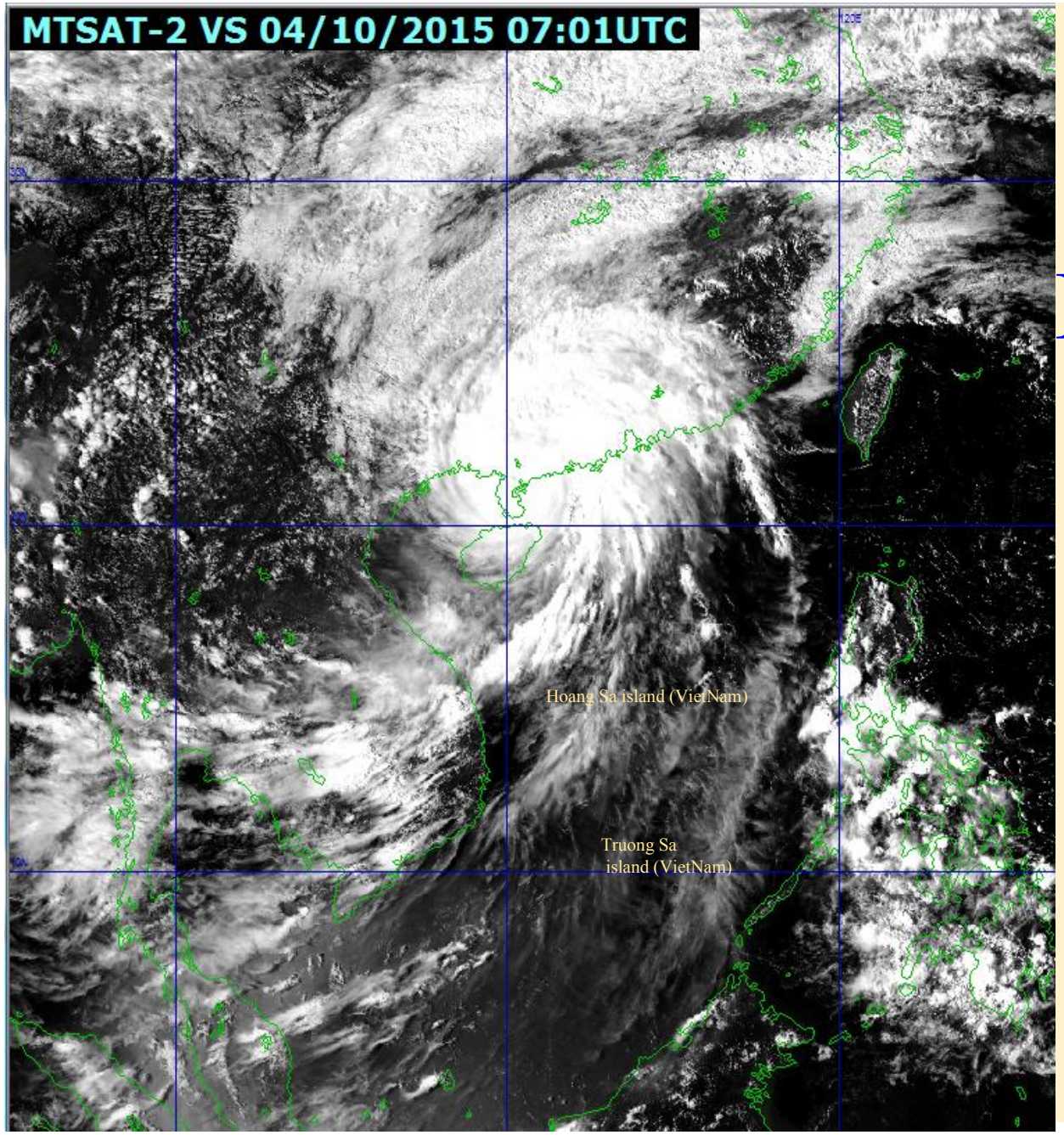
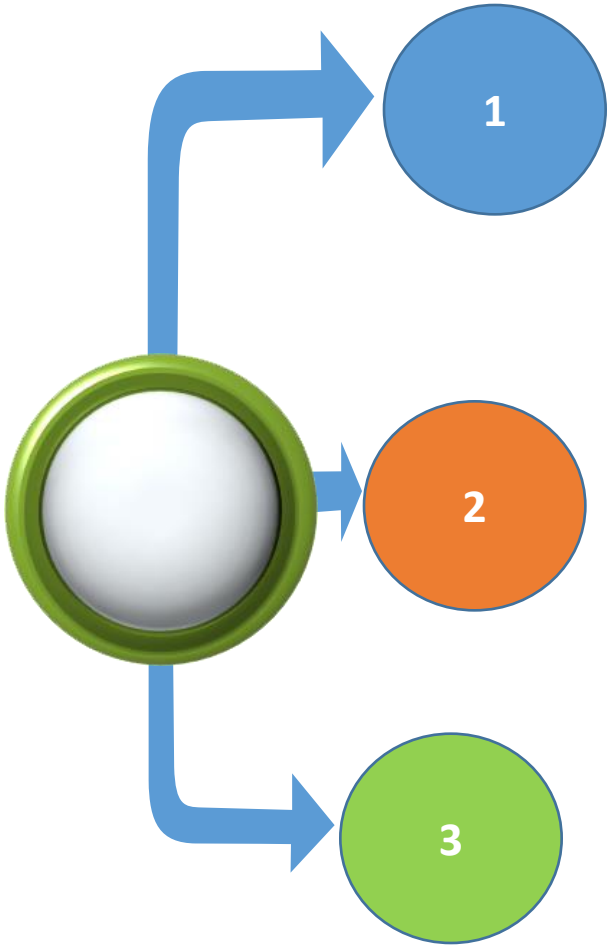


ANALYZE AND ASSESS THE RAPID CHANGE IN THE INTENSITY OF HURRICANE MUJIGAE IN 2015

LE DINH QUYET

Southern Regional Hydro-Meteorological Center, Viet Nam

CONTENT

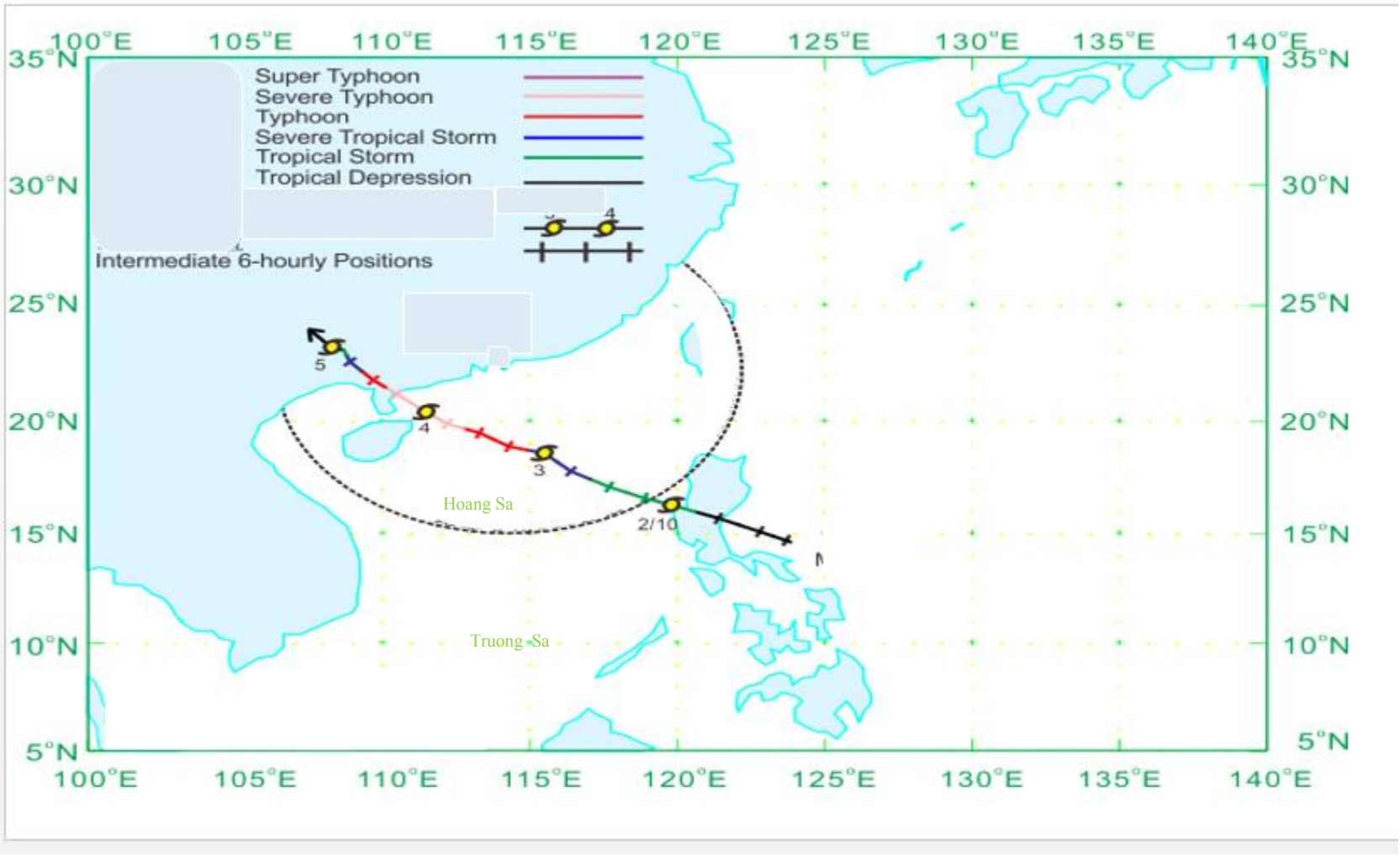


Mujigae formed; developed and made landfall

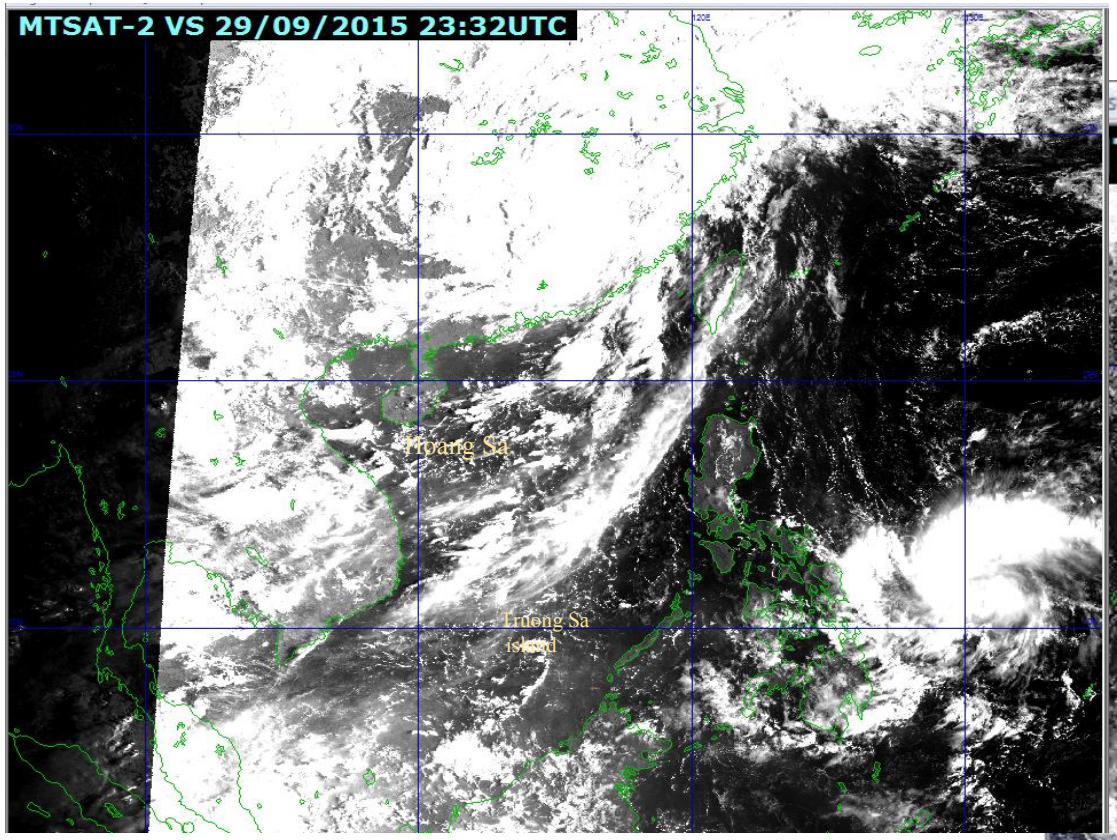
favorable conditions for rapid intensification of a typhoon

Conclusion

PART 1: Mujigae formed; developed and made landfall



- **From September 30, to October 5, 2015**
- **Mujigae formed as a tropical depression over the sea areas east of the Philippines in the afternoon of 1 October**
- **Tracked west-northwestwards in the direction of Luzon**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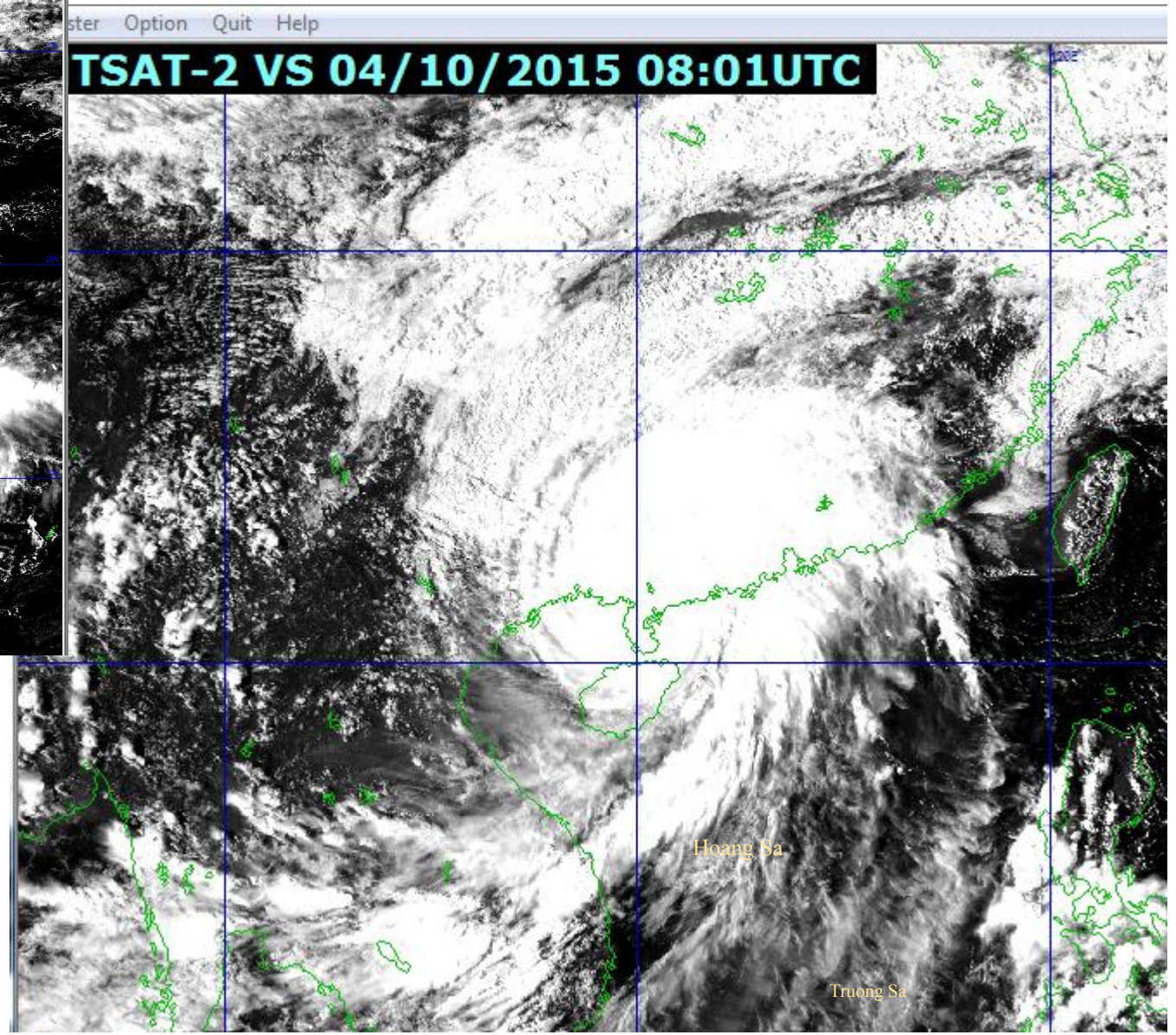
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- Mujigae entered the Bien Dong Sea October 2, and intensified into a tropical storm developed into a severe typhoon in the small hours of 4 October.

- Reaching its peak intensity before noon with an estimated sustained wind of 175 km/h near its centre

- It finally degenerated into an area of low pressure in the afternoon of 5 October over Guangxi

references

- Rapid intensification (RI) was defined as the deepening rate of greater than 41 hpa/day in the central sea level pressure (SLP) – **Holliday and ThompSon 1979**)
- Typically defined as an increase of about 15m/s in the maximum sustained surface wind speed in a 24h period- **Kaplan and DeMaria 2003**
- As an increase of maximum sustained winds of 30kt in 24h, with a minimum 5 kt increase in the first 6h and a 10kt increase in the fist 12h of the RI period- **Wang and Zhou 2008**

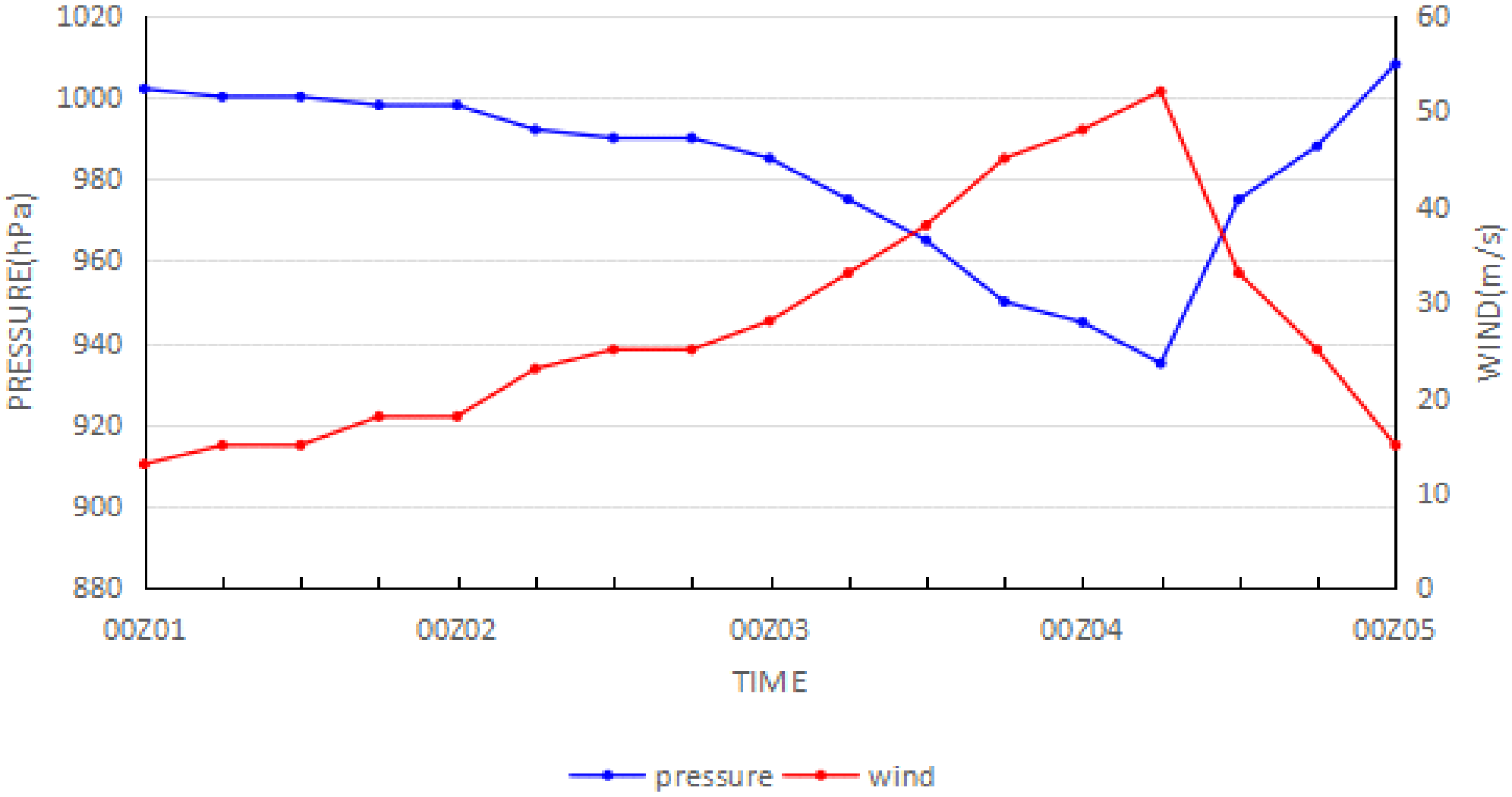
- Intensification proceeds most rapidly when SST is between 27^0C and 30^0C but slows down as SST increase above 30^0C - **Chan 2001**

- Upwelling and vertical mixing of the cool underlying ocean by the TC vortex can produce a negative feedback between the atmosphere an ocean- Sutyrin and Khain 1979 - **Bender and Ginis 2000**

TC intensity change dependent on:

- Sea level pressure (SLP)
- SST
- Low vertical shear
- Warm core
- **water vapor flux**
- .....

Presure and Wind

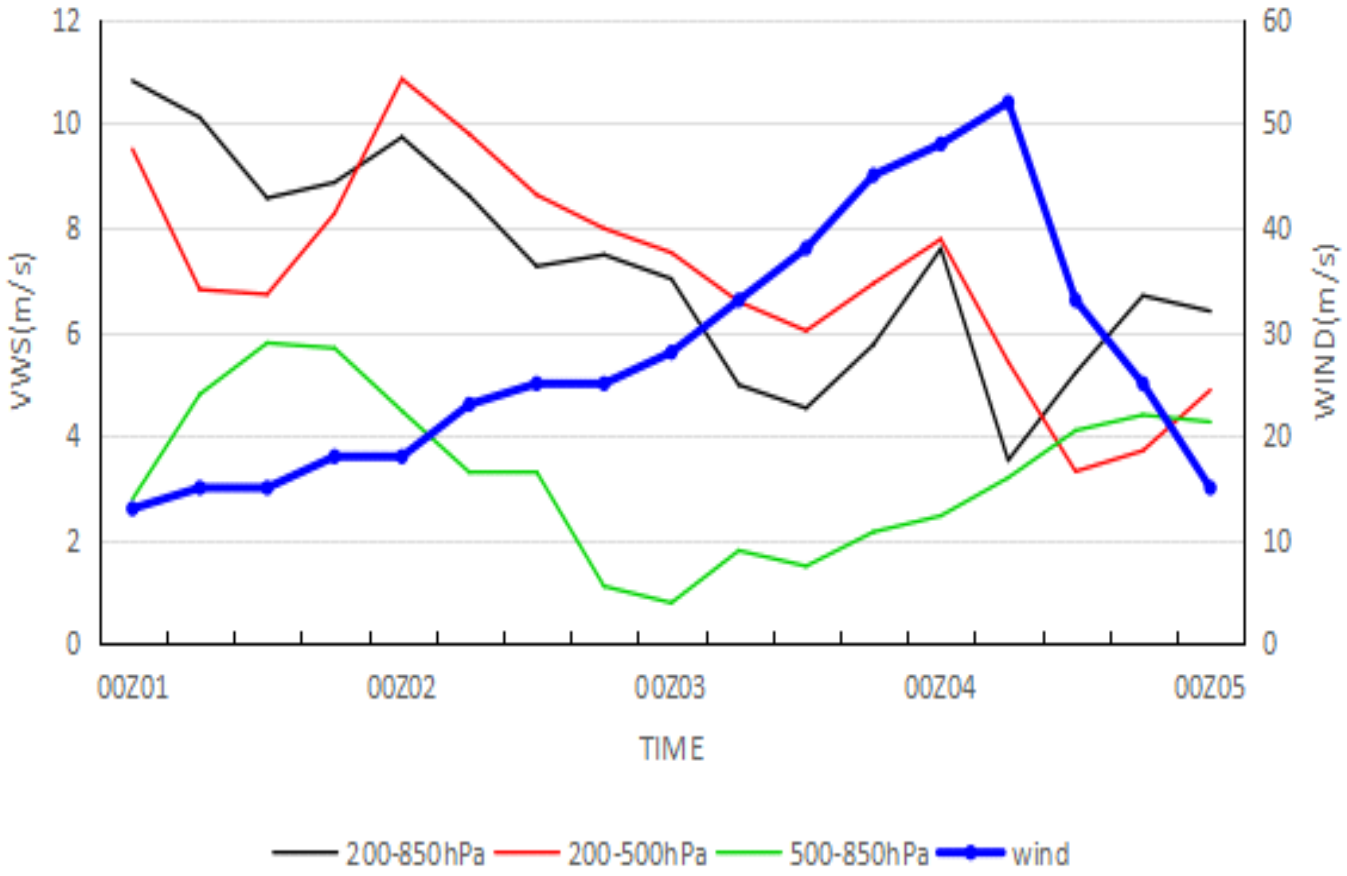


PART 2: FAVORABLE CONDITIONS FOR RAPID INTENSIFICATION OF A TYPHOON

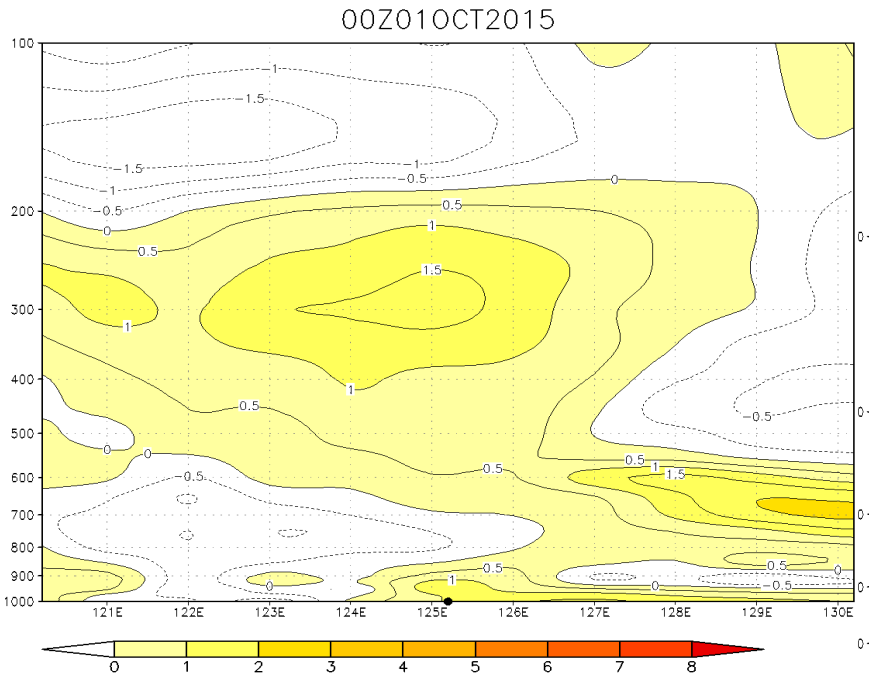
1. Vertical wind shear

- 200-850hPa: <10m/s

- From 18:00 UTC 2 Oct to 06:00 UTC 4 Oct it decreased 4.5m/s



2.Warmcore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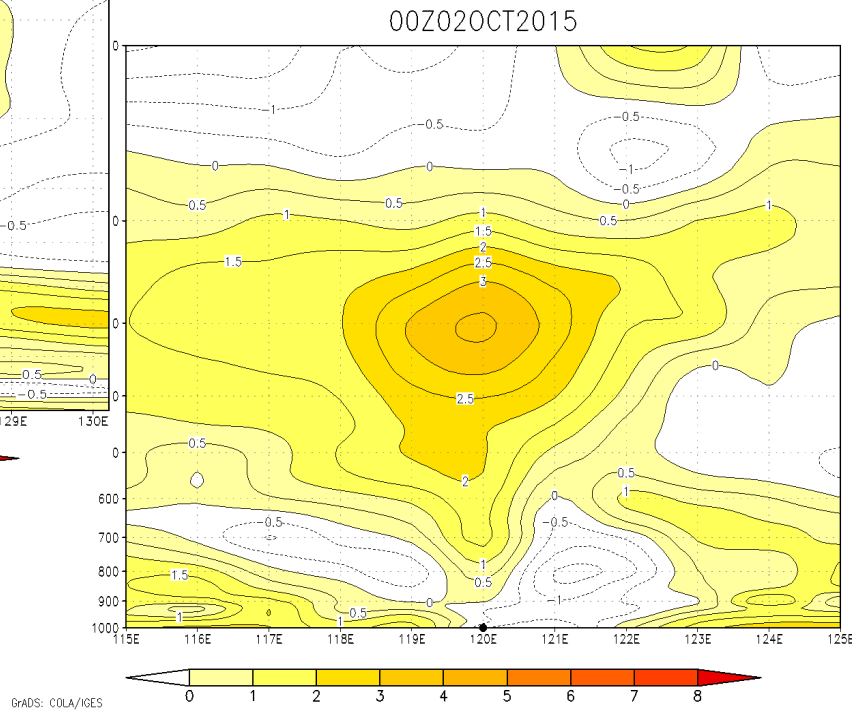
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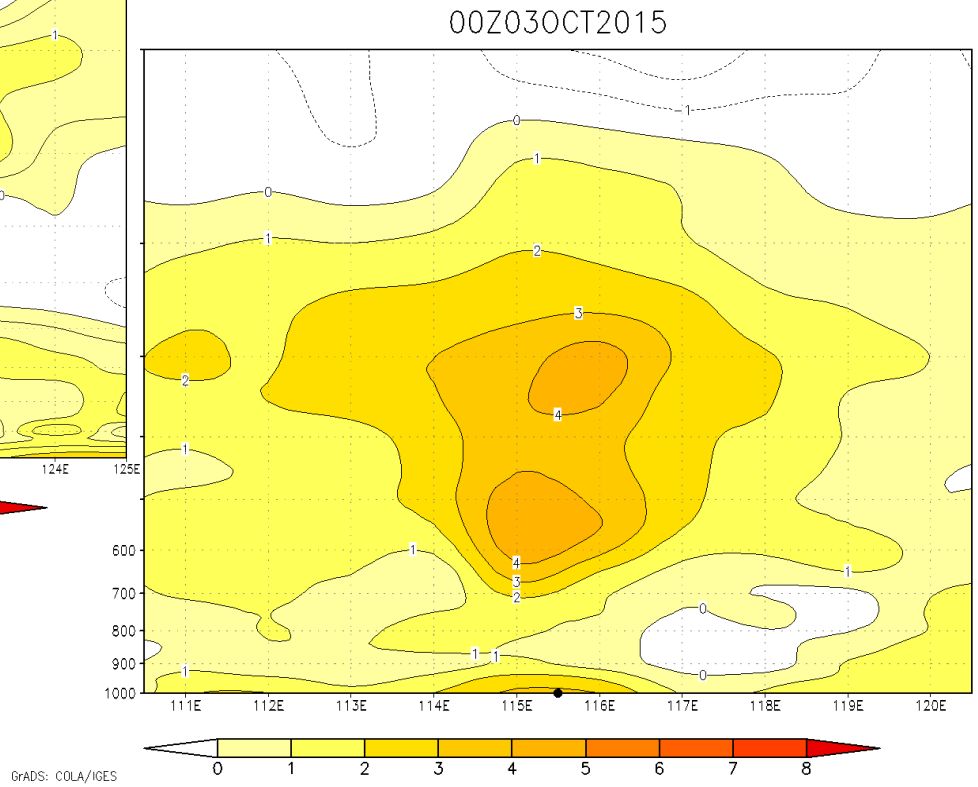
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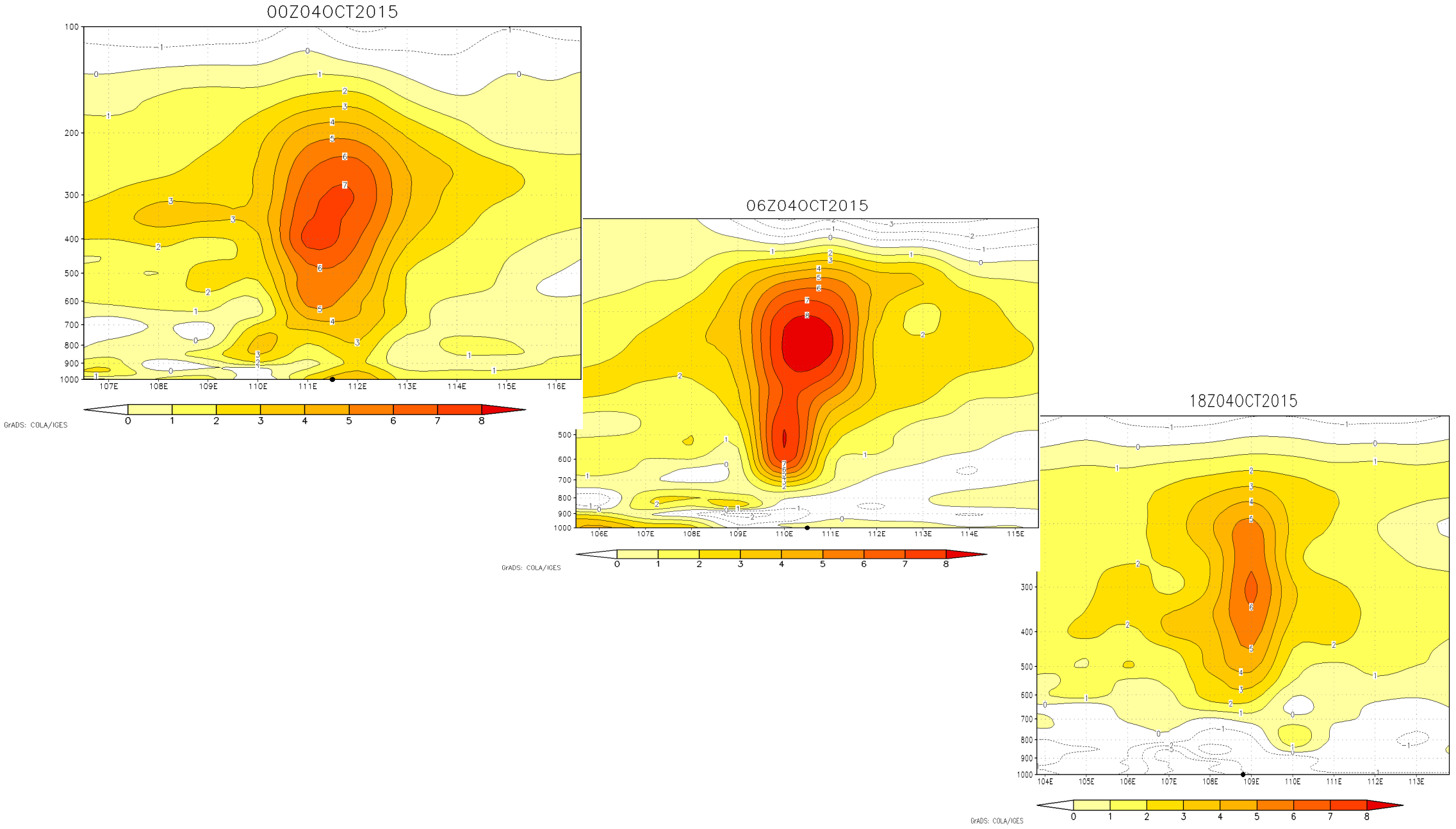
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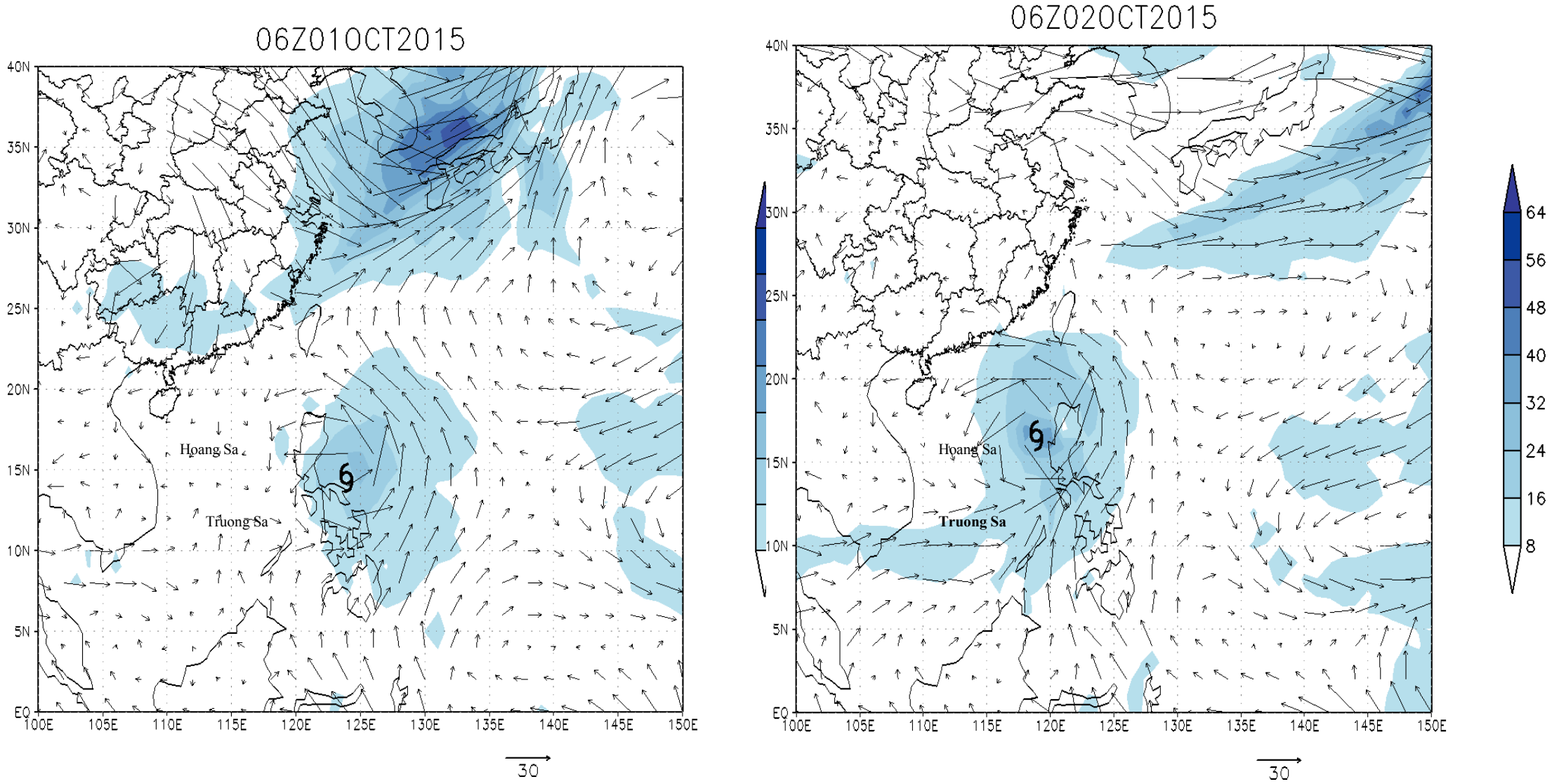
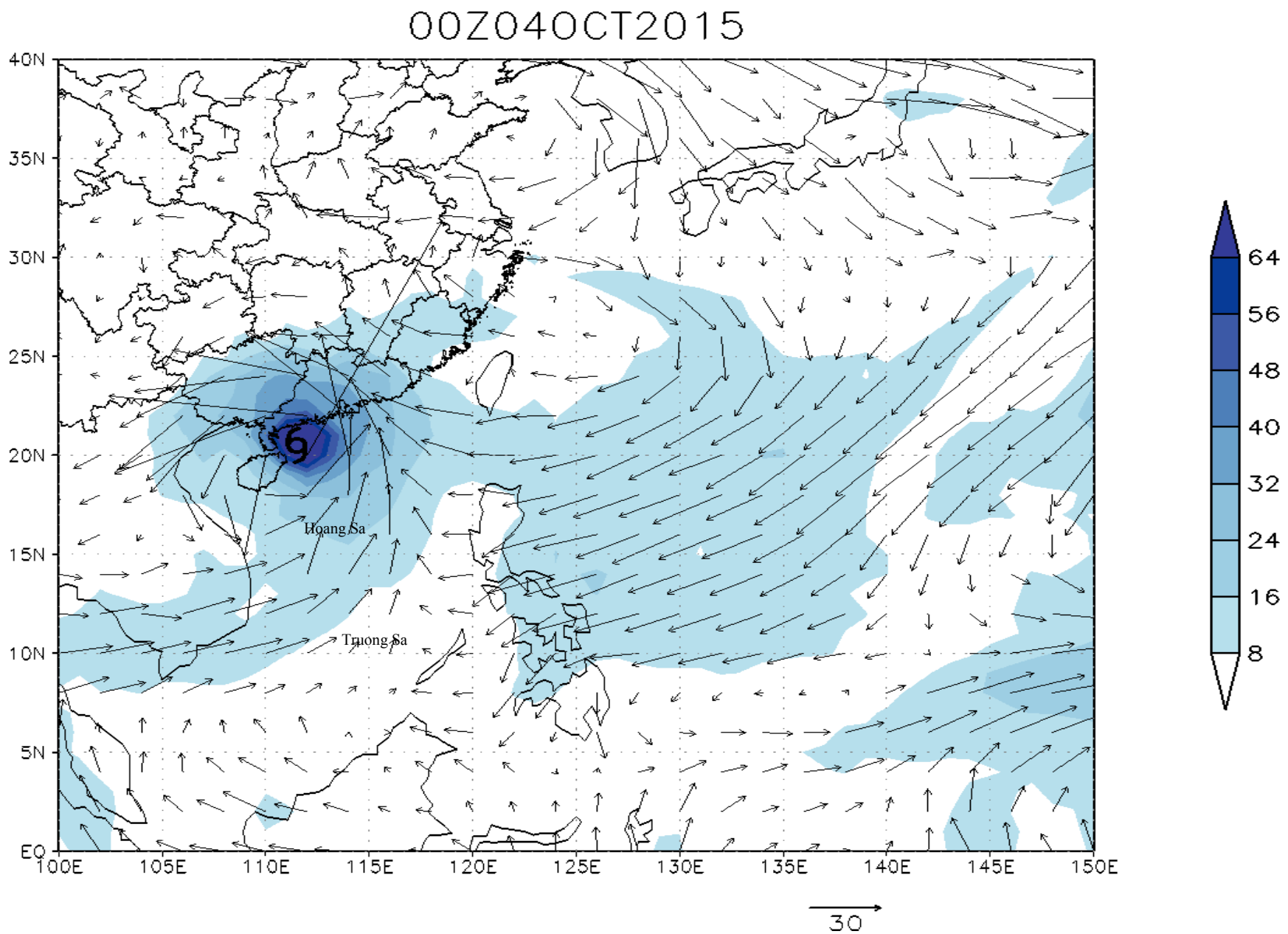
3. The water vapor flux of 850hPa

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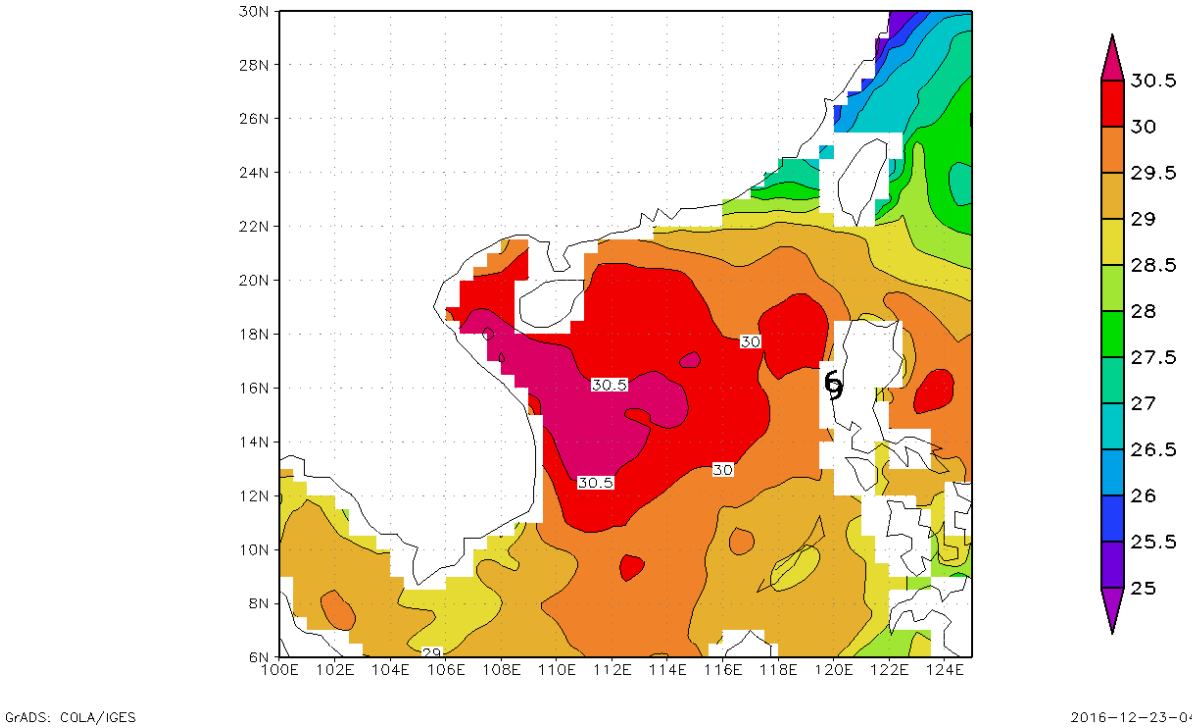
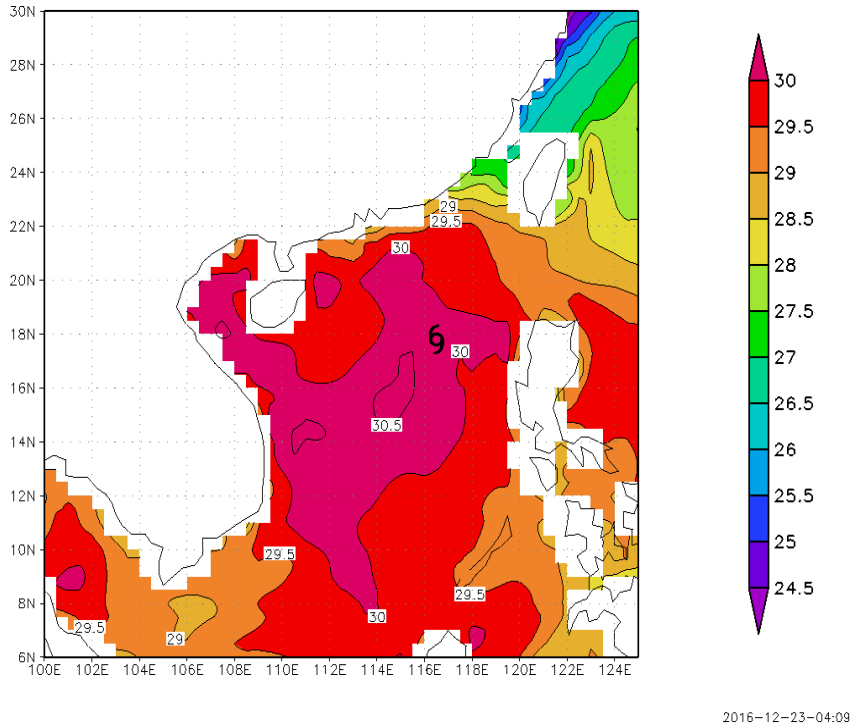
• Sea surface temperature



02 oct 2015



03 Oct 2015

Part 3: Conclusion

-Typhoon Mujigae was strong. It **experience 4** categories before making landfall

- Mujigae had processes for the rapid intensification as a period from 1800 UTC 02 Oct to 0600 UTC 04 Oct, the maximum 10m wind speed increased by 27 m/s and the central sea level pressure dropped by 55 hPa

- It accurred decreasing environmental vertical shear at 200-850hPa; Vertical wind shear magnitude decreased sharply from 7 m/s to 4.5m/s

- While typhoon was strongest, the water vapor flux of 850hPa increased more and more; Value of warm core was 8

- Favorable ocean condition for RI of a TC such as High sea suface temperature, as value was above 29^0C, even 31.5^0C

- The role of the warm core in Mujigae intensification has been indentified by 6-8^0C


THANK YOU