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SCHOOL OF ENERGY AND ENVIRONMENT

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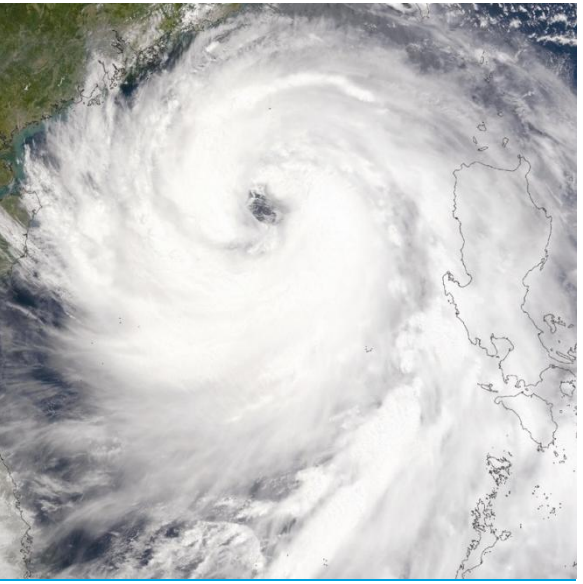

Seasonal Prediction of Tropical Cyclone Activity using a Regional Climate Model

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Outline

- Model description
- Structure of model tropical cyclone
- Model climatology and interannual variability
- Summary

The model

- Modified version of Regional Climate Model Version 3 (RegCM3) developed at ITCP
- Horizontal resolution: 60 km
- Emanuel cumulus scheme
- Domain: 94ºE-172ºW, 14ºS-41ºN
- Initial conditions: 8 ensemble members from 00UTC on 1 May and every 6 hr after
- Integration till the end of October

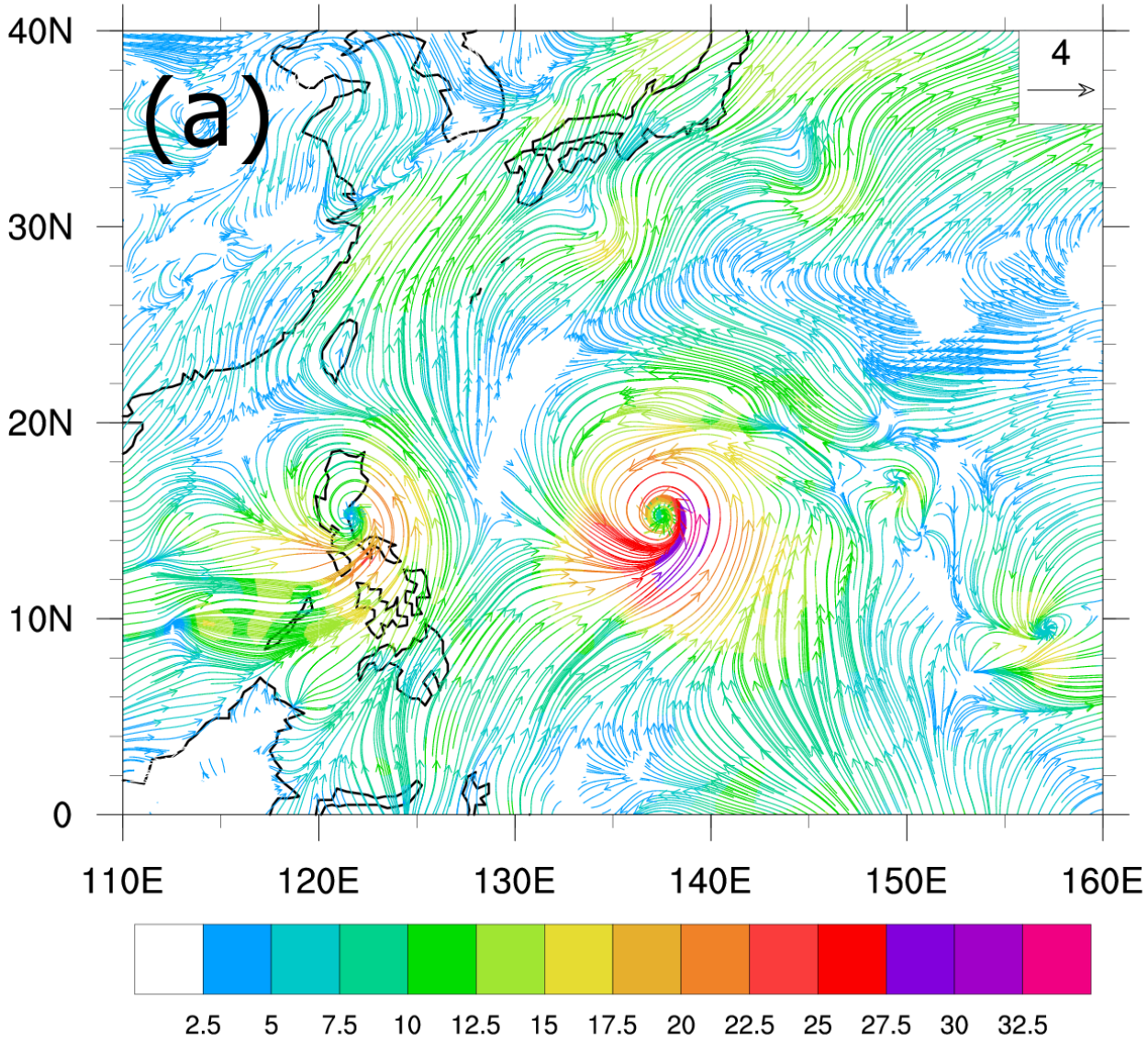
The model

- **Initial and boundary conditions: ERA40**
- **SST: weekly OISST from NOAA**

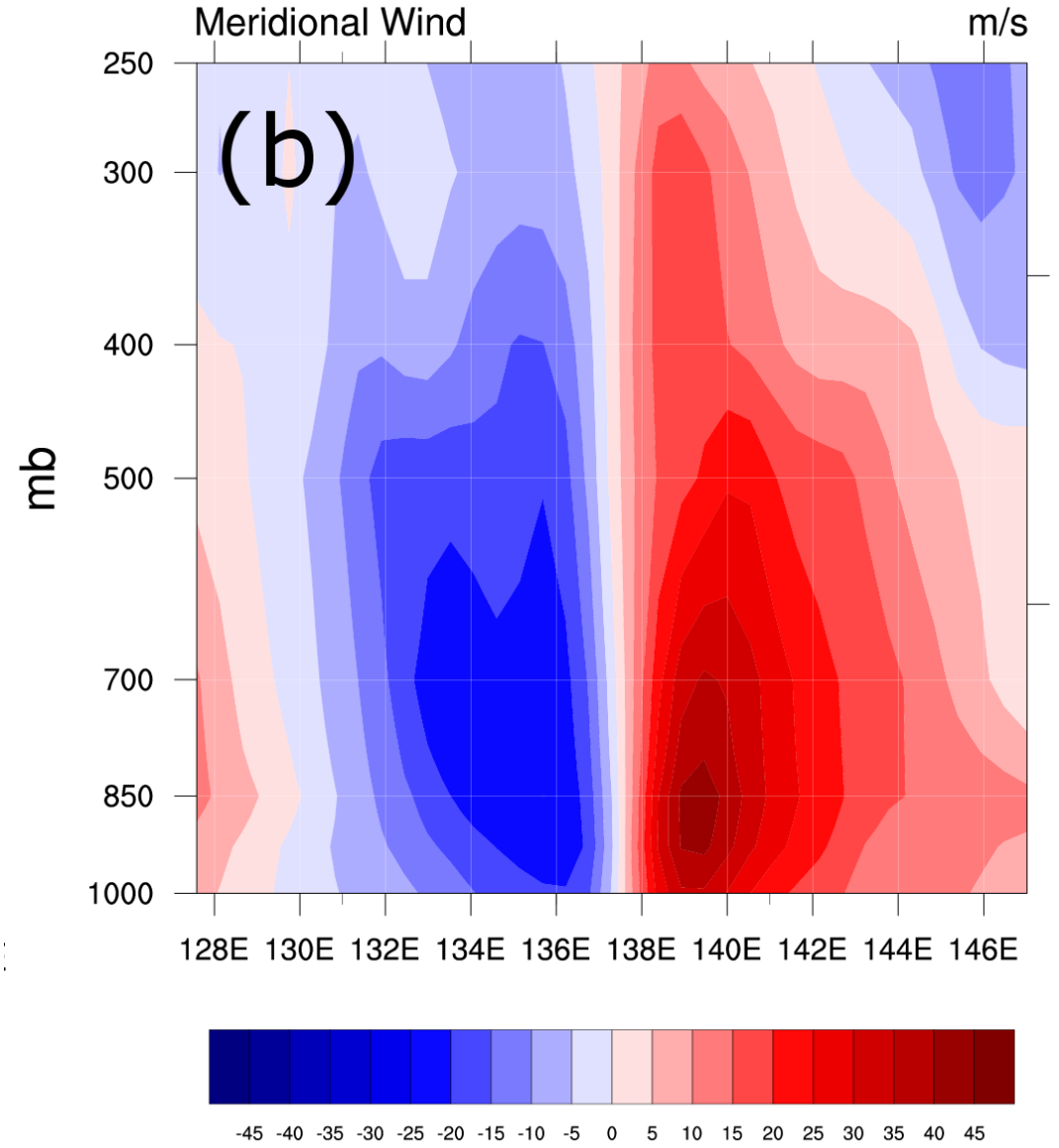
Detection of a tropical cyclone

- Local maximum $\zeta_{850hPa} \geq \zeta_T$ (450×10^{-6} s^{-1})
- T_{300hPa} at centre – $T_{environment} \geq 1^oC$
- lifetime ≥ 2 days
- Genesis over the ocean

Example of a tropical cyclone in RegCM3



Example of a tropical cyclone in the Regional Model



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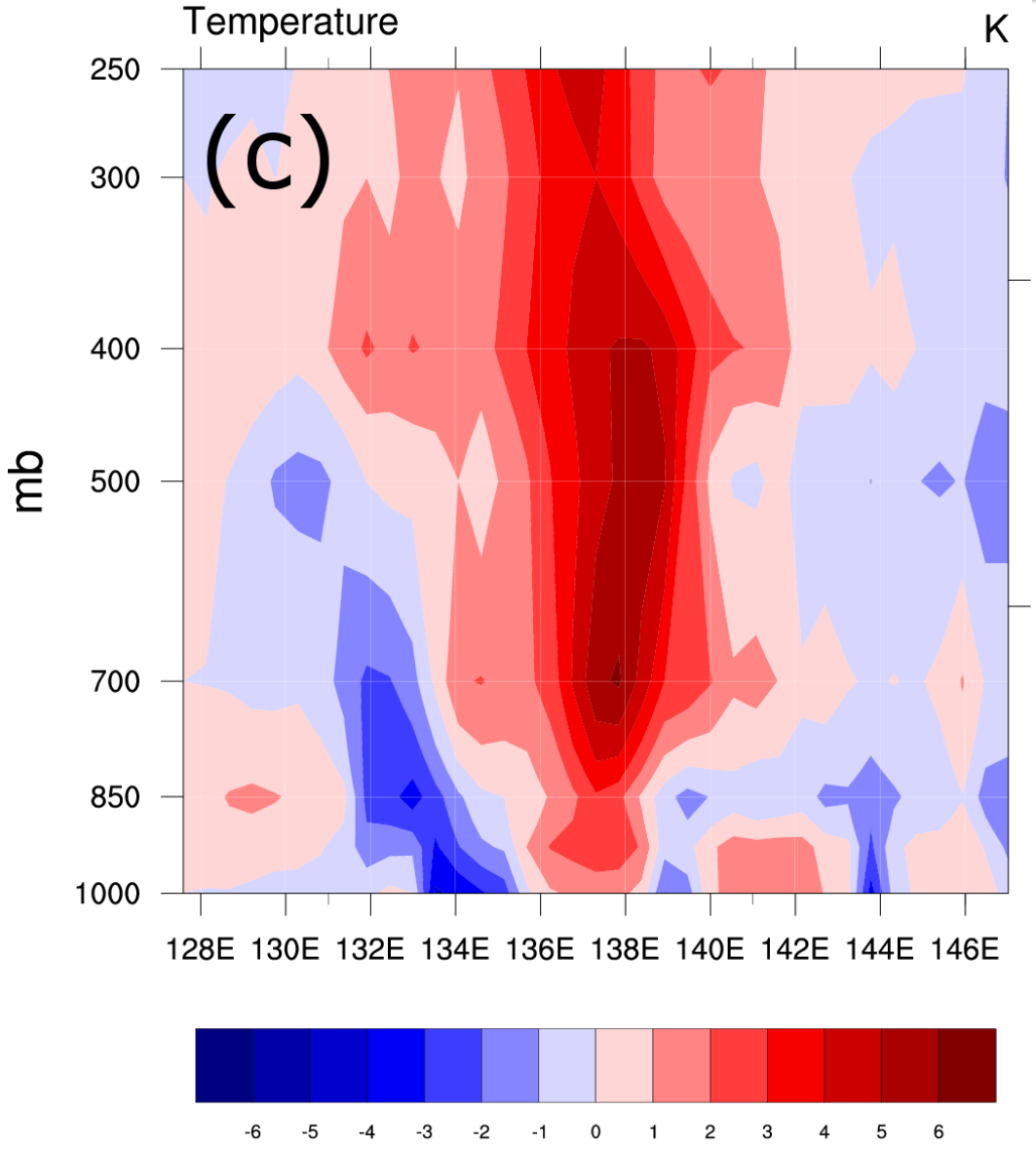
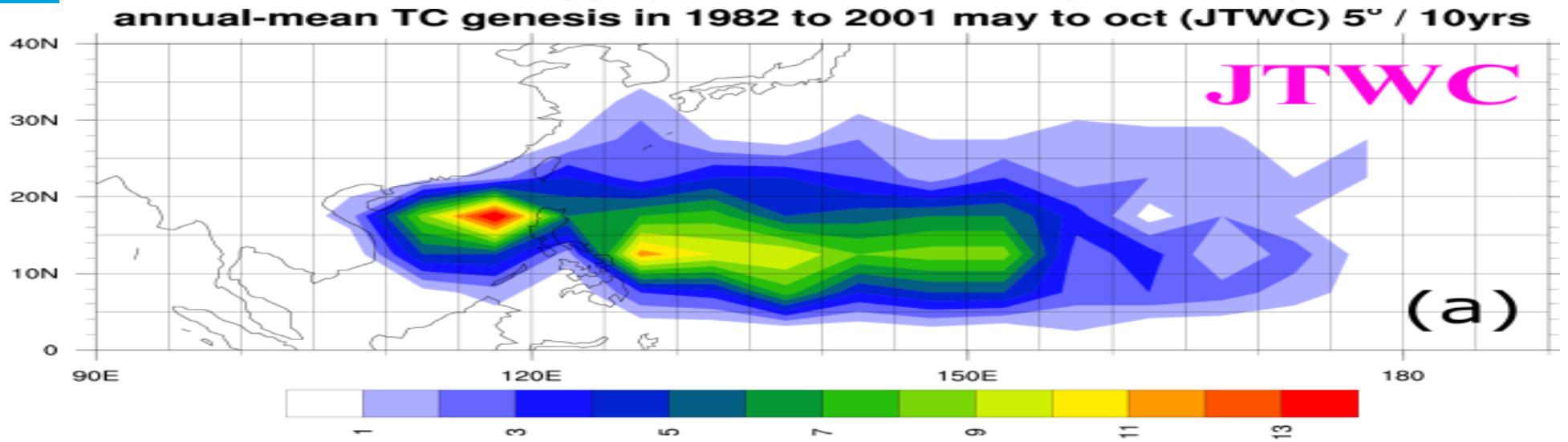
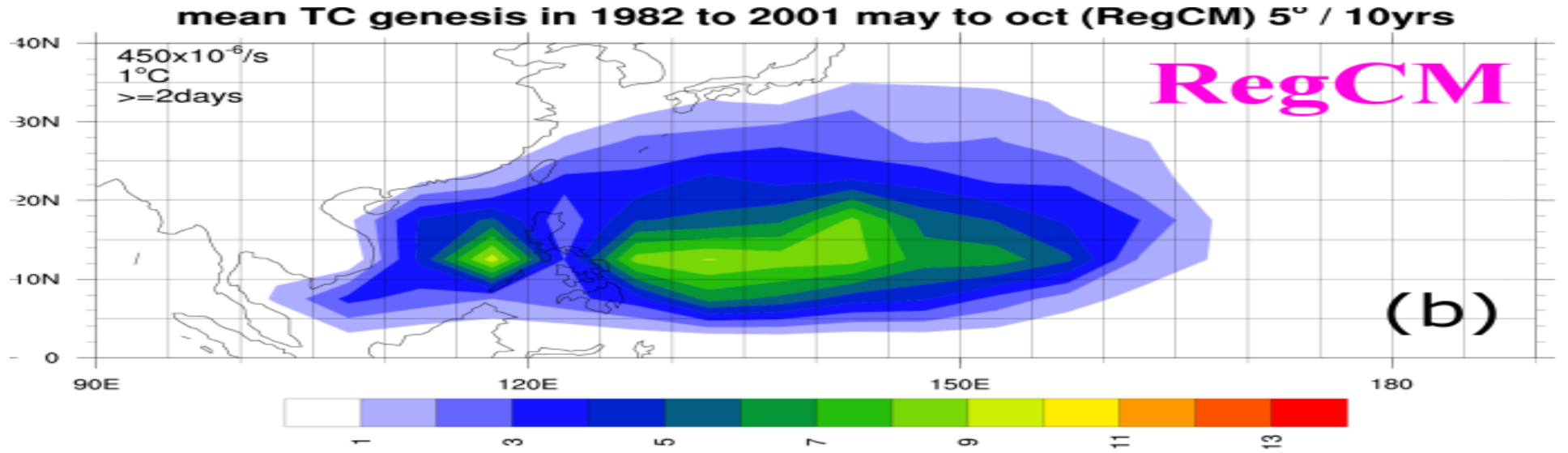


Model Climatology (1982-2001, May to Oct)





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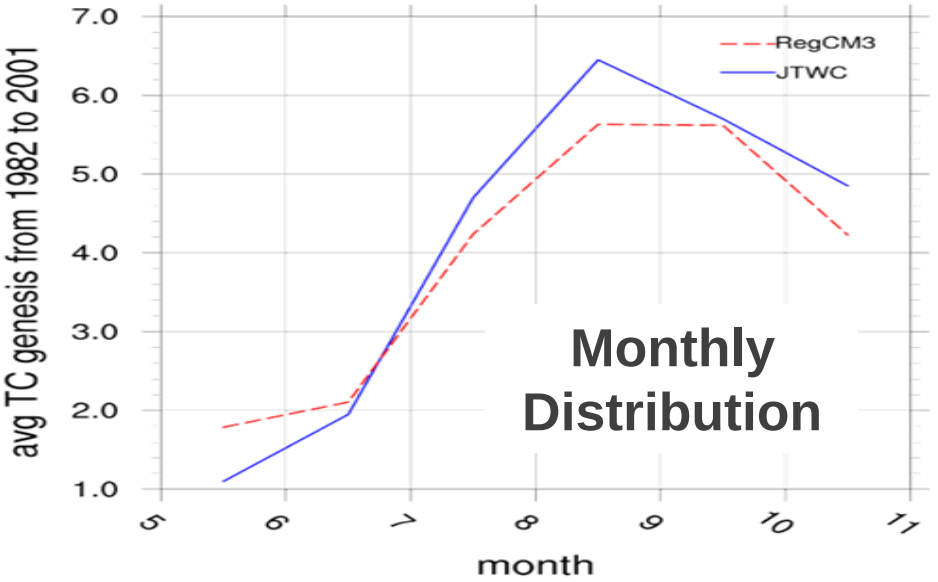

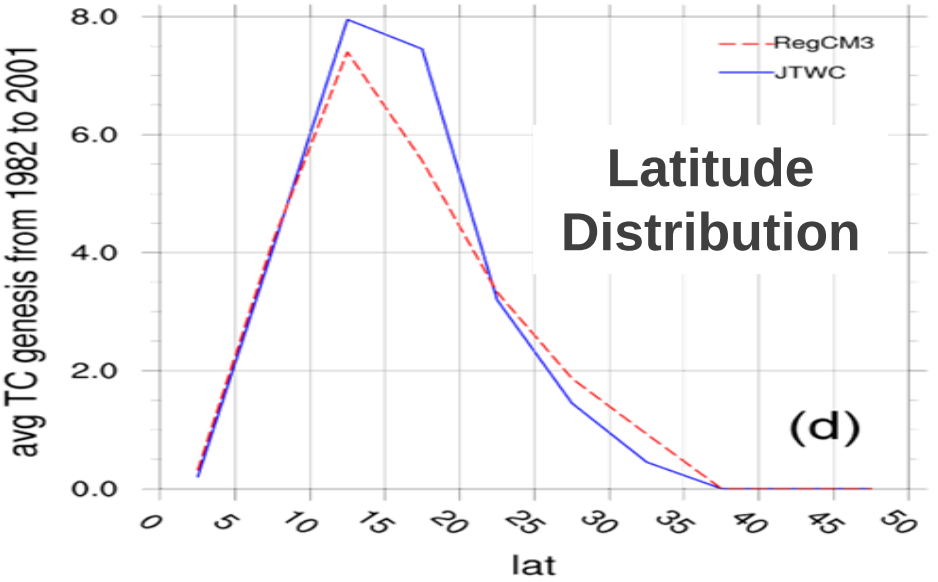

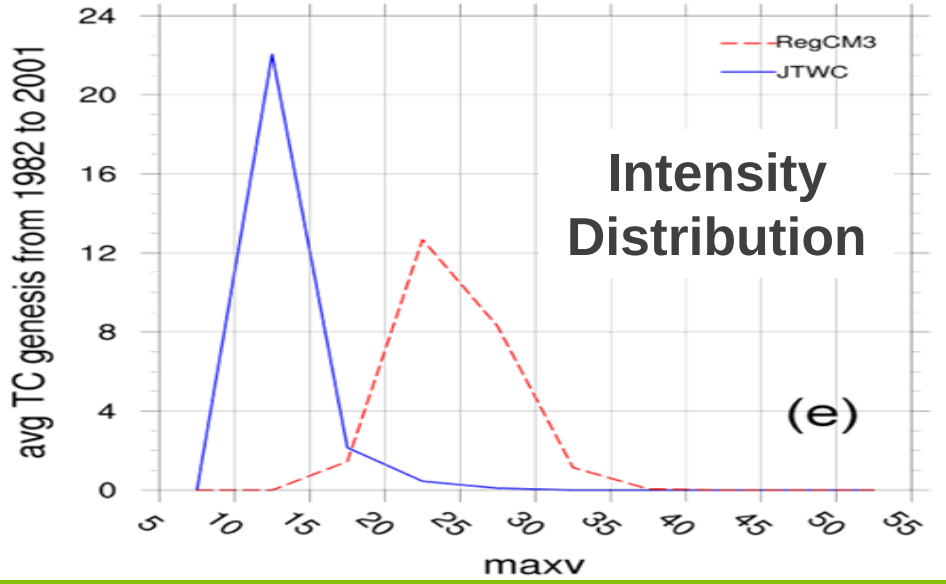

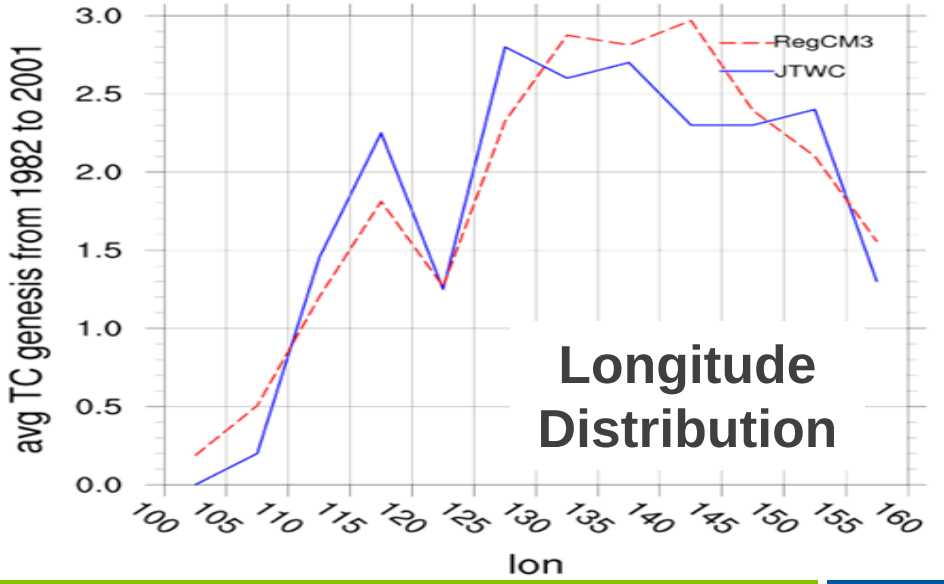

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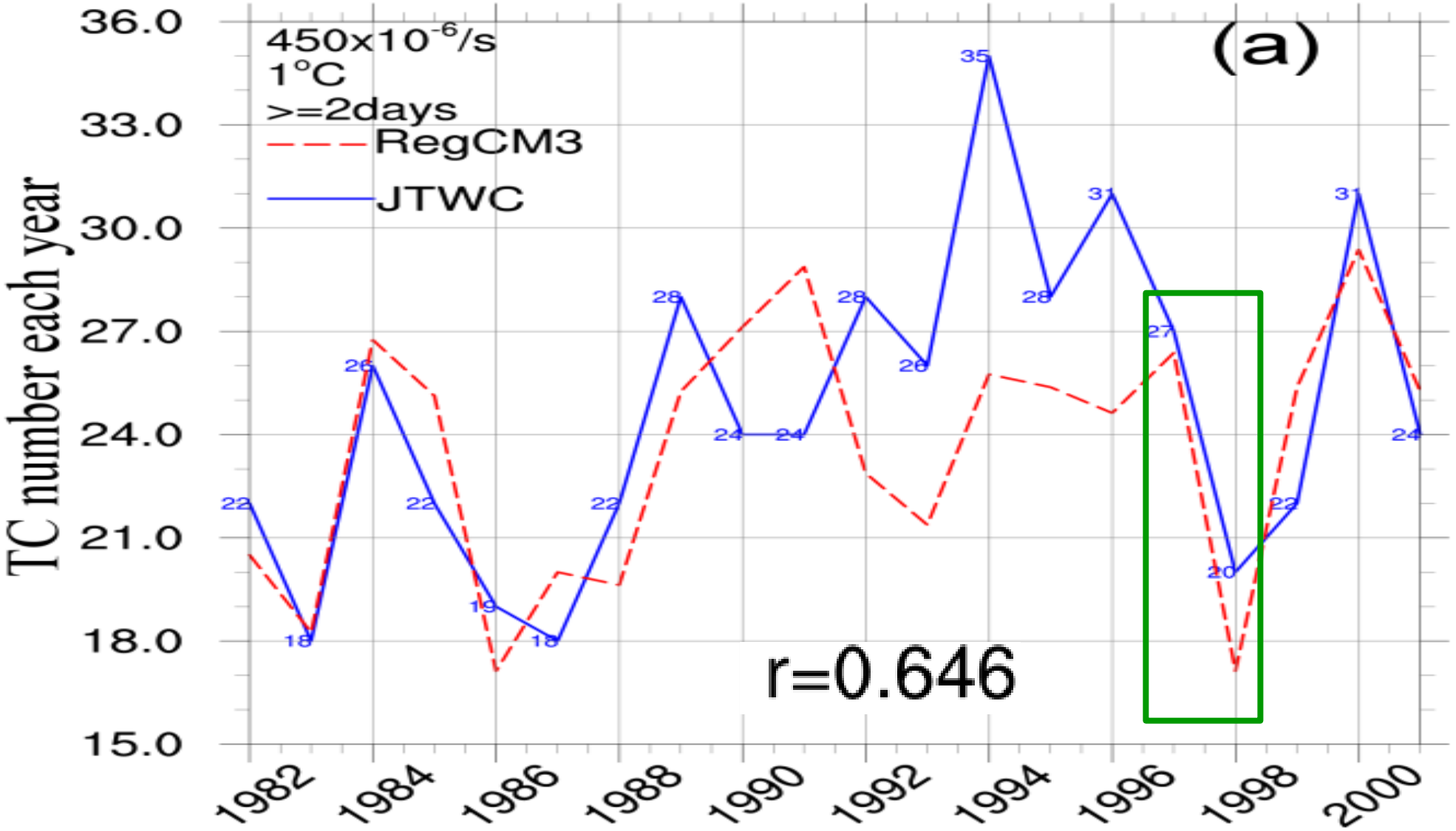
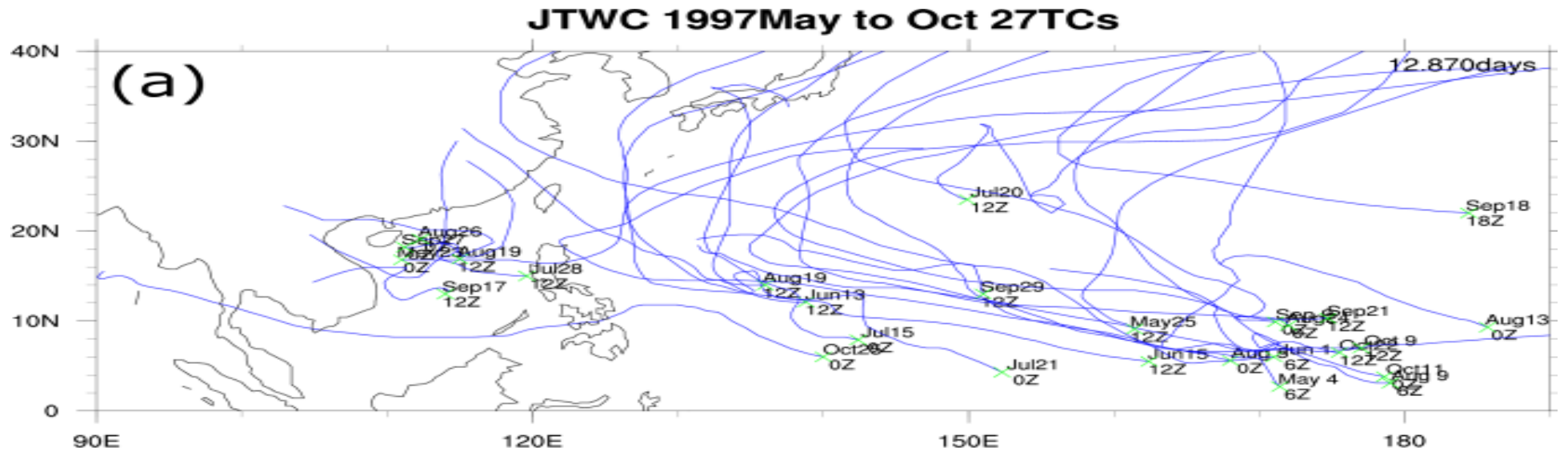
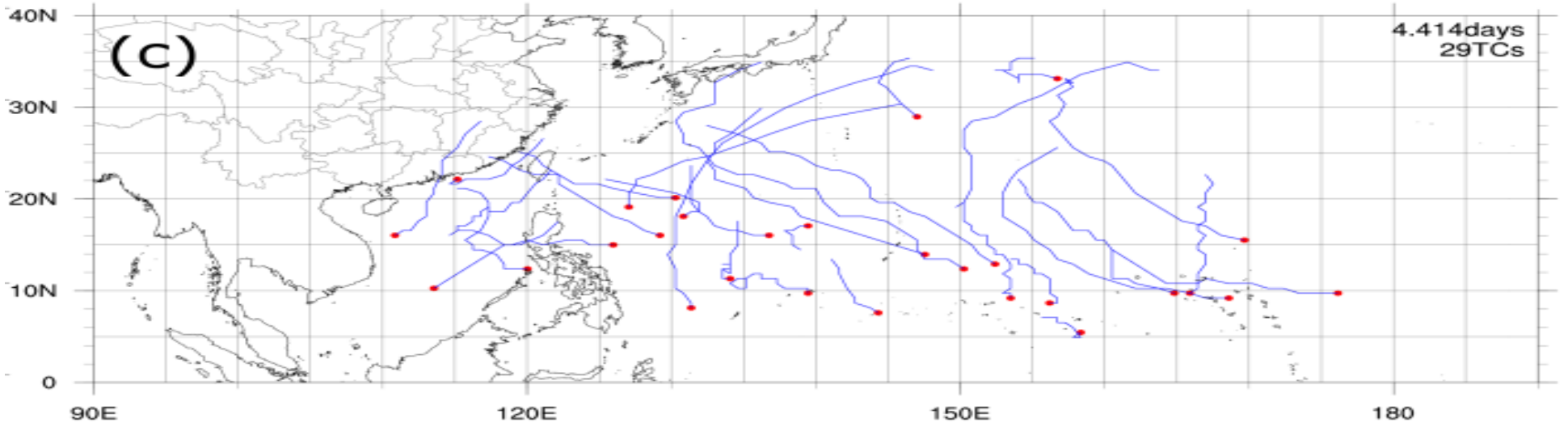


Model vs. Observed (1997, May to Oct)





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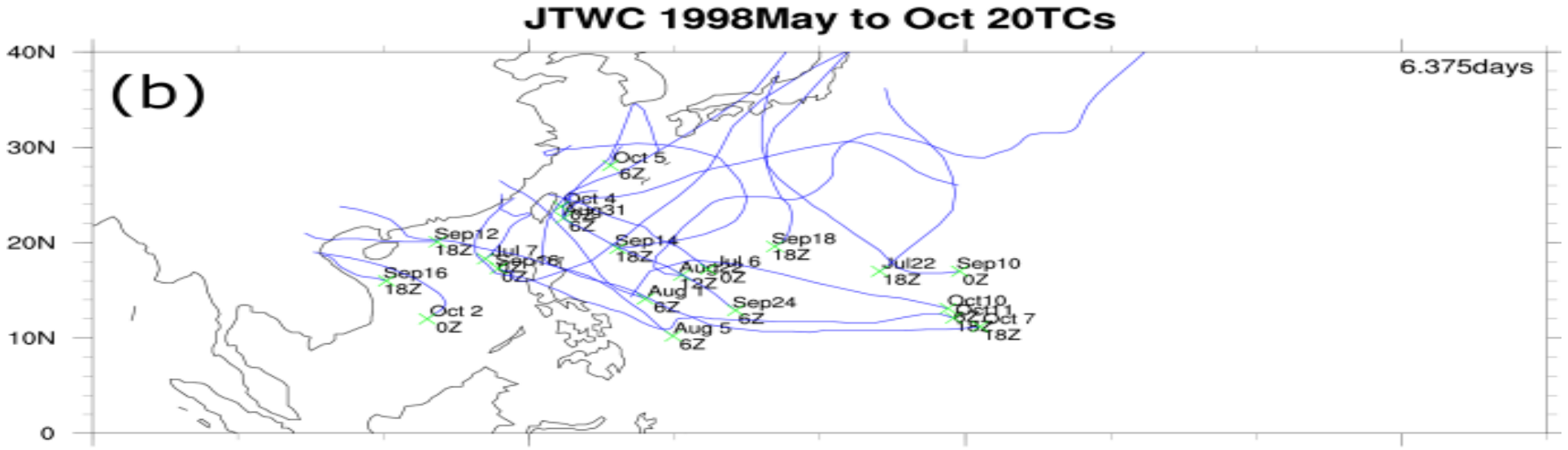
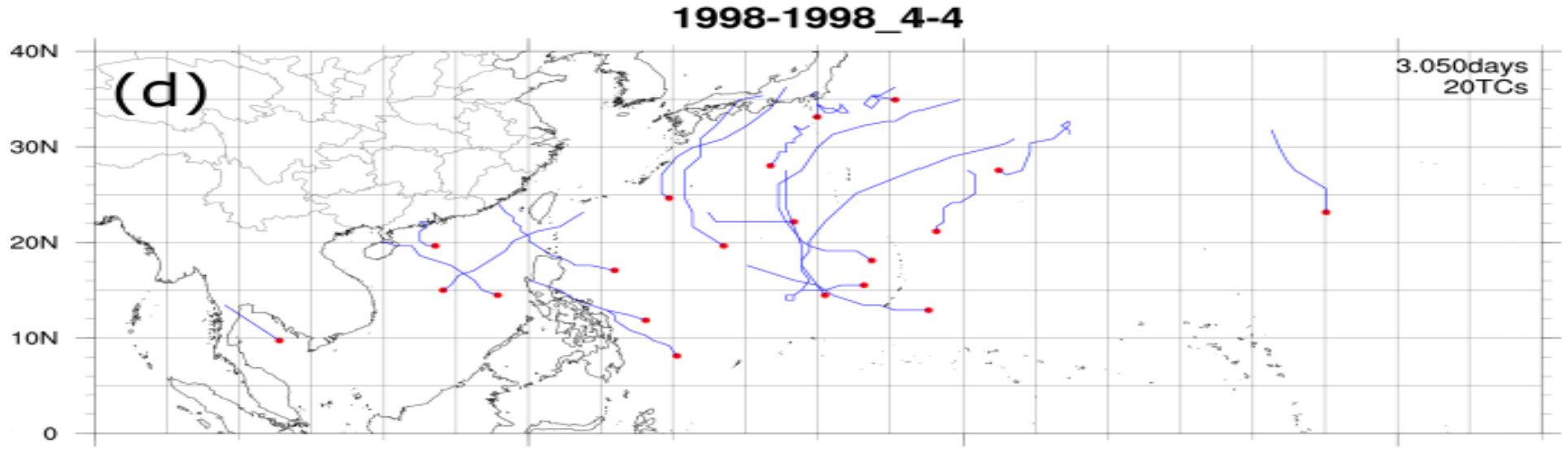
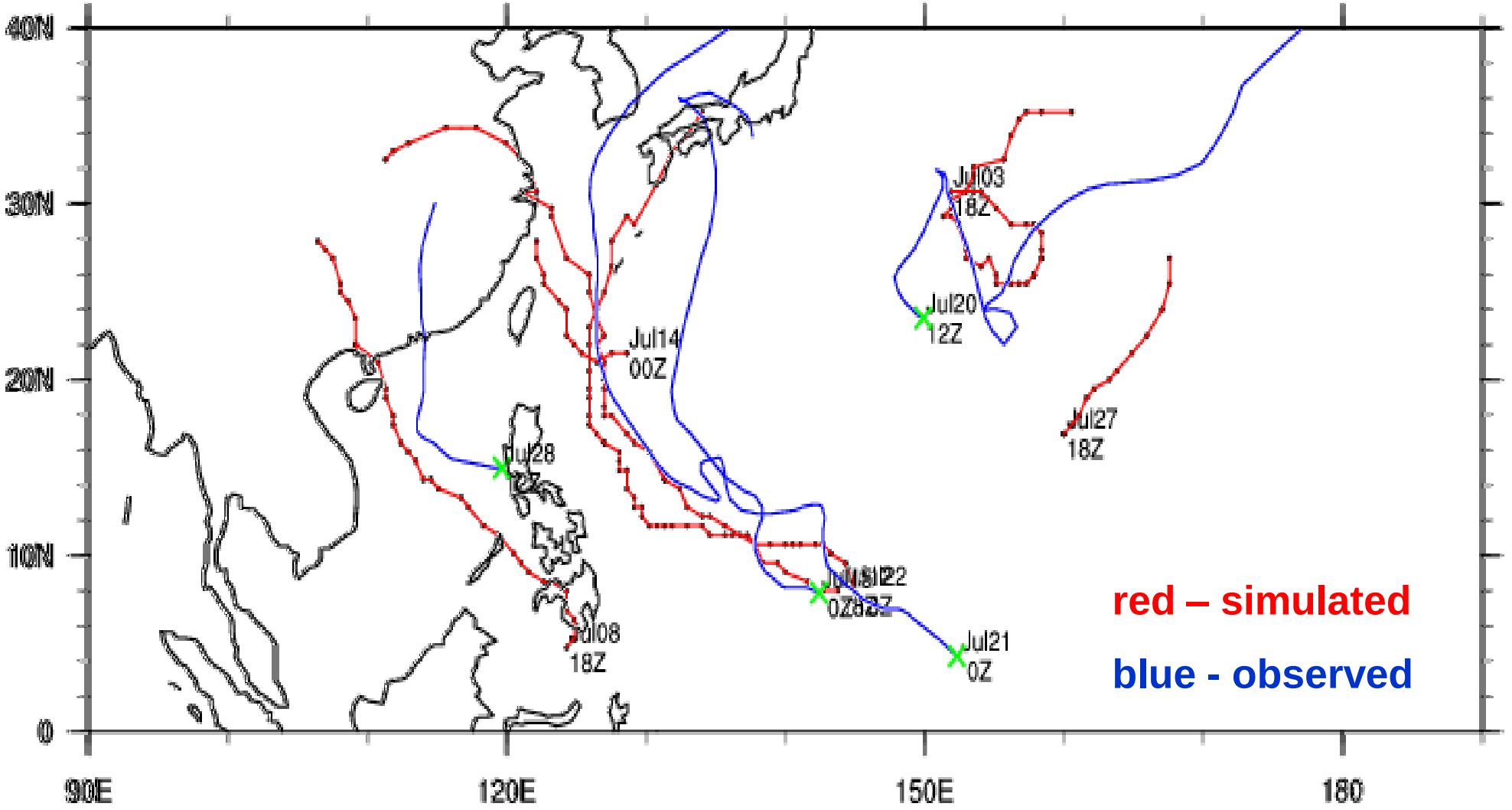




Example of simulation of a 3-month forecast



Summary

- **Even with a 60-km resolution, RegCM3 is able to generate vortices with structures that resemble those of real tropical cyclones.**
- **The model is capable of reproducing the basic climatology, the interannual variability of tropical cyclones and tracks of individual tropical cyclones in the western North Pacific.**
- **It is therefore possible to use RegCM3 with global model predictions as initial and boundary conditions to produce seasonal forecasts of tropical cyclone activity.**