



# Seasonal Prediction of Tropical Cyclone Activity using a Regional Climate Model

# 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: 94°E-172°W, 14°S-41°N**
- **Initial conditions: 8 ensemble members from 00UTC on 1 May and every 6 hr after**
- **Integration till the end of October**

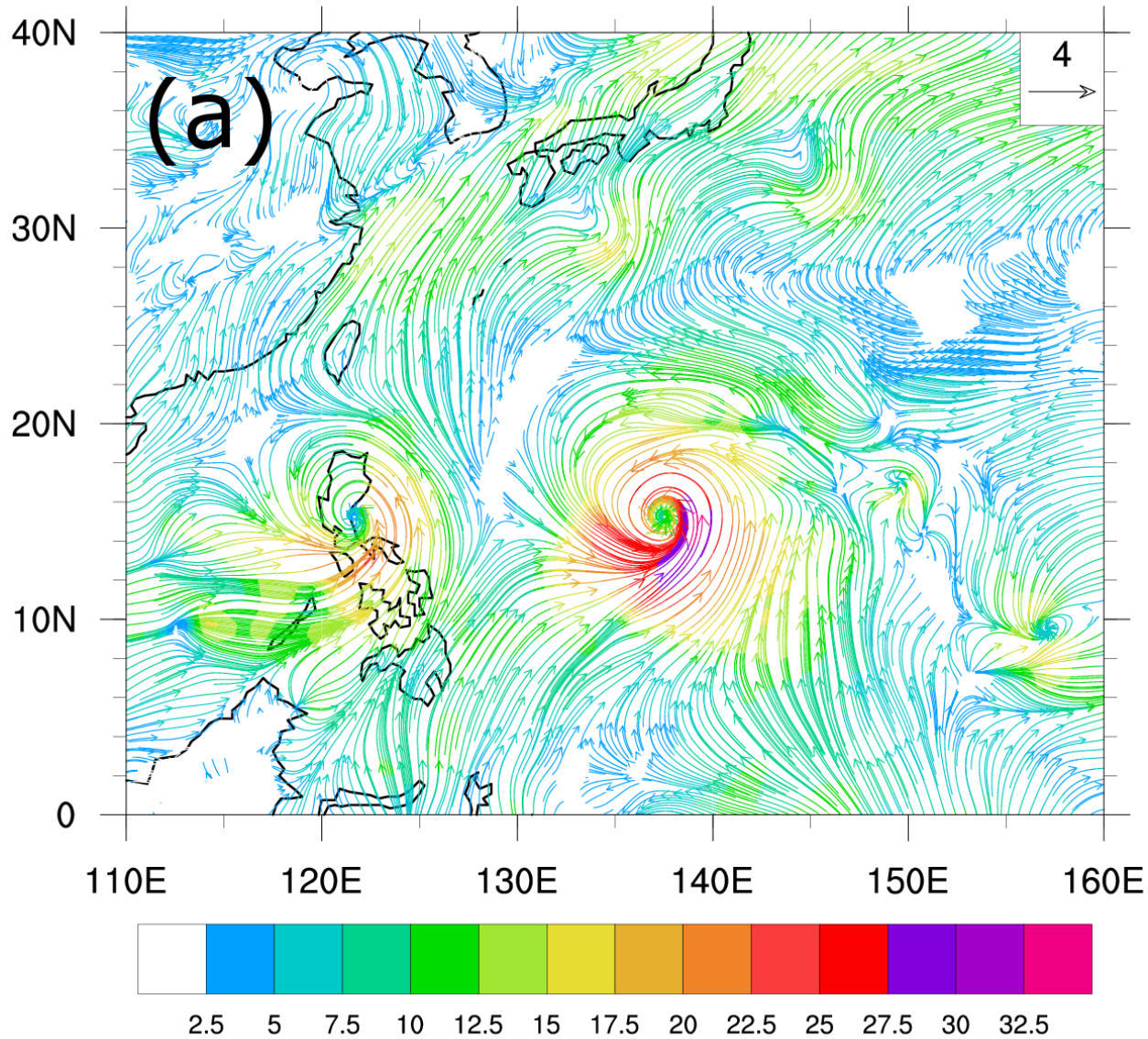
# The model

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

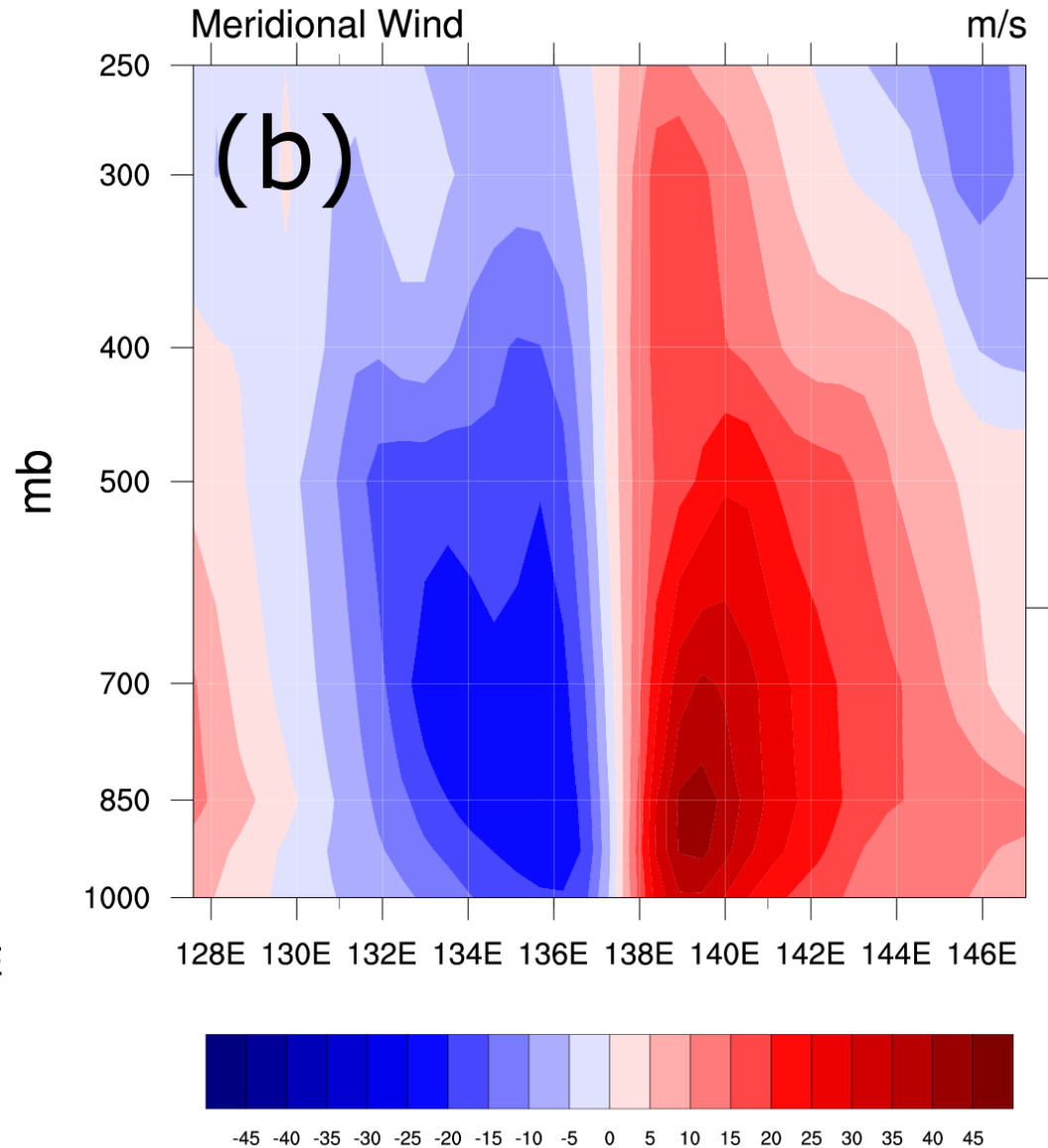
# Detection of a tropical cyclone

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

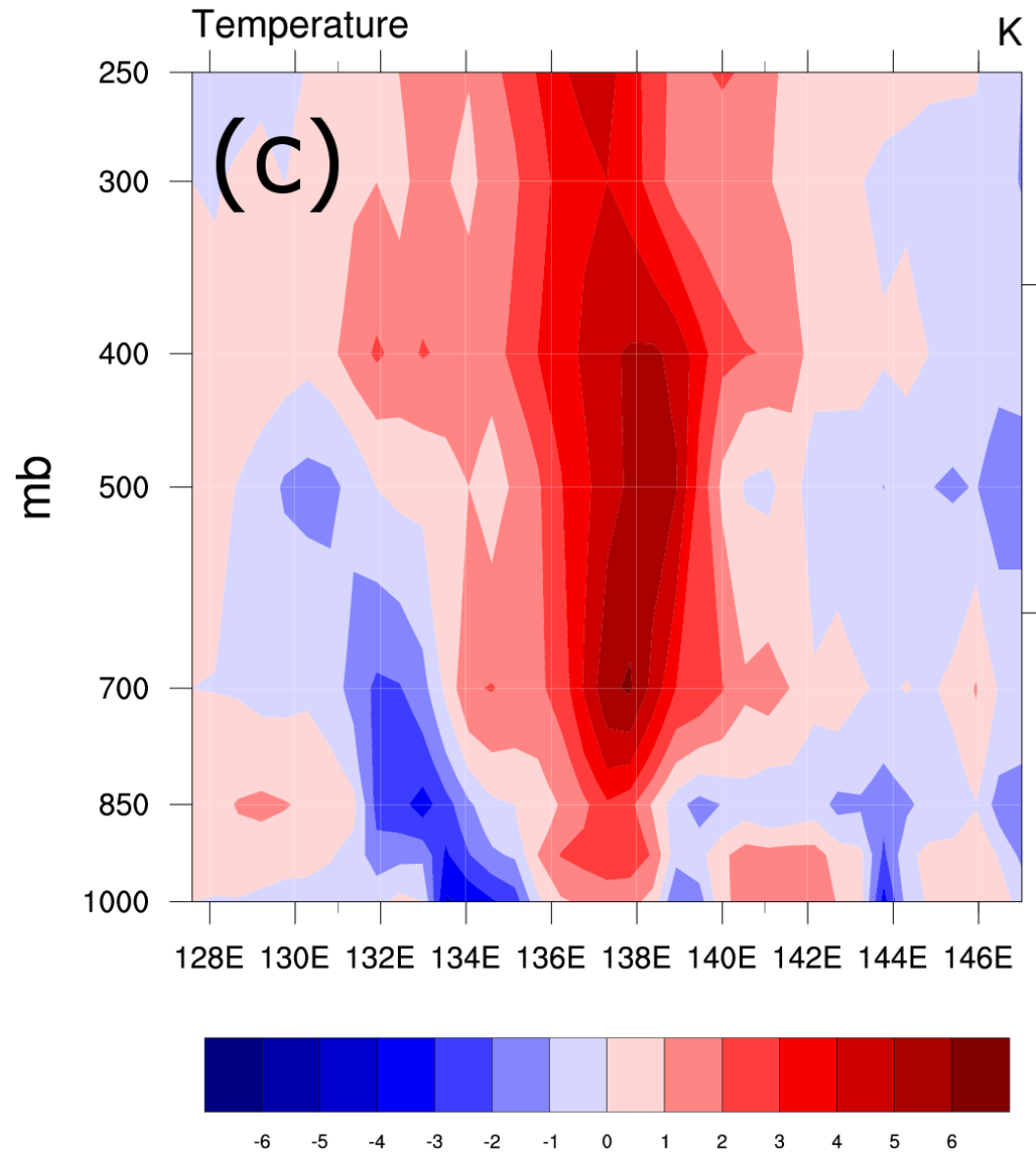
# Example of a tropical cyclone in RegCM3



# Example of a tropical cyclone in the Regional Model

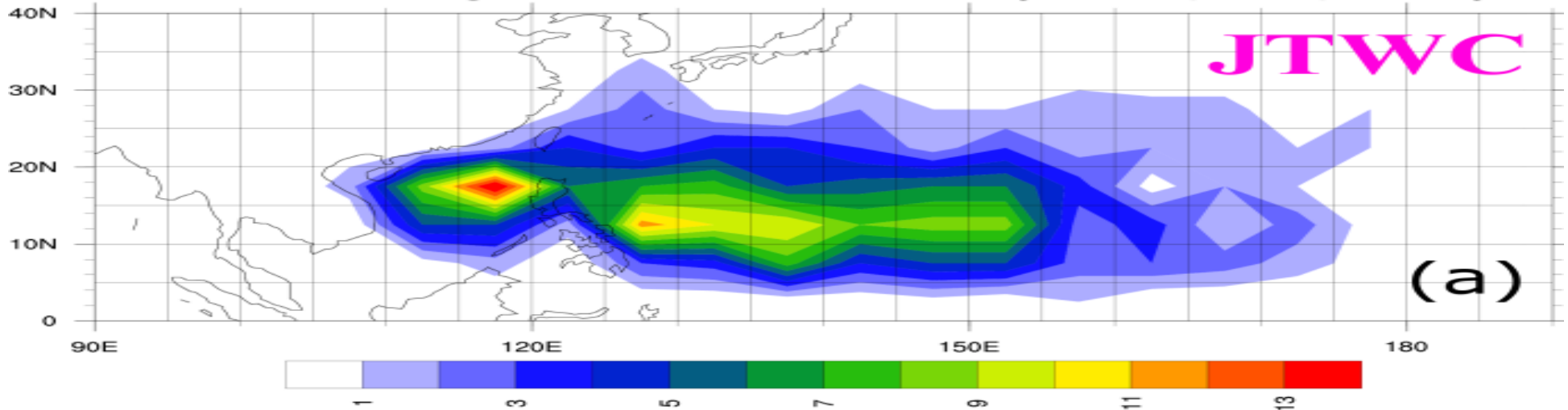


# Example of a tropical cyclone in the Regional Model

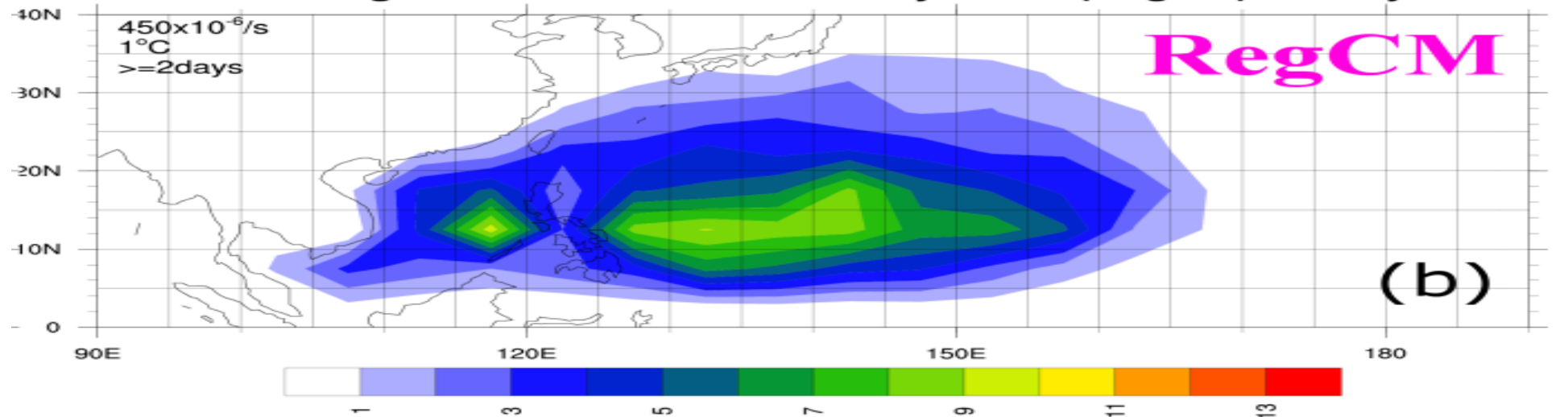


# Model Climatology (1982-2001, May to Oct)

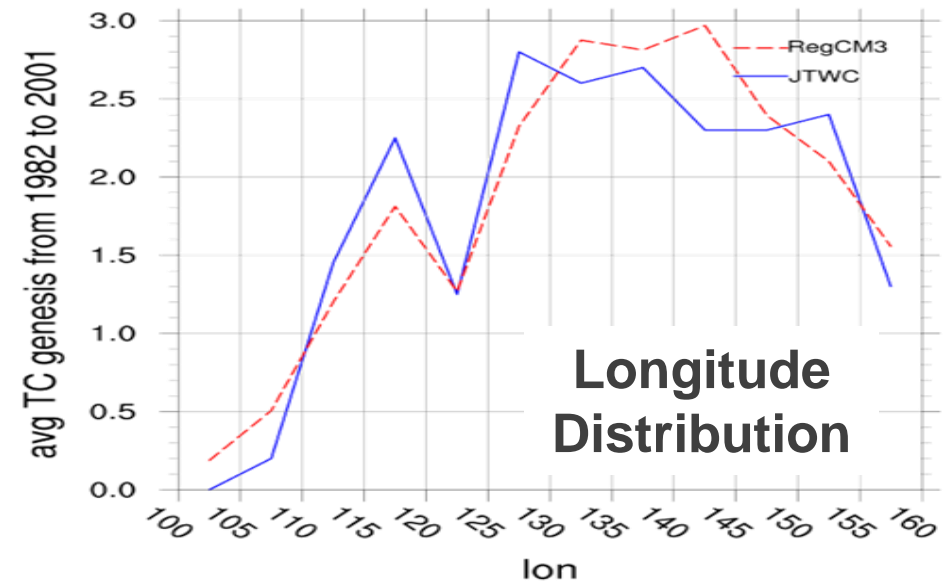
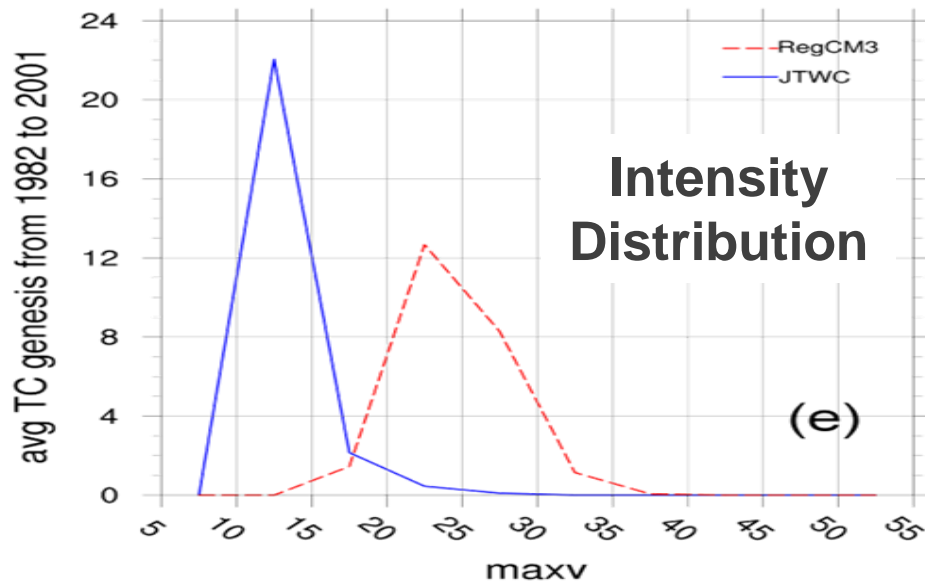
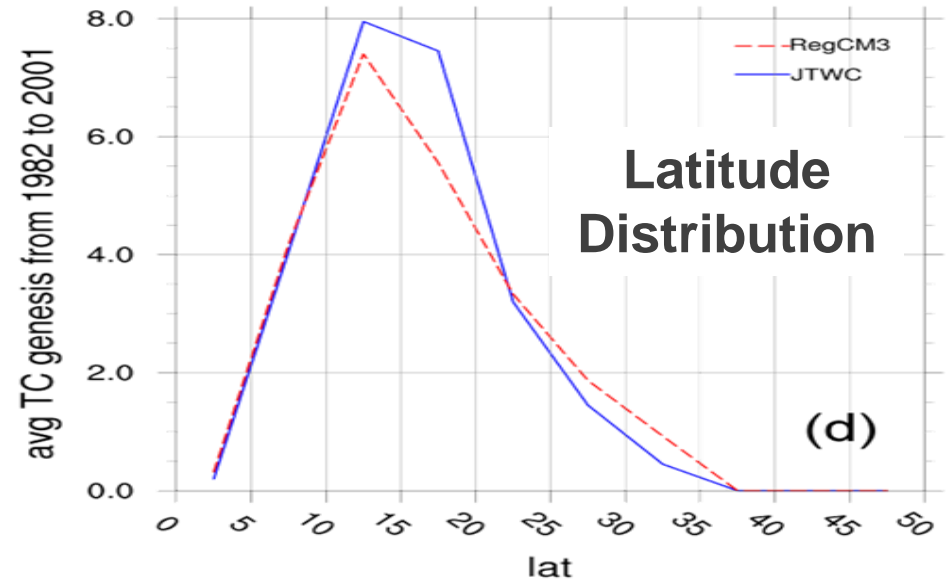
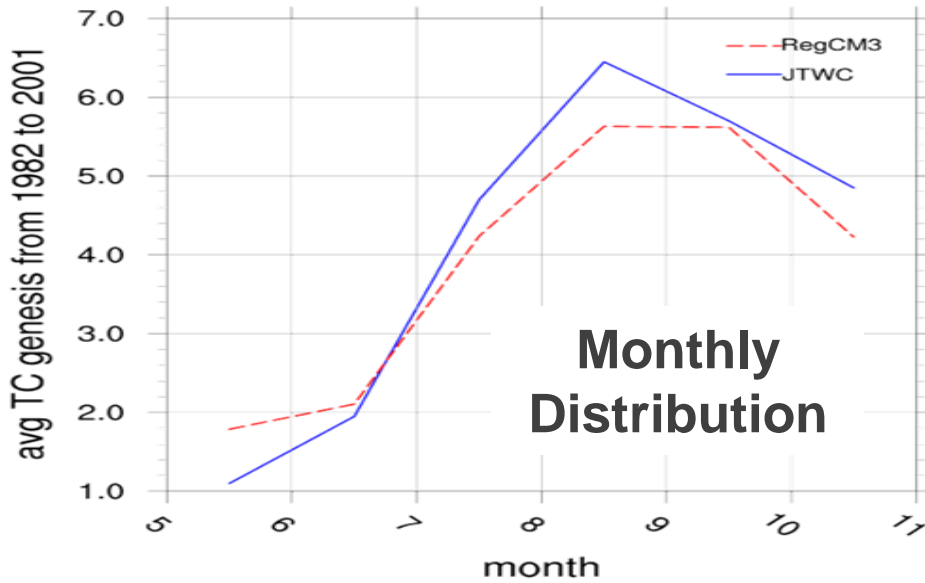
annual-mean TC genesis in 1982 to 2001 may to oct (JTWC) 5° / 10yrs



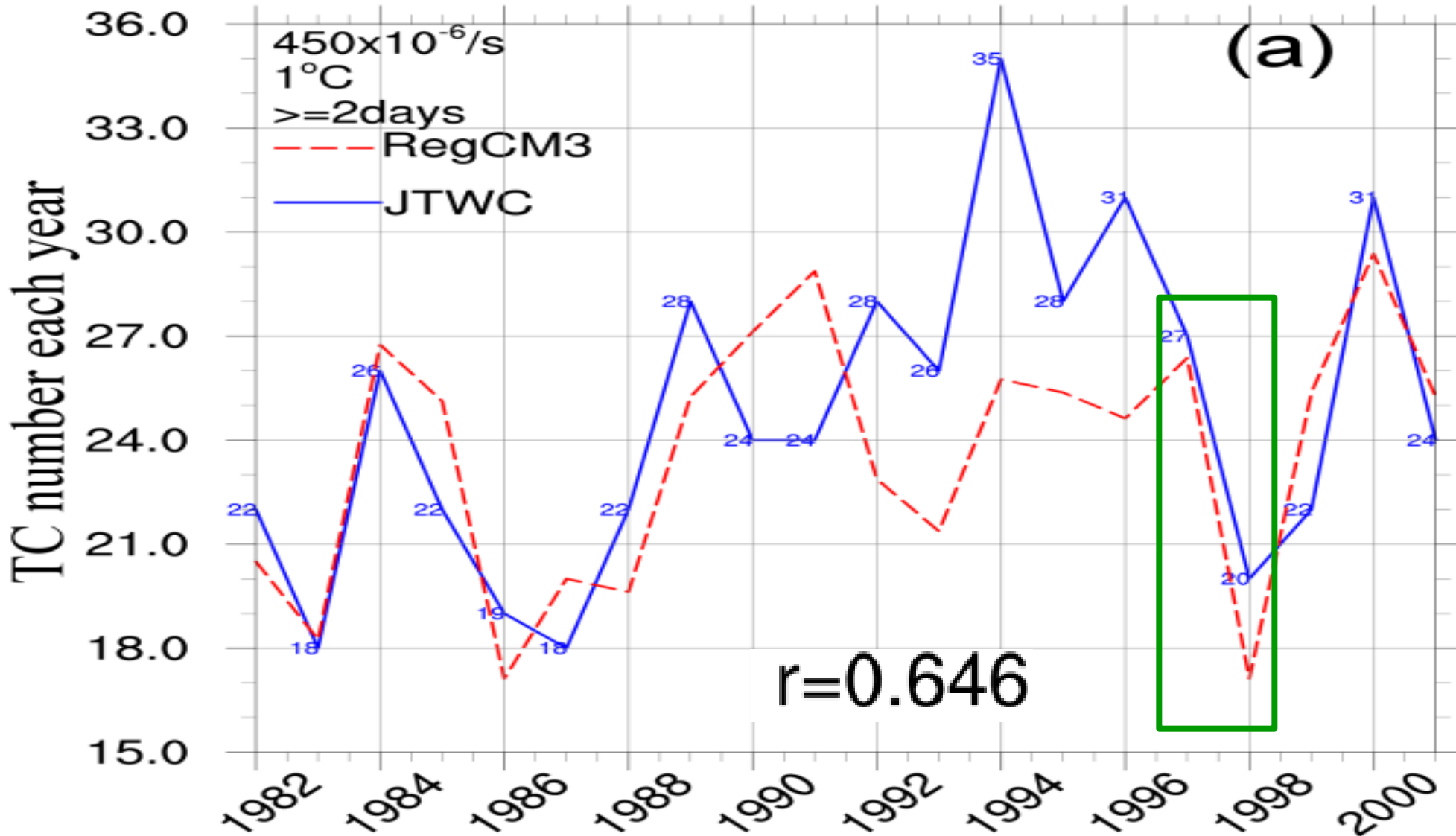
mean TC genesis in 1982 to 2001 may to oct (RegCM) 5° / 10yrs



# Model Climatology (1982-2001, May to Oct)

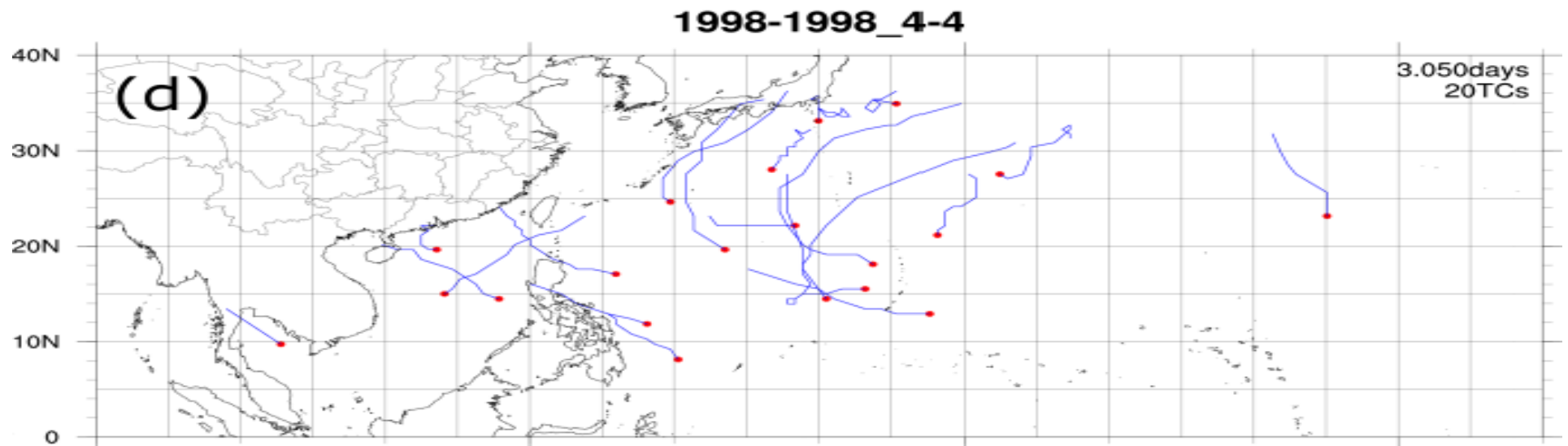
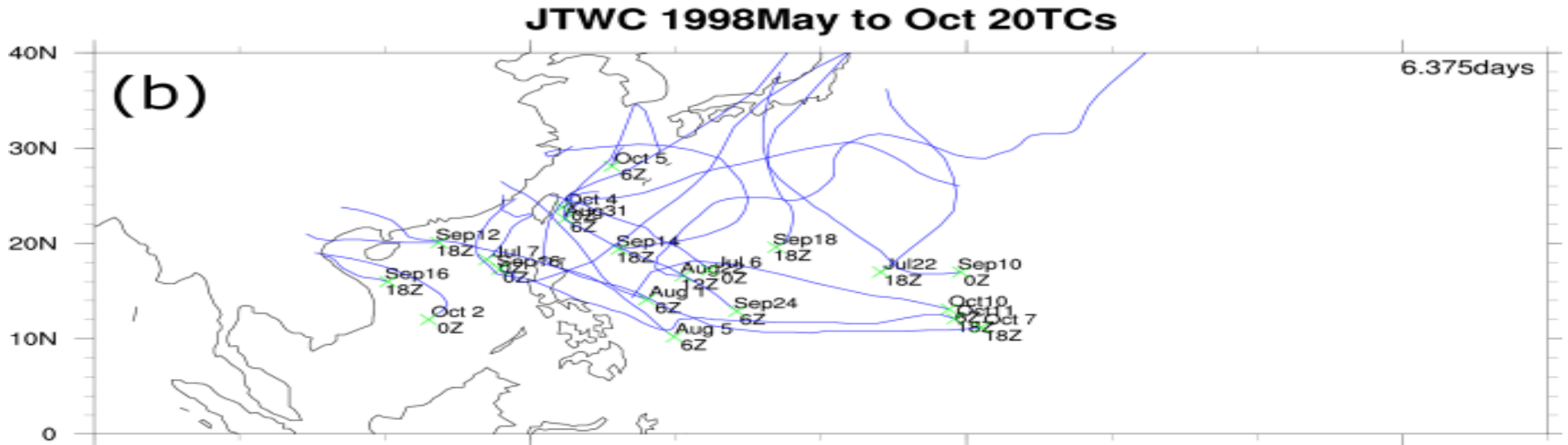


# Model Climatology (1982-2001, May to Oct)

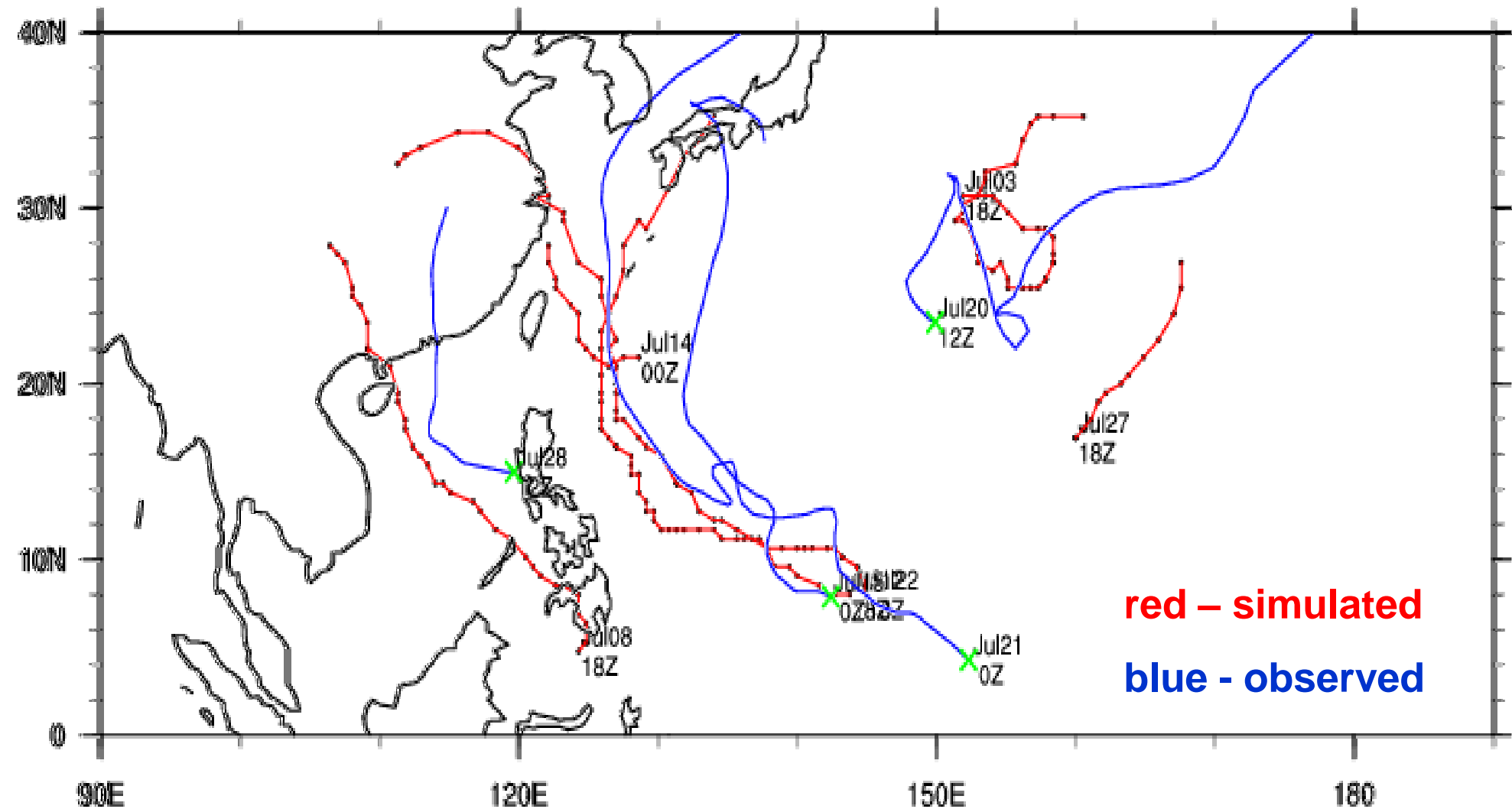




# Model vs. Observed (1998, May to Oct)



# 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.**