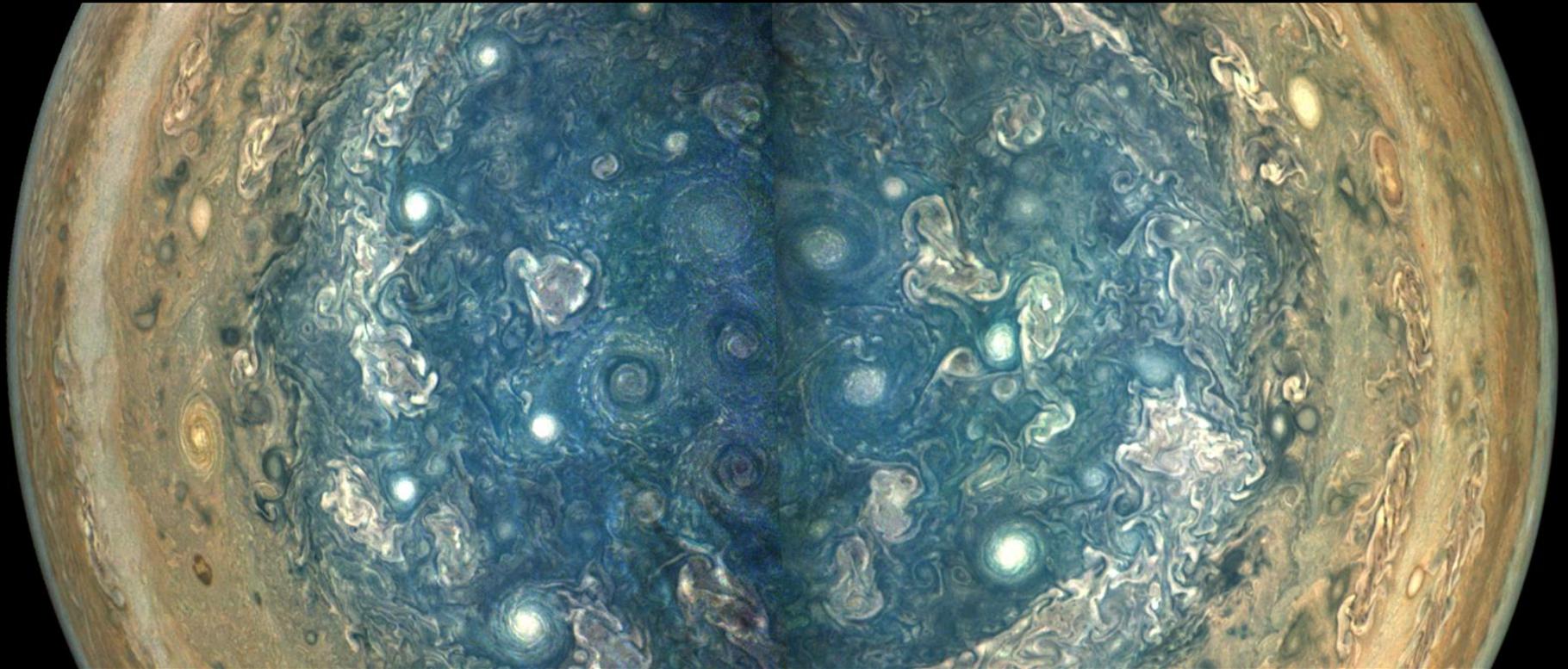


# Behaviour of Jupiter's polar polygons over 5 years of JunoCam imaging

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Hansen, Glenn S. Orton, Tom Momary



# South Polar Region

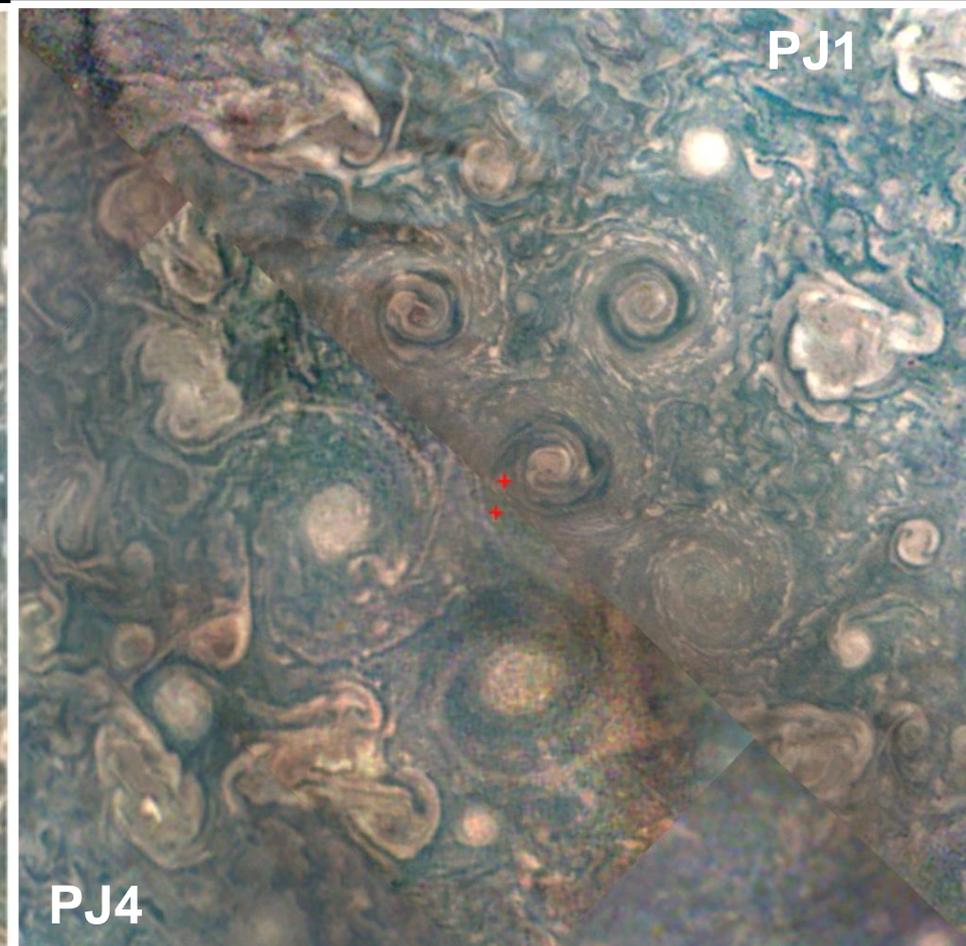
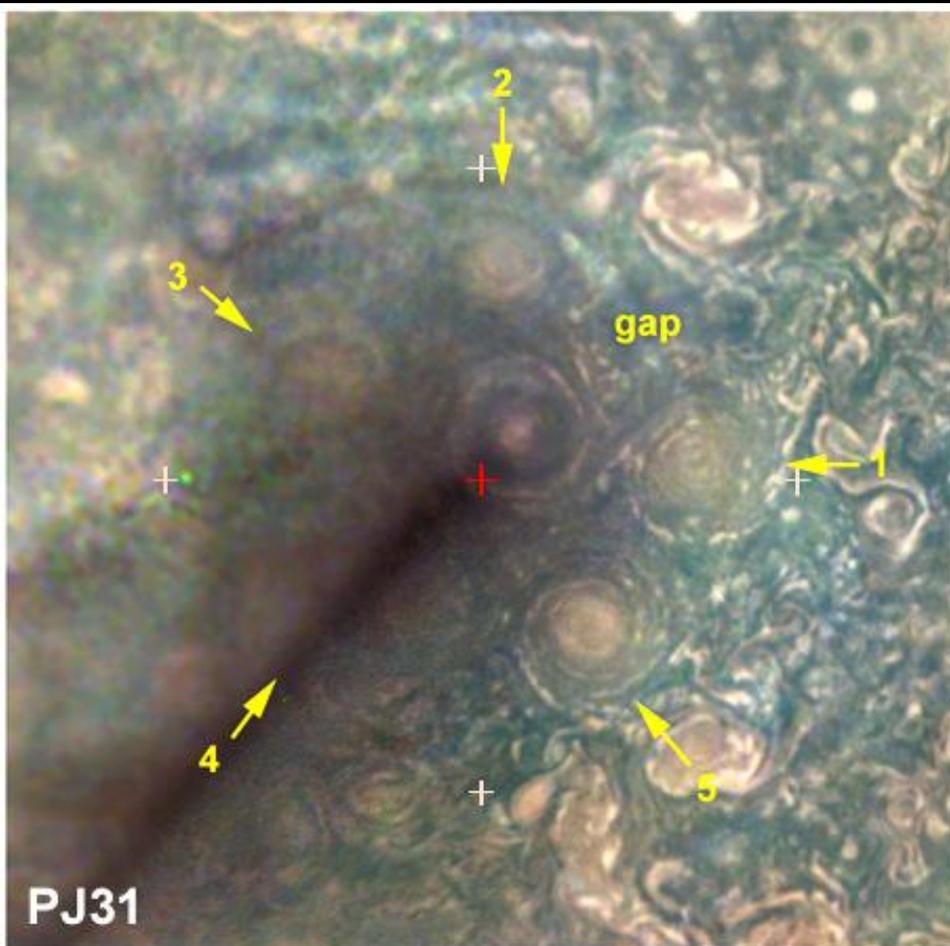
PJ1



PJ4

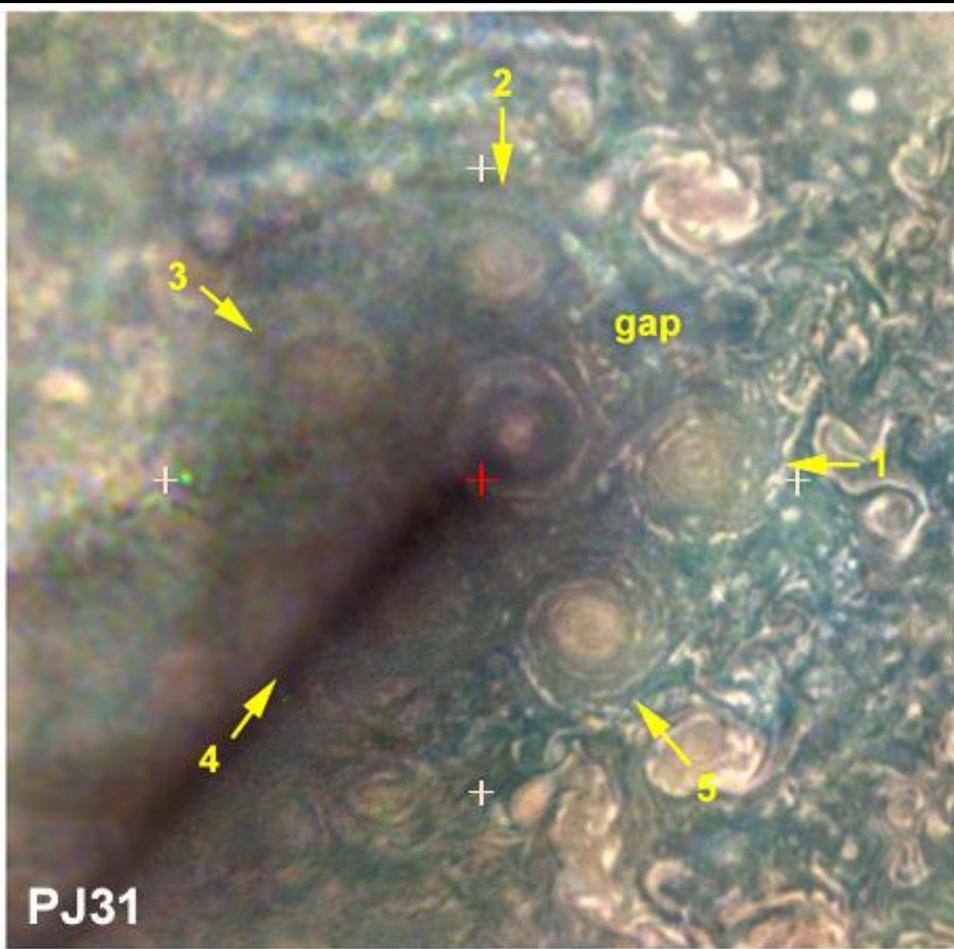
South polar projection maps

The pentagon retains the same configuration after nearly 5 years.



It rotates very slowly: mean speed  $+1.21 (\pm 0.07)$  deg/PJ  
or  $+8.3 (\pm 0.5)$  deg/yr .

## Geometric explanation of the form of the south polar pentagon:

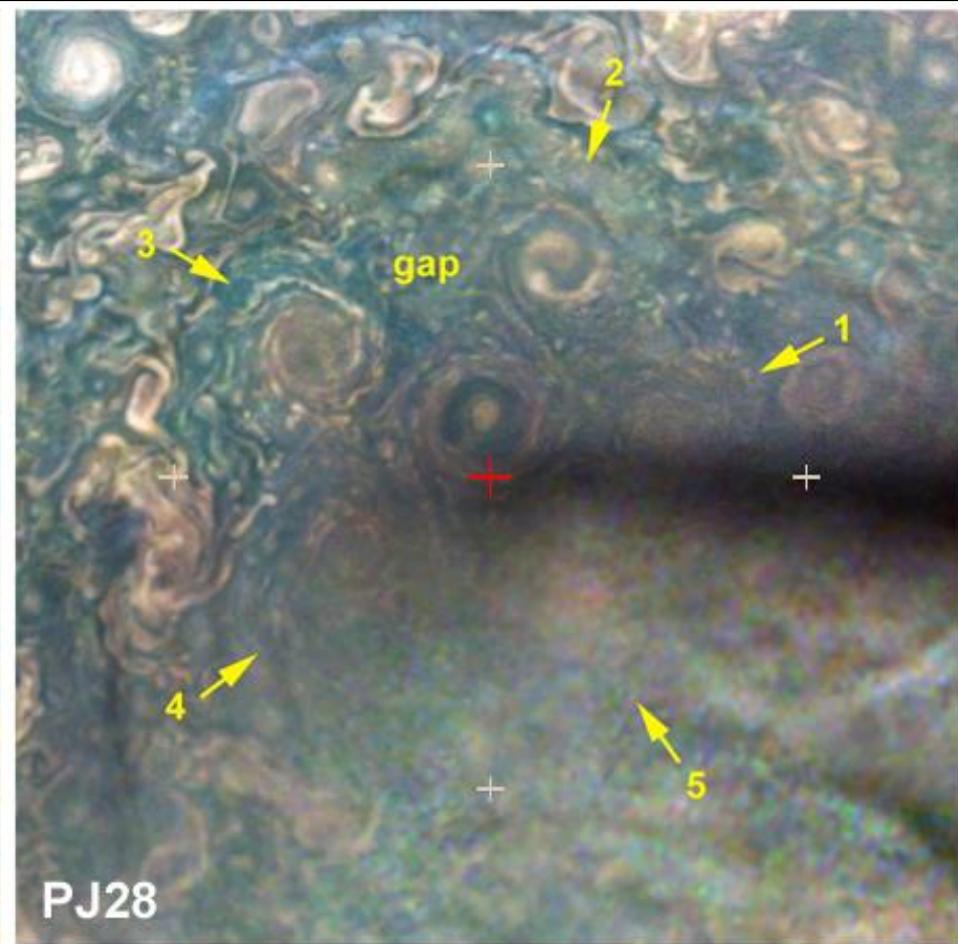
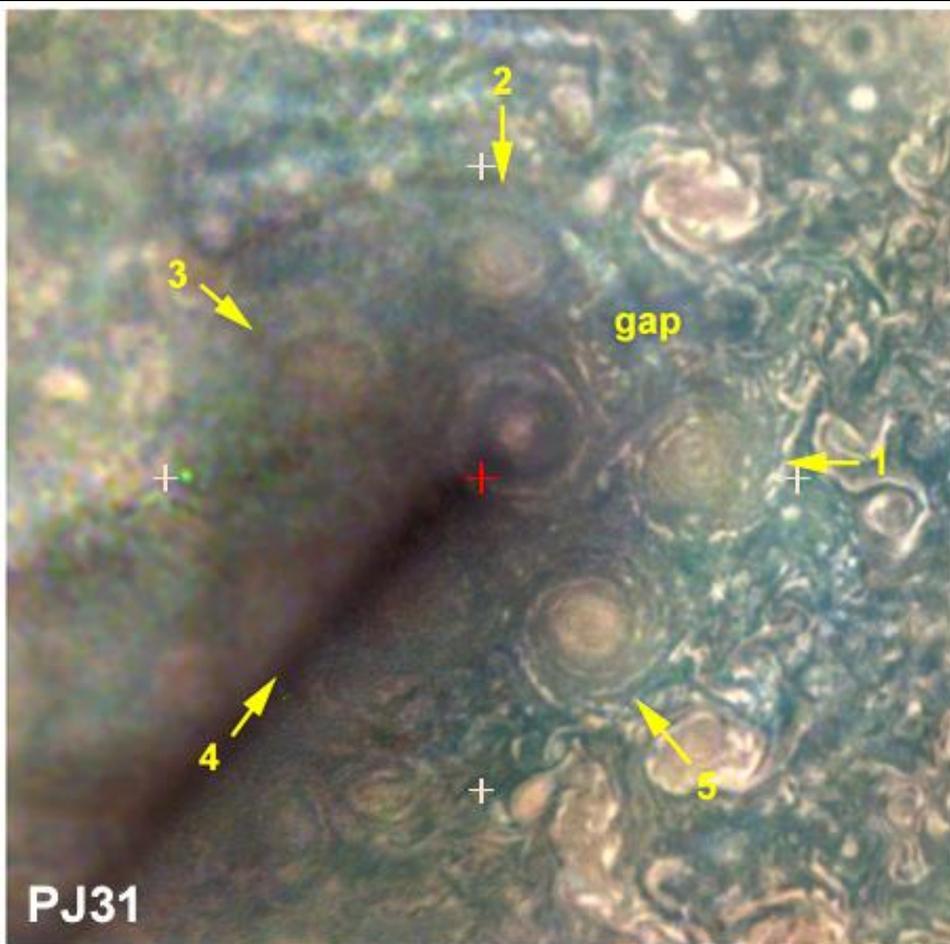


### Conjectures:

1. Cyclonic vortices accumulate and grow as close to the pole as possible.
2. The size of the cyclones is limited.
3. The central cyclone must be smaller than average of those around it.

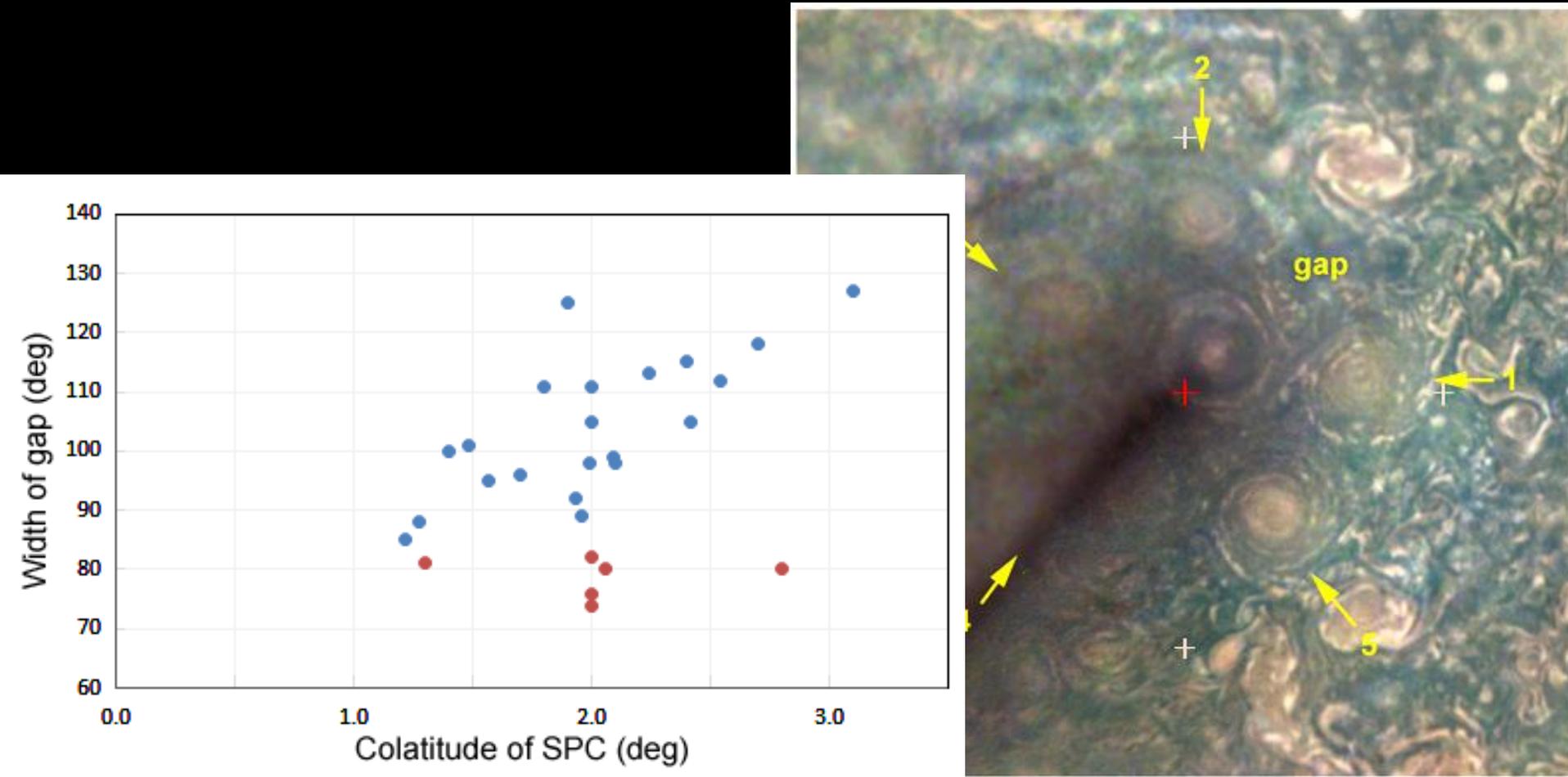
Close packing as a 'vortex crystal' then produces the asymmetric pentagon observed.

To keep the cyclones closest to the pole, as the central cyclone drifts:



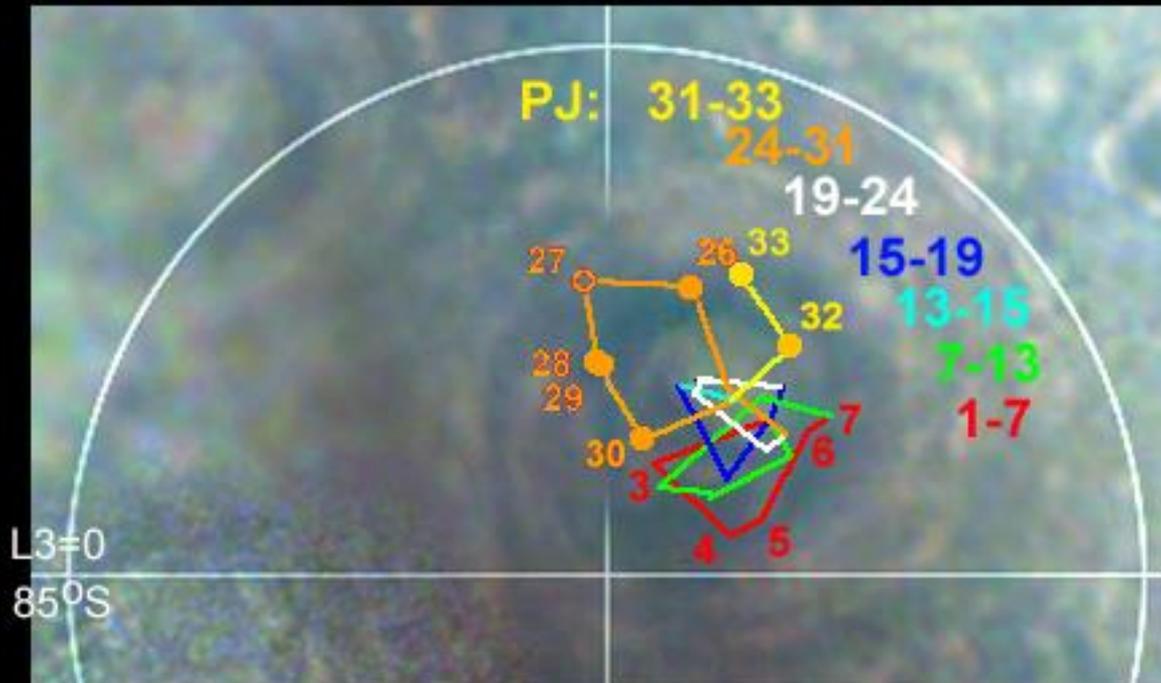
When it drifts in longitude, the gap shifts from CPCs 1&2 to CPCs 2&3.

To keep the cyclones closest to the pole, as the central cyclone drifts:



When it drifts to lower latitude, the gap (angle between CPC-1&2) becomes wider.  
(Brown points: when there is a gap between CPC-2&3 associated with high longitude)

The pentagon also moves in semi-regular loops  
with mean period 11.5 ( $\pm 1$ ) months  
-- and tends to drift in one direction



This could be precession of the cycles  
around the pole at  $\sim 8$  ( $\pm 8$ ) deg/yr;  
or a non-periodic wandering.

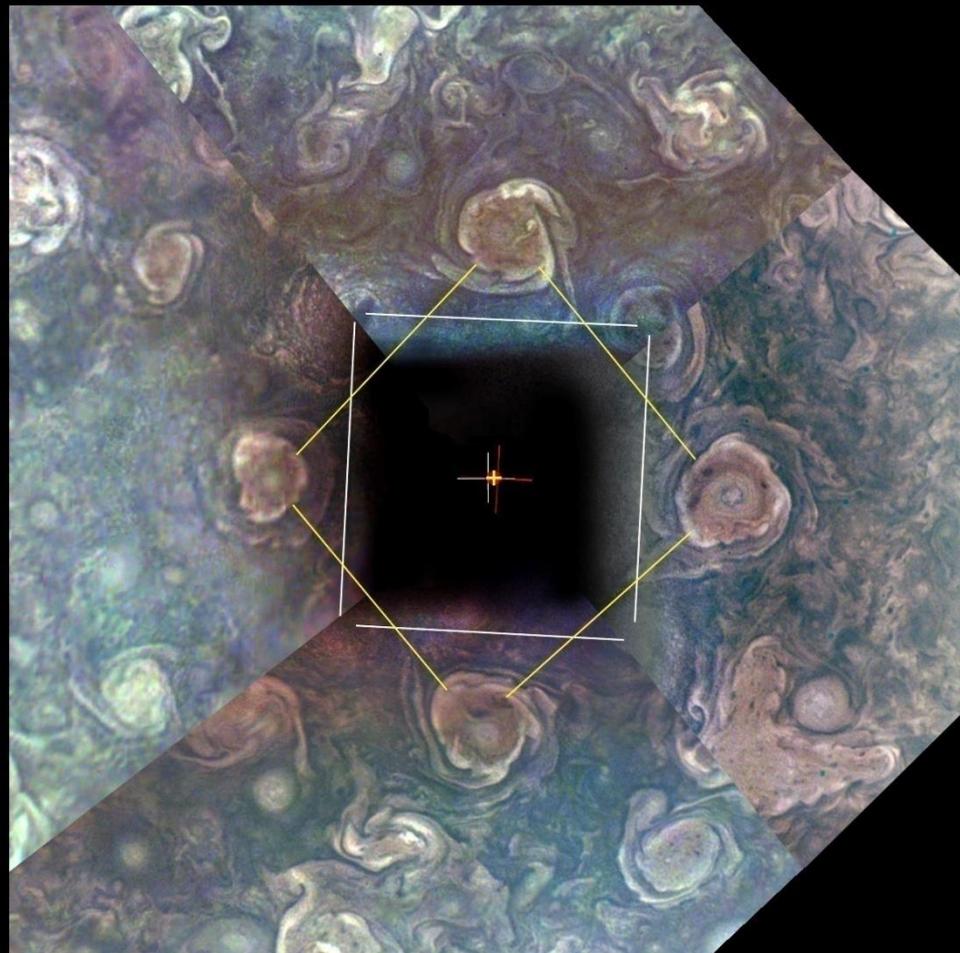
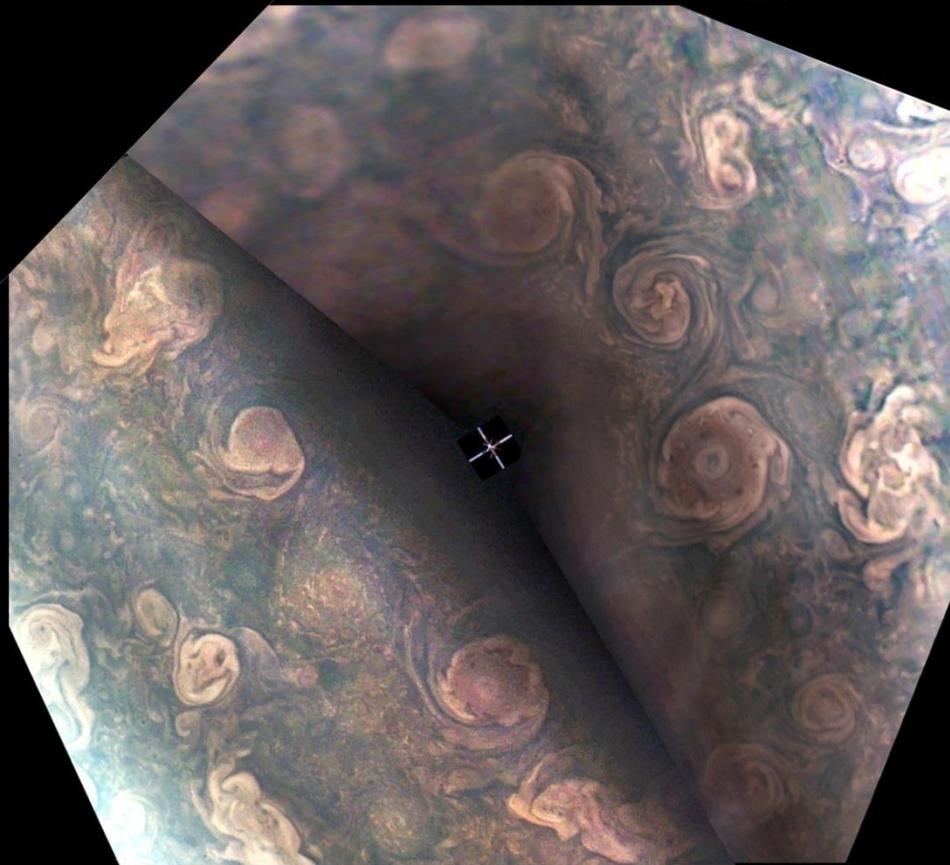
# North polar region

North Polar projection maps aligned in L3

*Credit: NASA / SwRI / MSSS / Gerald Eichstädt / John Rogers*

PJ1

PJ6 to PJ9 (combined, with small rotations)

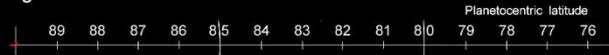


PJ4

# Composite north polar projection map, PJ25-PJ28

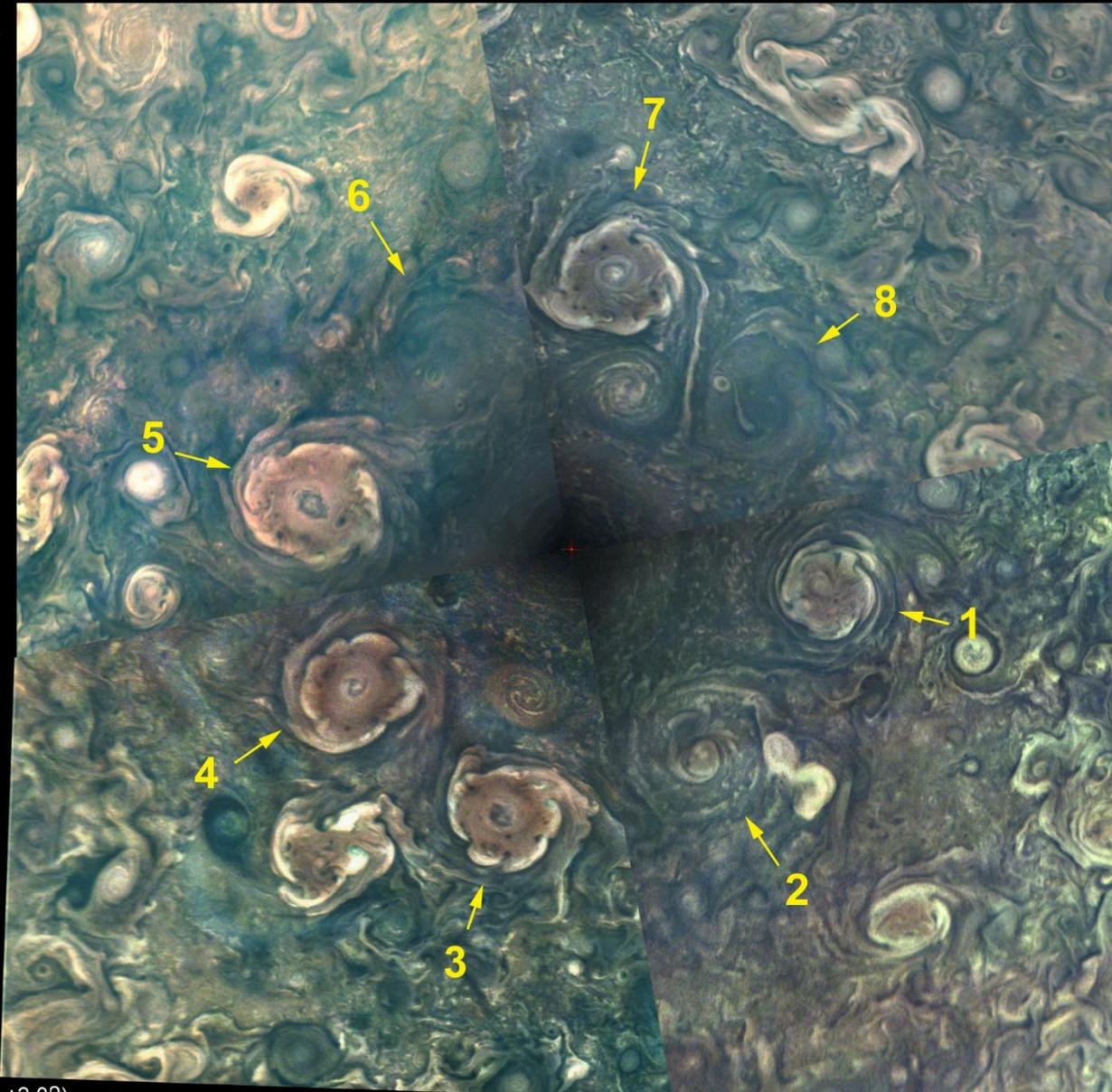
Credit: NASA / JPL / SwRI / MSSS / Gerald Eichstädt / John Rogers

L3=0 to right.



PJ28

PJ27



PJ25

(rotated +2.0°)

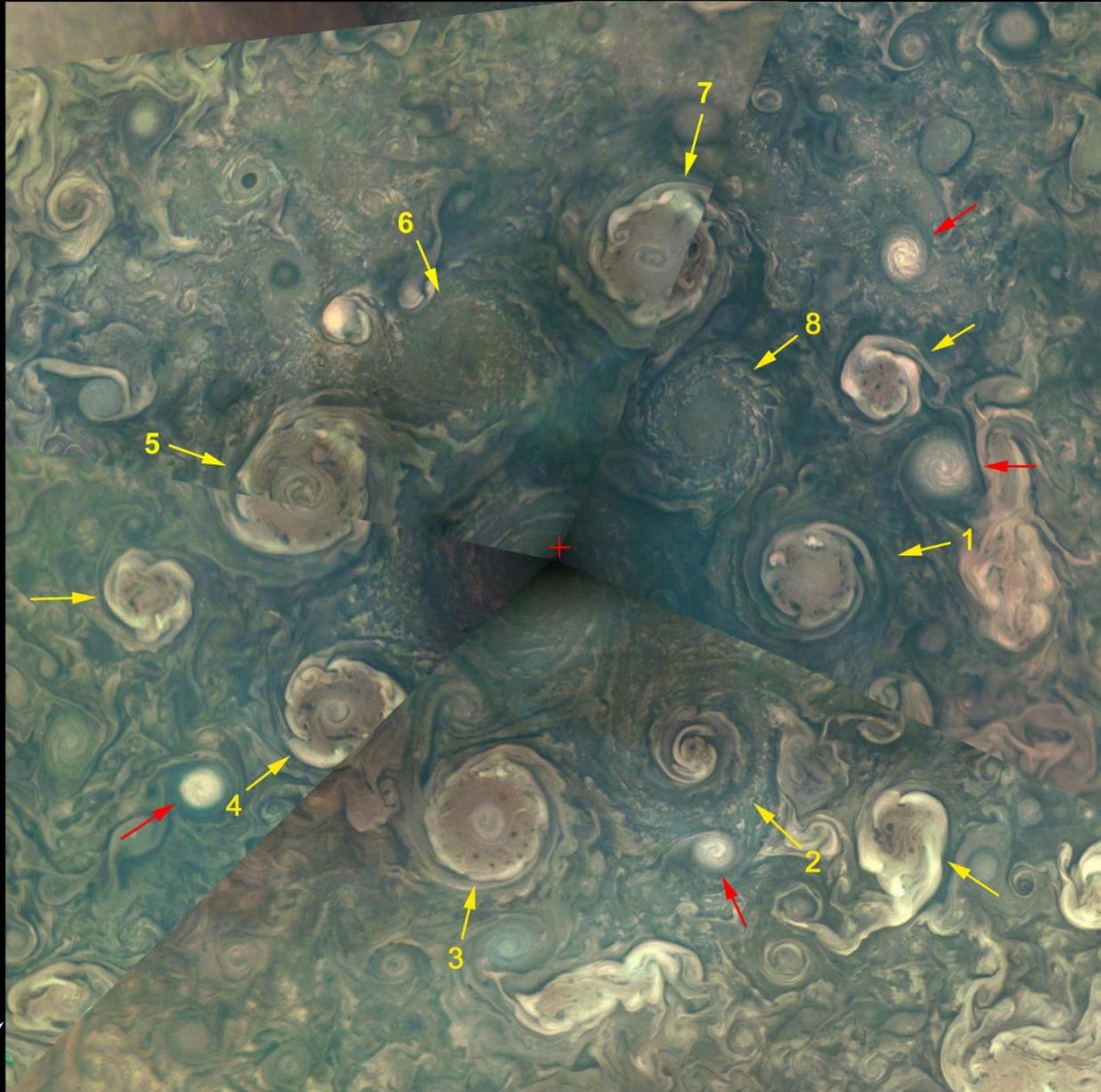
PJ26

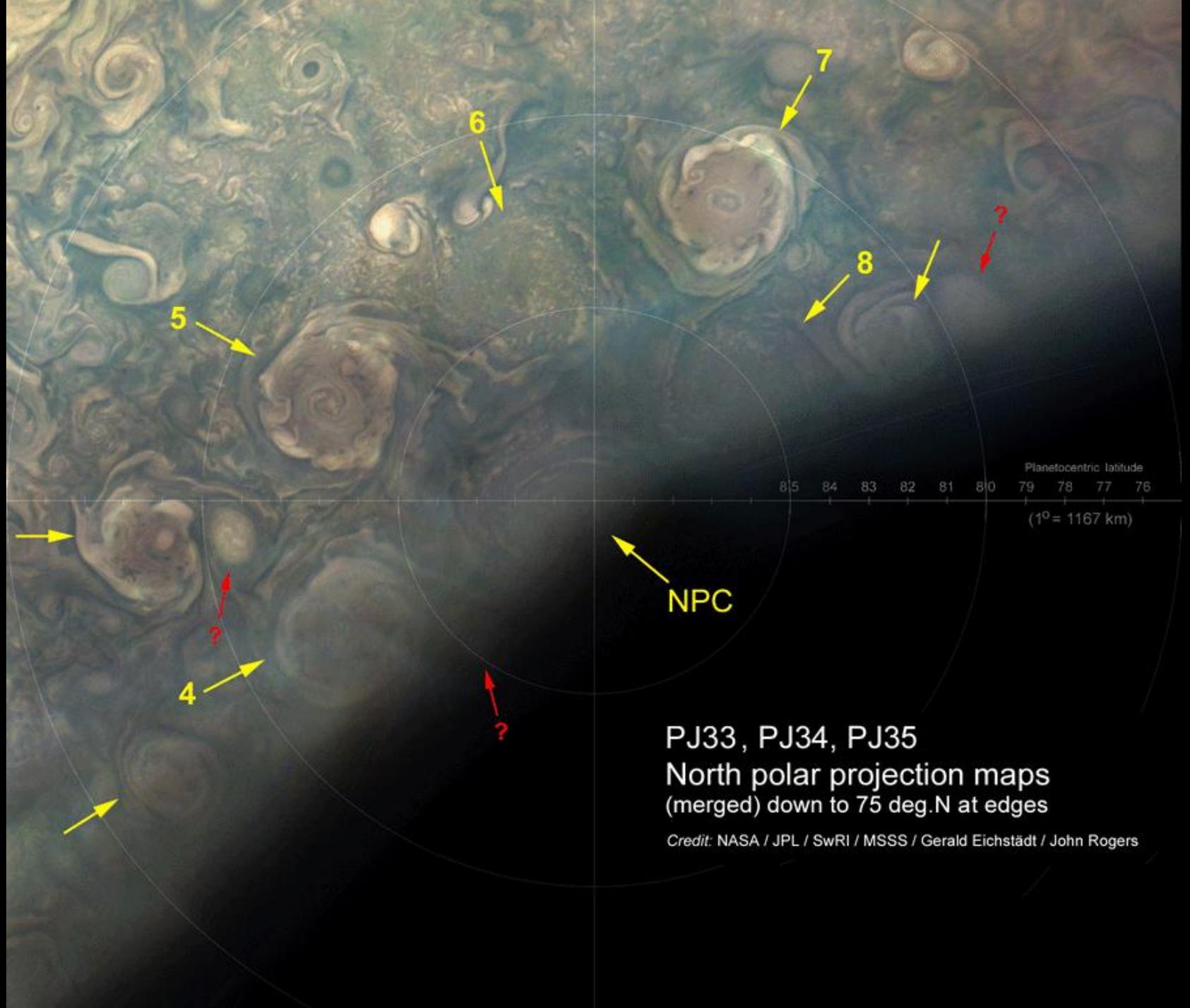
(No rotation nor translation of PJ26-PJ28 maps)

# Composite north polar projection map, PJ30-PJ33

PJ33

PJ32





***The End***

