</u>
<u>21 November 2009</u>	<u>1603 km</u>
<u>28 April 2010</u>	<u>99 km</u>
<u>18 May 2010</u>	<u>198 km</u>



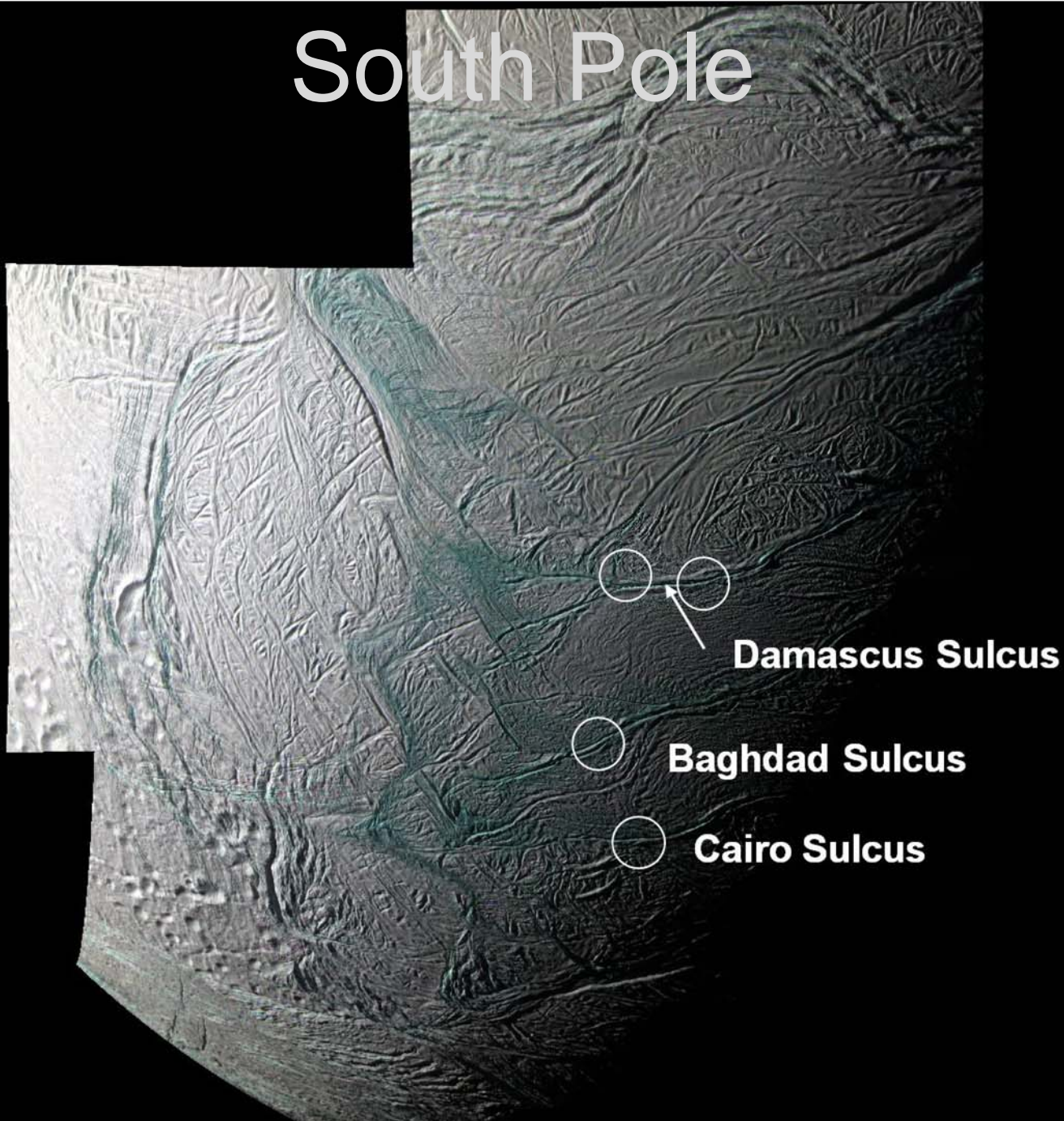
# Updated Map of Enceladus

Map of Saturn's Moon Enceladus - December 2008





# South Pole



**Damascus Sulcus**

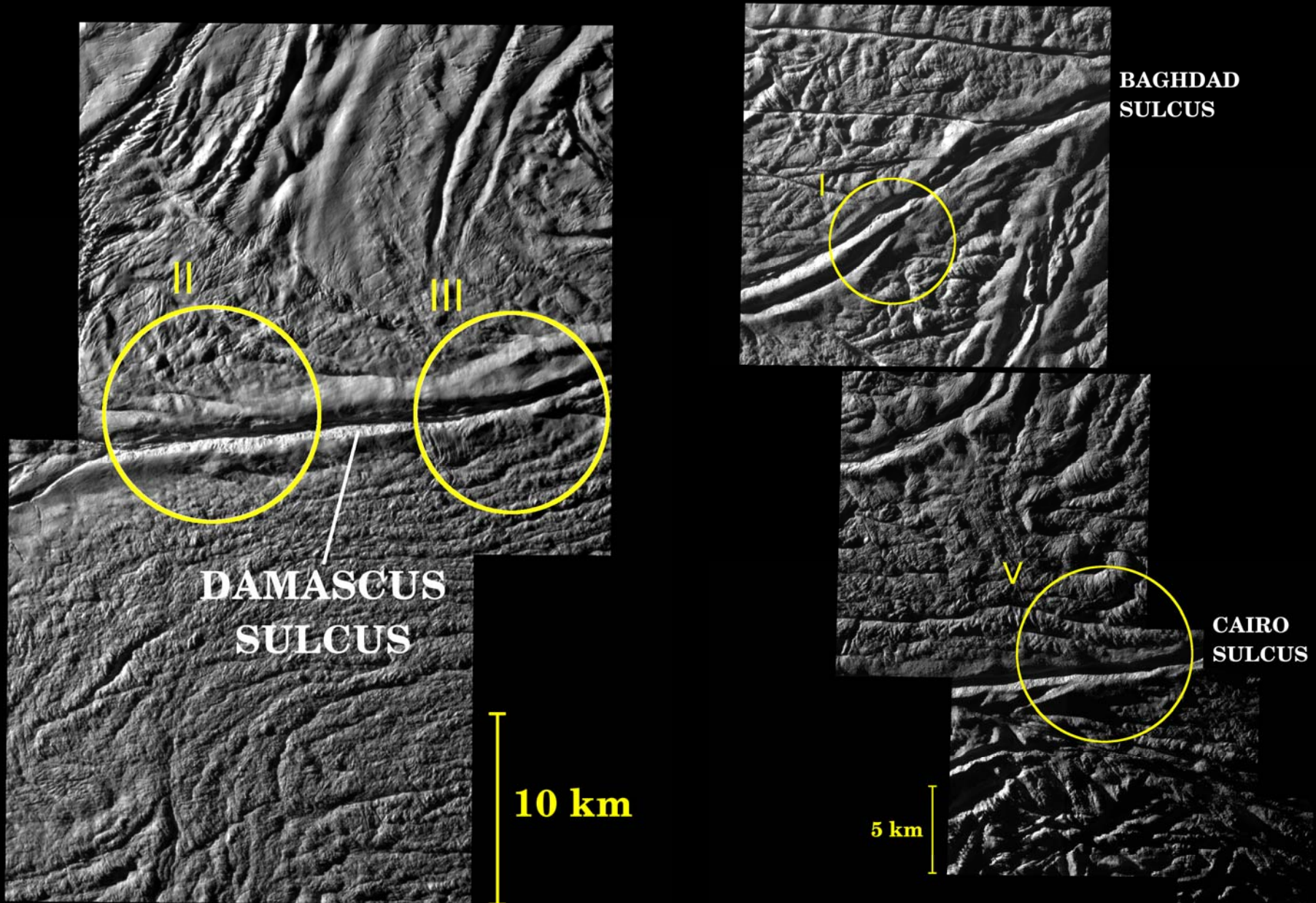
**Baghdad Sulcus**

**Cairo Sulcus**

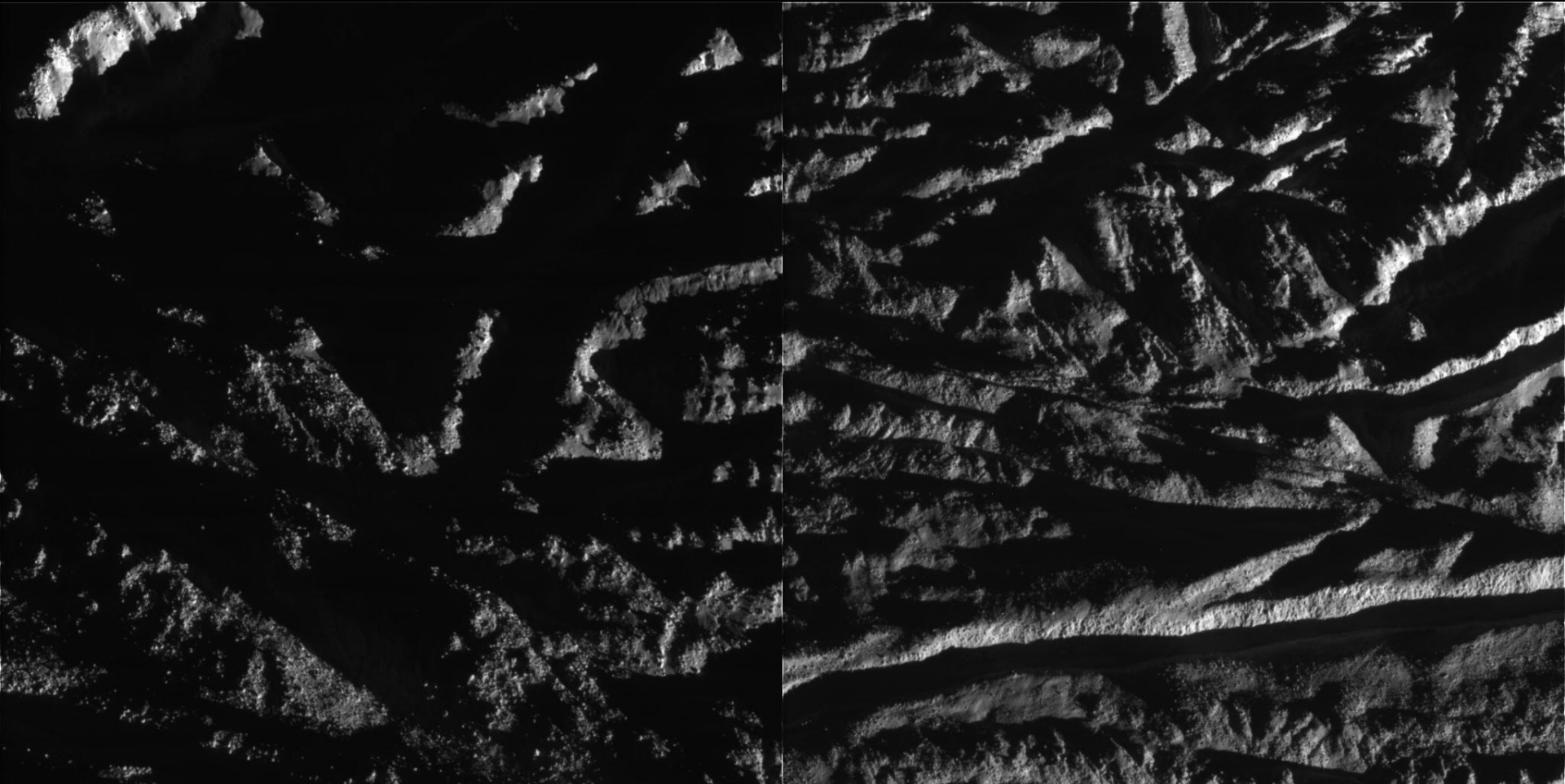
11 Aug 2008



# “skeet shoot” 11 Aug 2008: plume sources



# “skeet shoot” 11 Aug 2008







# “skeet shoot” 31 Oct 2008

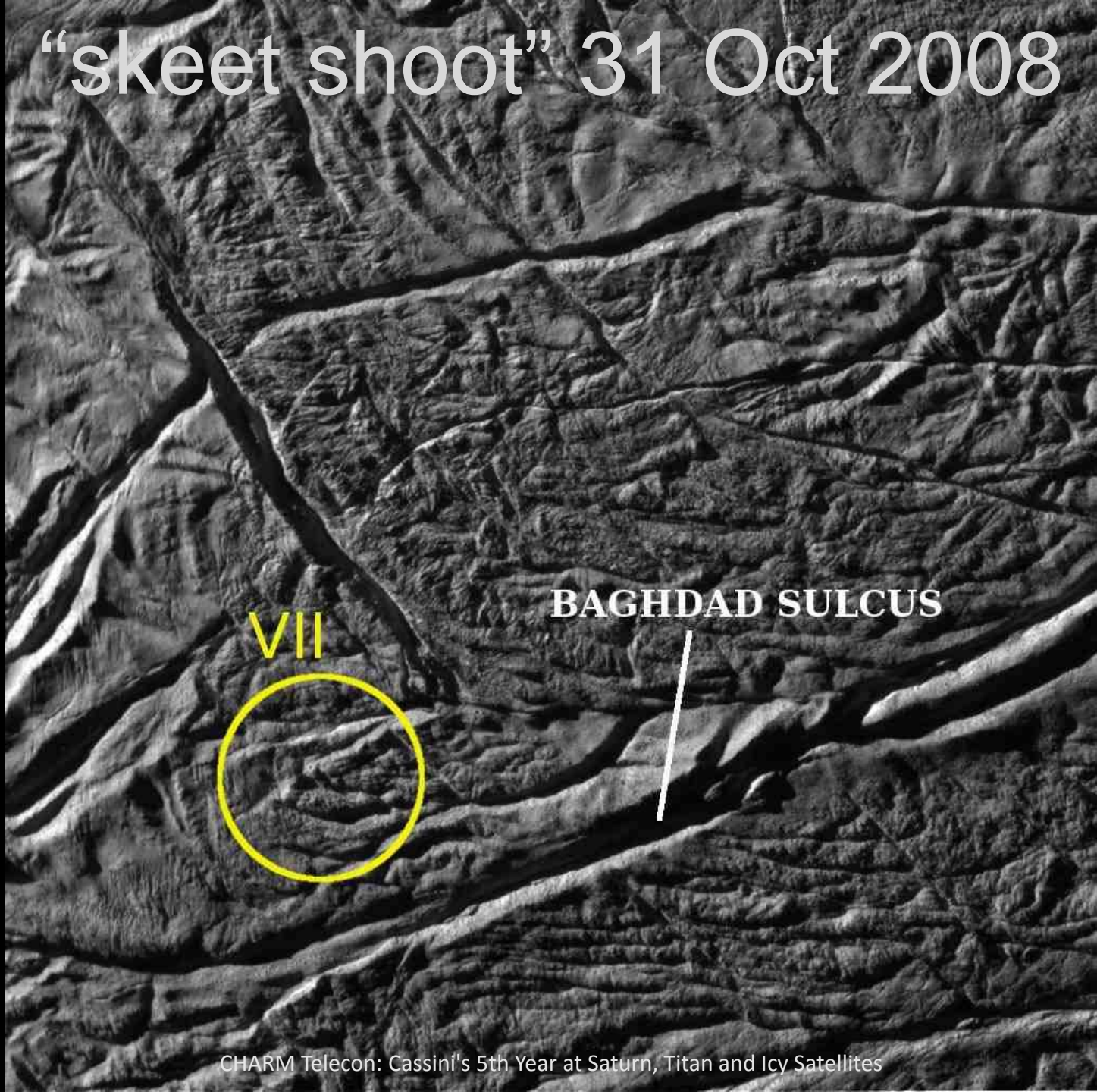


# “skeet shoot” 31 Oct 2008





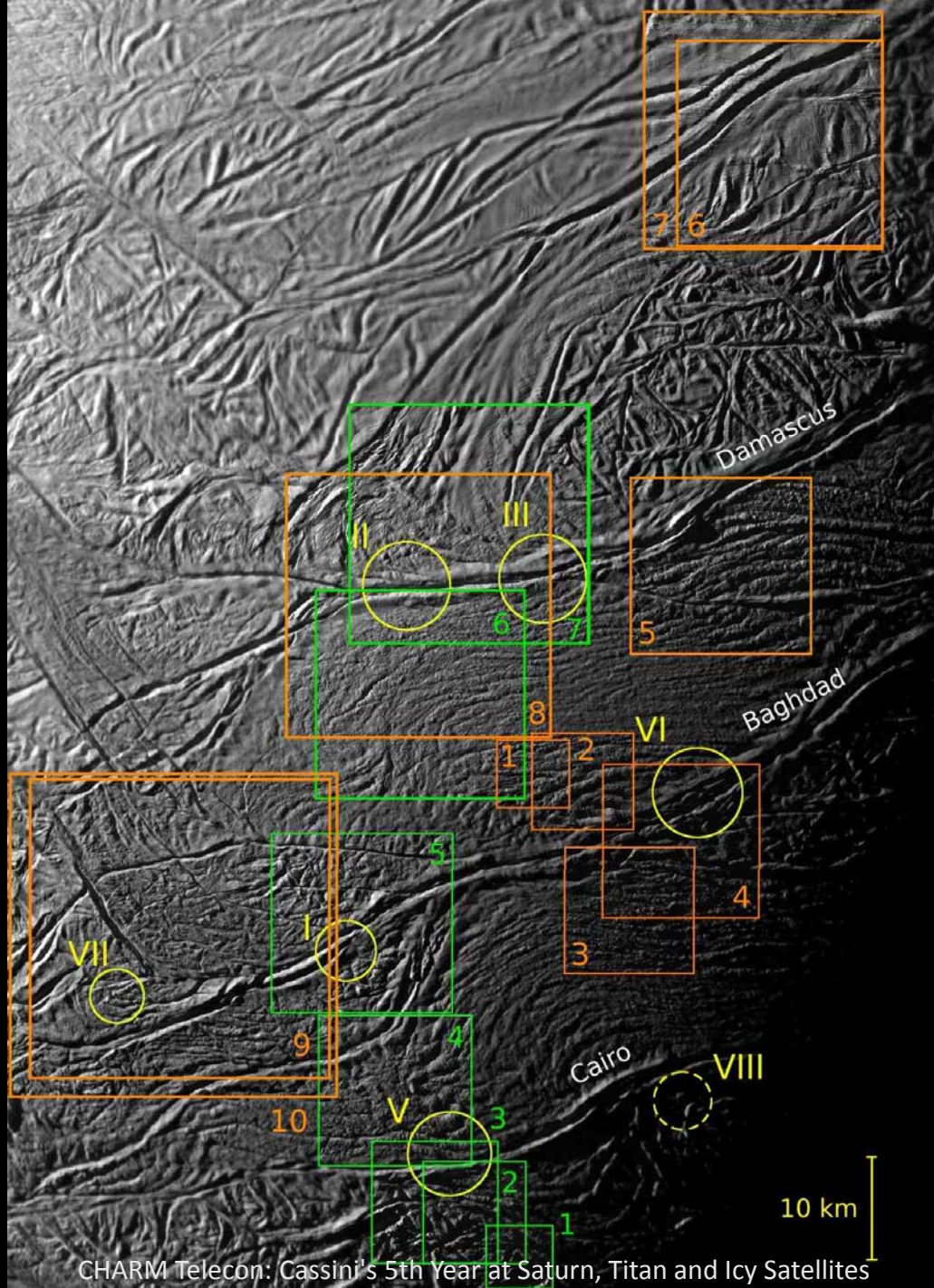
# “skeet shoot” 31 Oct 2008



VII

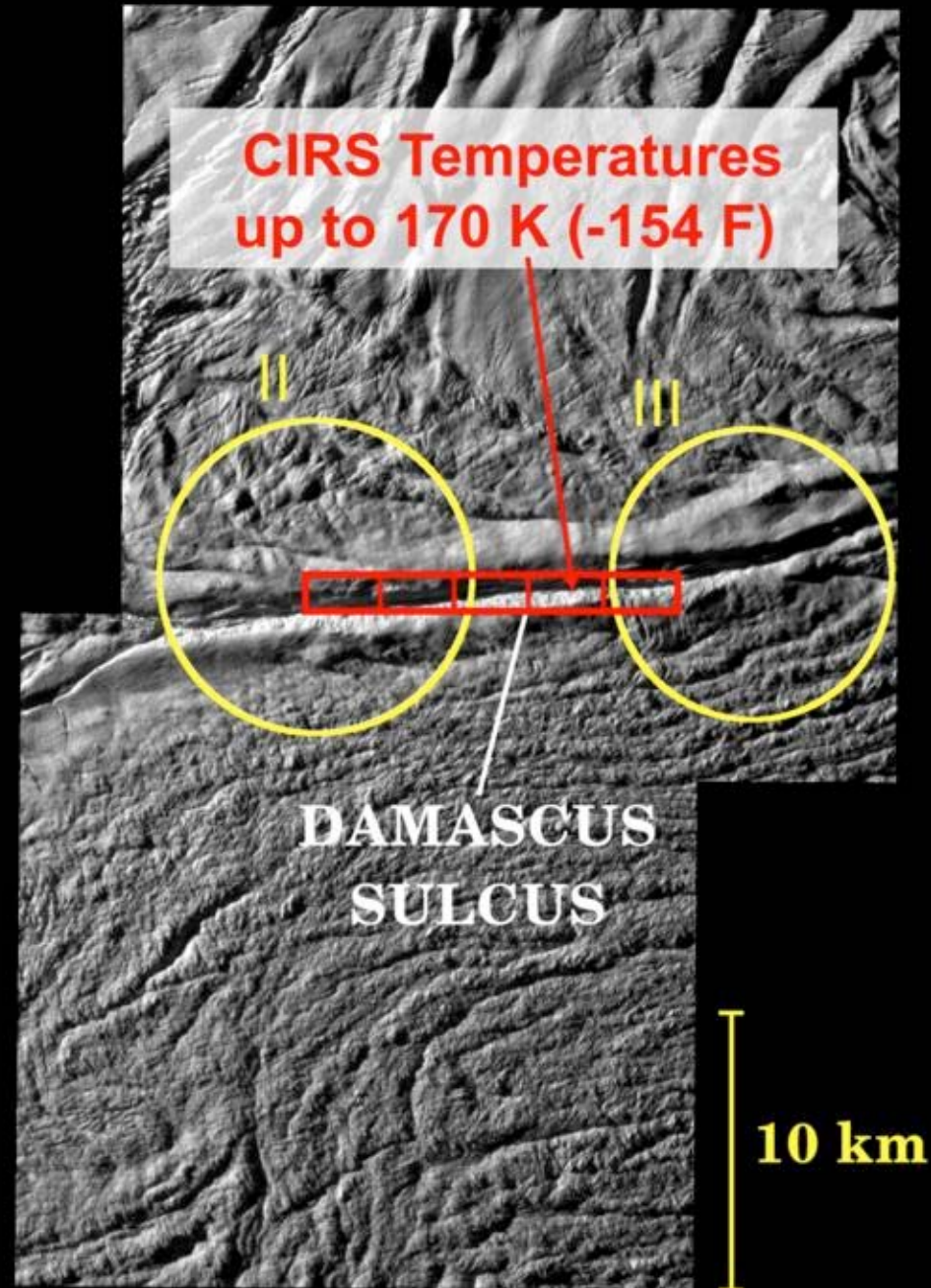
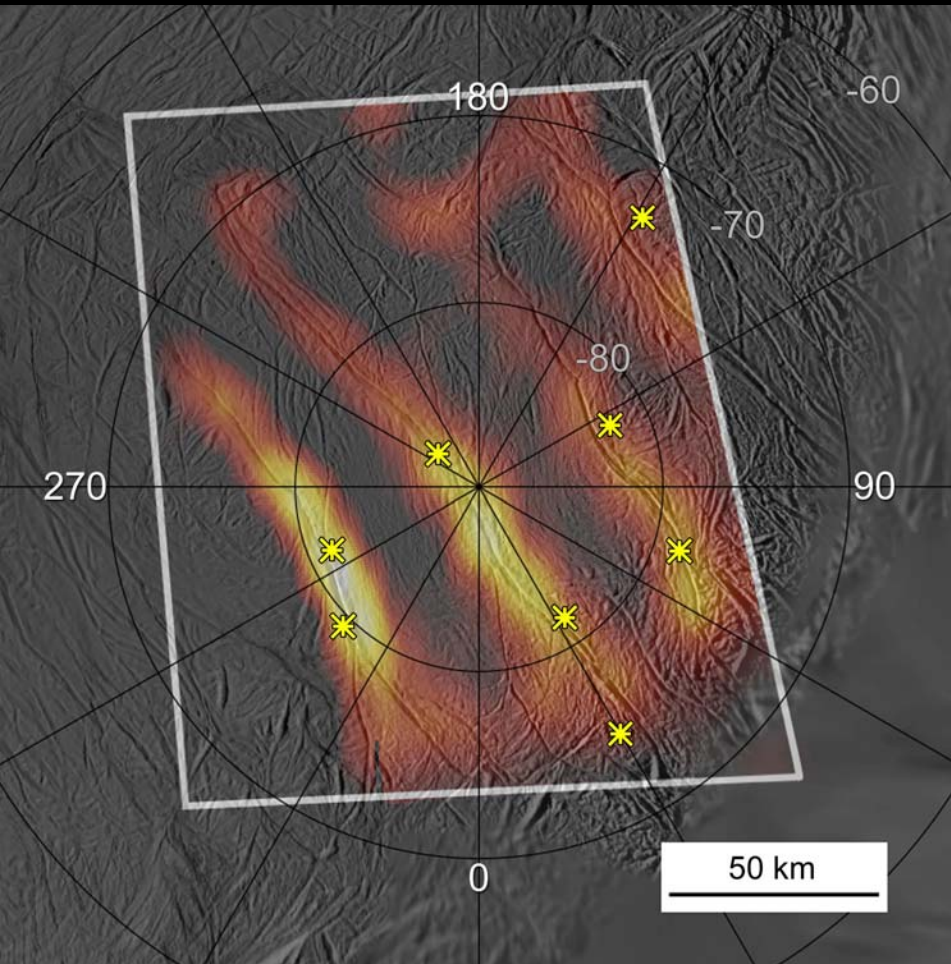
BAGHDAD SULCUS



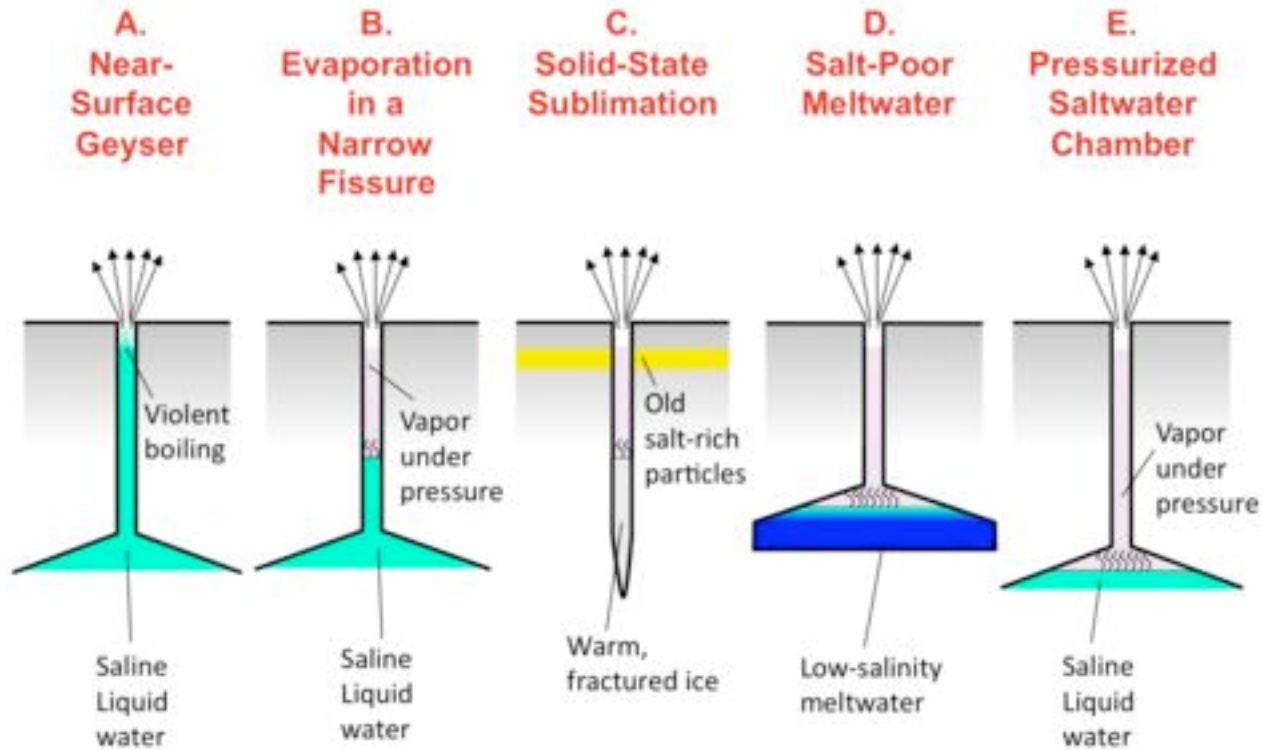




# Temperature Measurements



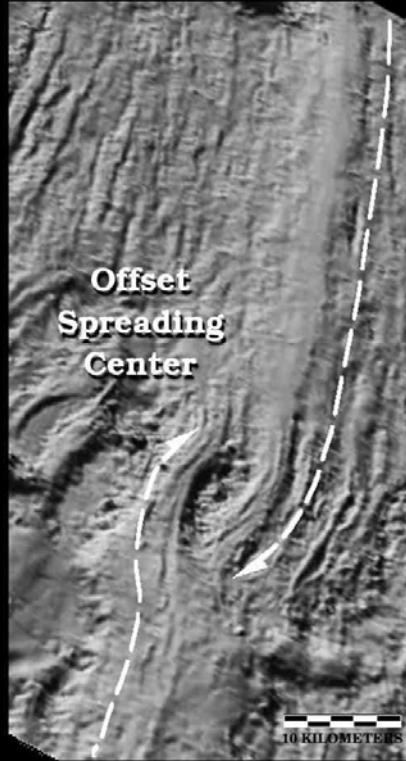
# Plume Vent Models





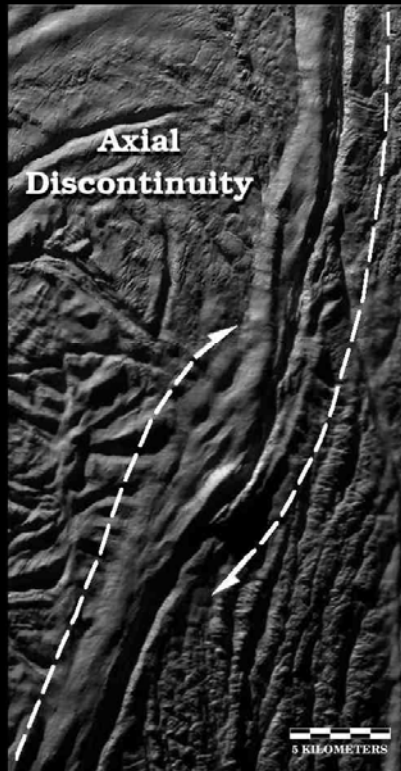
# Tectonics

**EARTH**  
(East Pacific Rise)

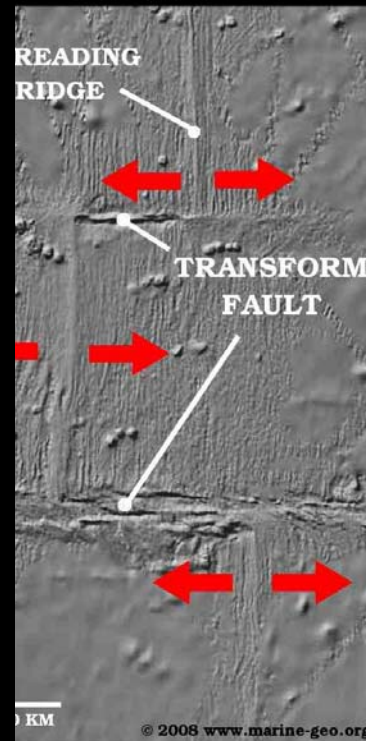


©2008 www.marine-geo.org

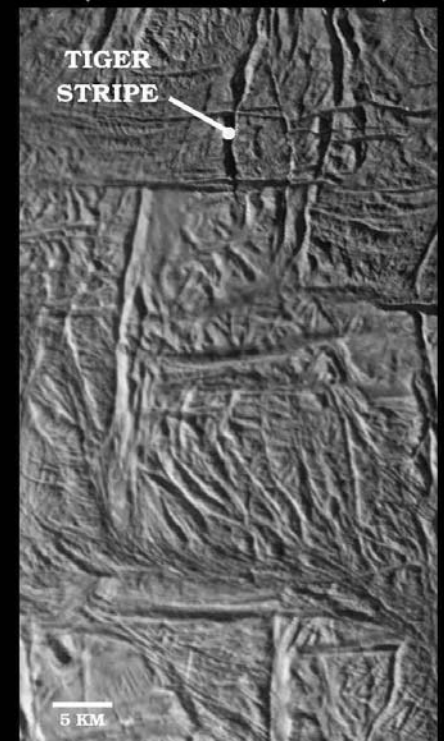
**ENCELADUS**  
(Damascus Sulcus)



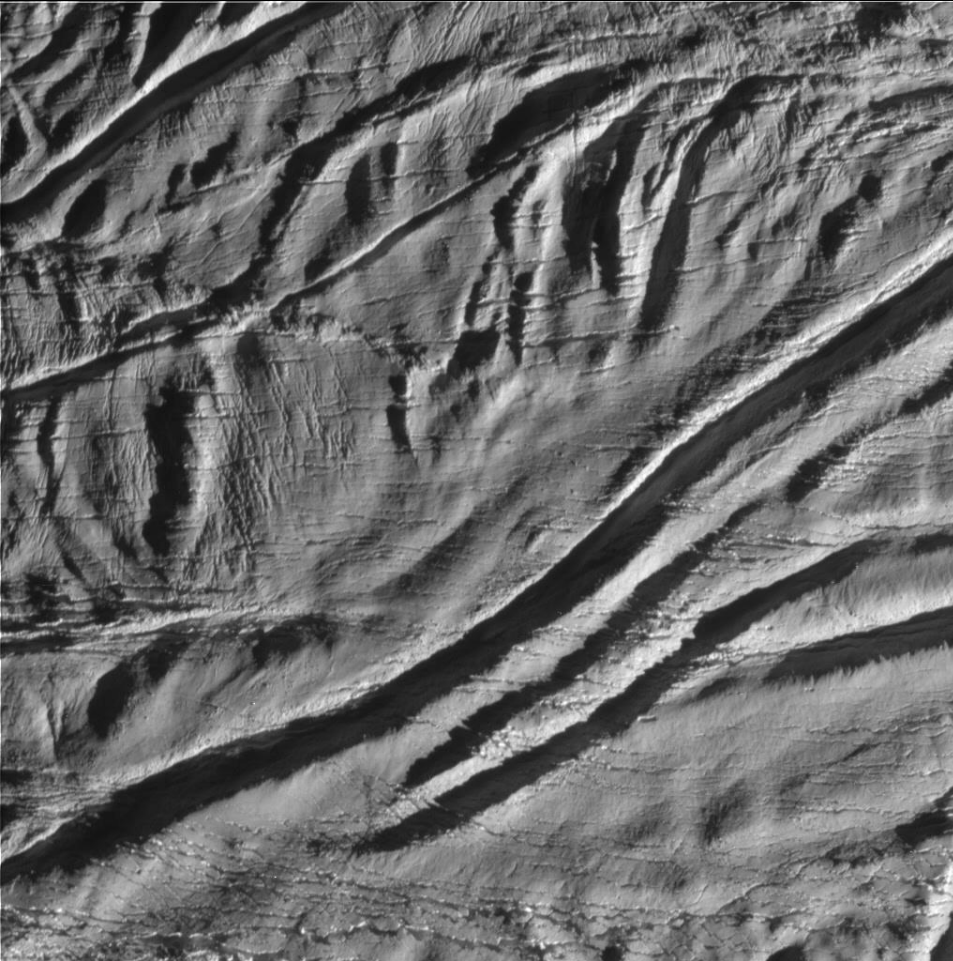
**EARTH**  
(East Pacific Rise)



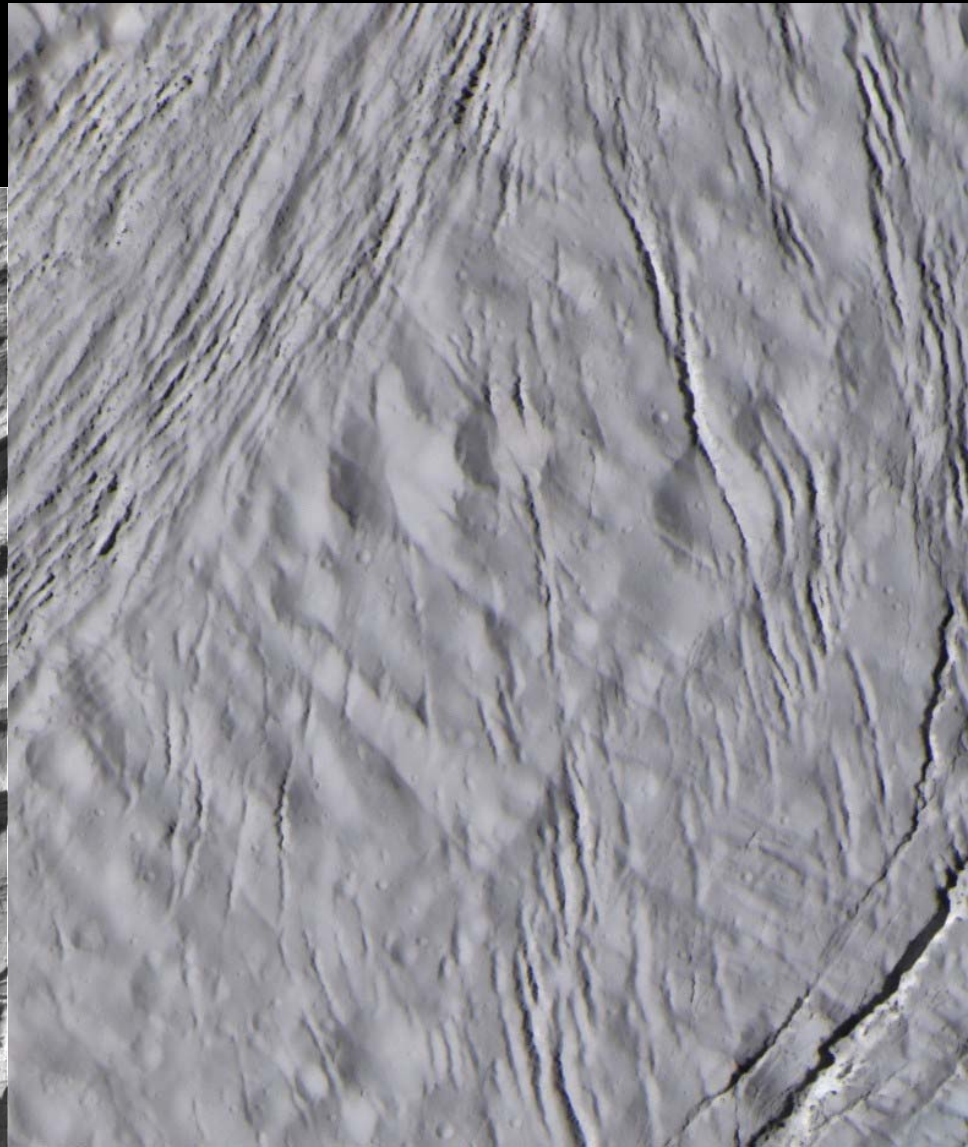
**ENCELADUS**  
(South Polar Terrain)



# Myriad Fractures



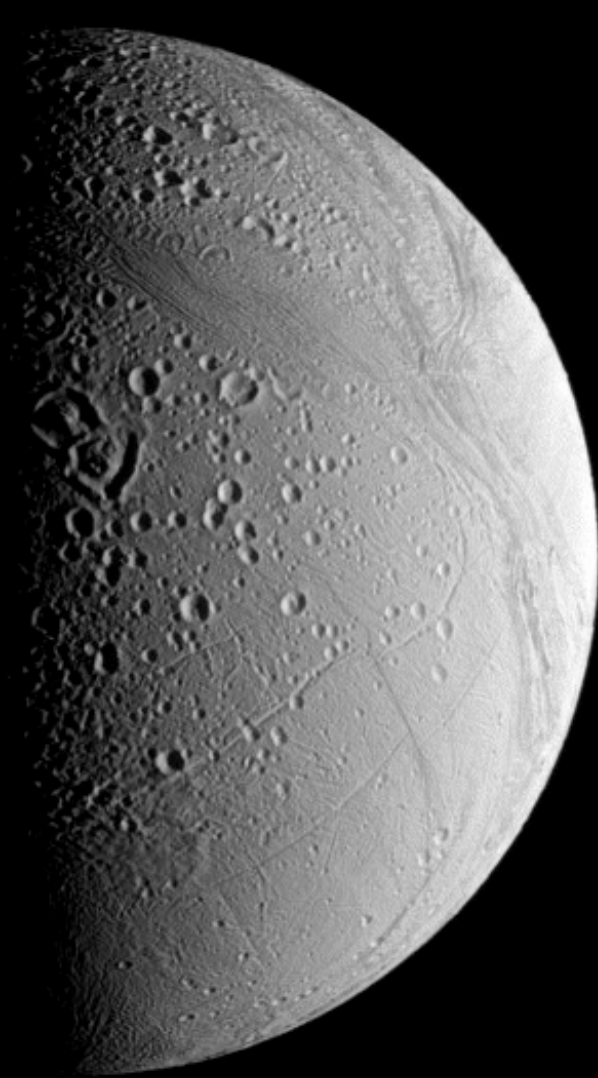
near the South-polar Terrain boundary  
31 Oct 2008



near-equatorial  
9 March 2005



# Complex Geologic History



30 June 2008

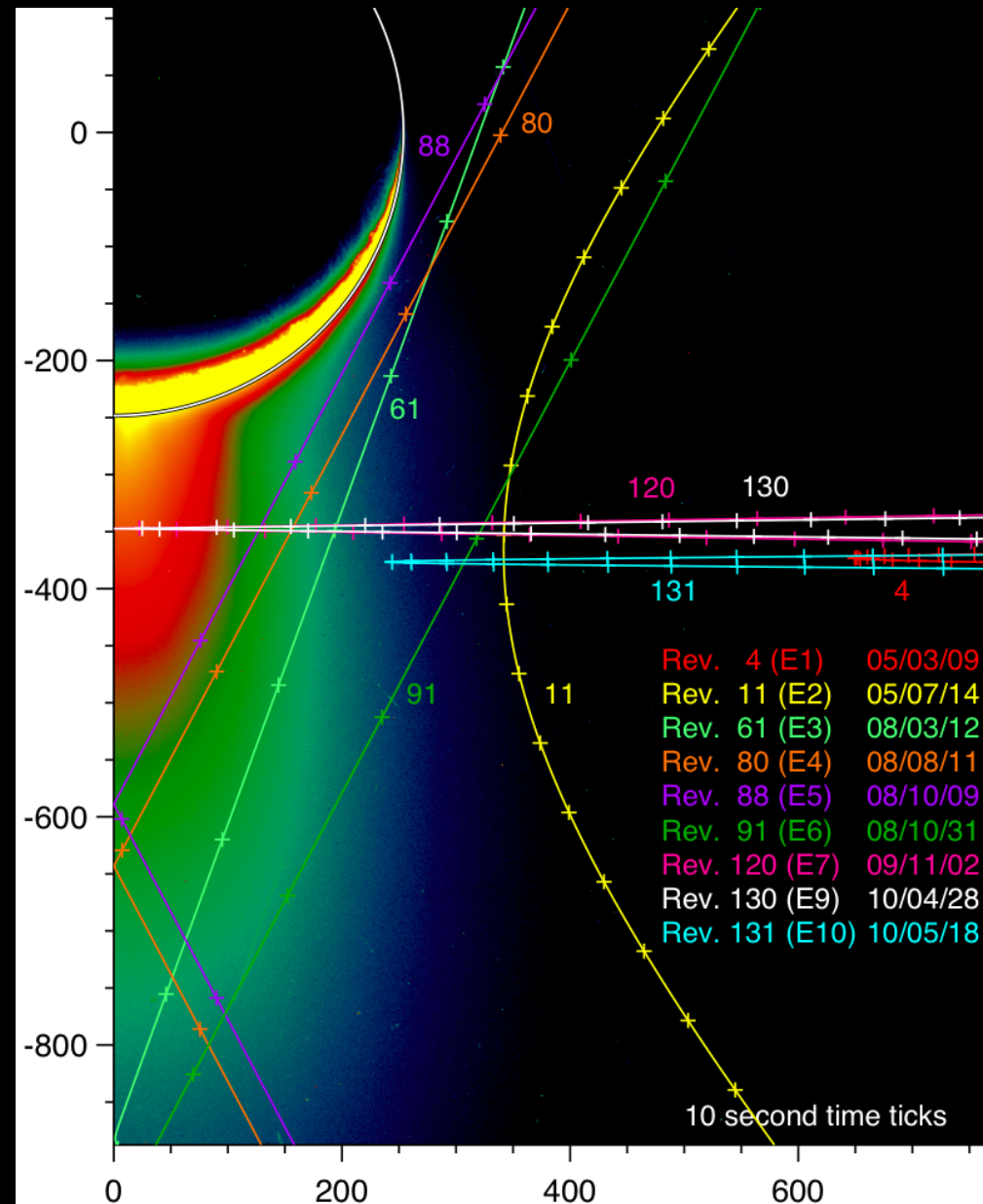


2 Dec 2008

# Cassini's Enceladus Encounters

## Seven to date

<u>17 Feb 2005</u>	<u>1176 km</u>
<u>9 March 2005</u>	<u>504 km</u>
<u>14 July 2005</u>	<u>172 km</u>
<u>12 March 2008</u>	<u>52 km</u>
<u>11 August 2008</u>	<u>50 km</u>
<u>9 October 2008</u>	<u>25 km</u>
<u>31 October 2008</u>	<u>197 km</u>
<u>2 November 2009</u>	<u>99 km</u>
<u>21 November 2009</u>	<u>1603 km</u>
<u>28 April 2010</u>	<u>99 km</u>
<u>18 May 2010</u>	<u>198 km</u>



# Cassini Mission Overview

Four-Year Prime Tour + Two-Year Extended Mission (Proposed), July 2004 - July 2010



Extended Mission

# Crescent Dione



25 Feb 2009