

# **Super-Parameterized UZIM (SUZI) - an update**

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Dynamical Frameworks Breakout

# Last time

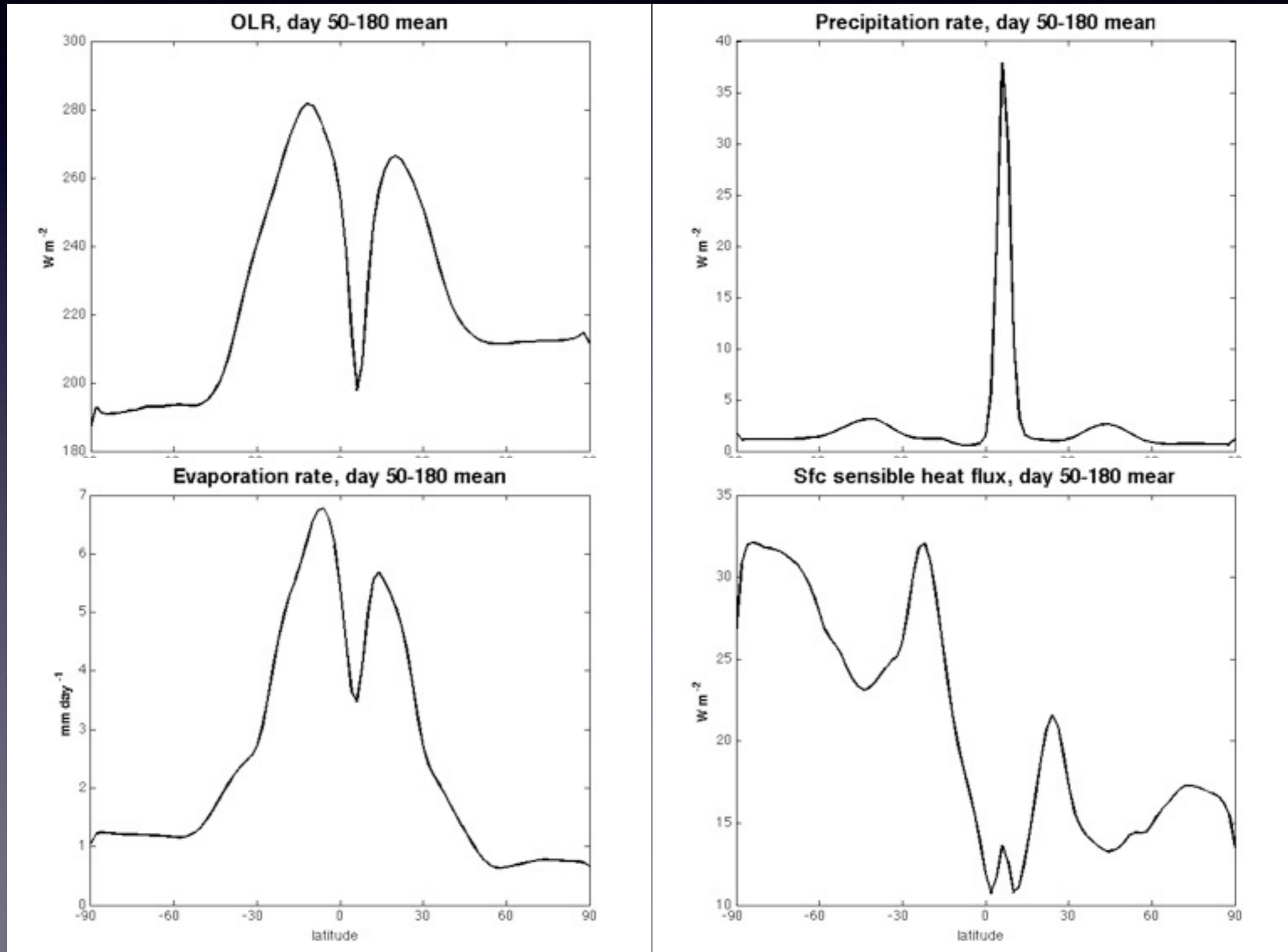
- SAM had been coupled to the z-coordinate UZIM dynamical core and run at 2562 (450km) for an aquaplanet simulation. The climatology and tropical variability didn't look bad
- Ross wrote an new dynamical core with a sigma vertical coordinate with Charney-Phillips staggering.

# **Sigma-vertical coordinate**

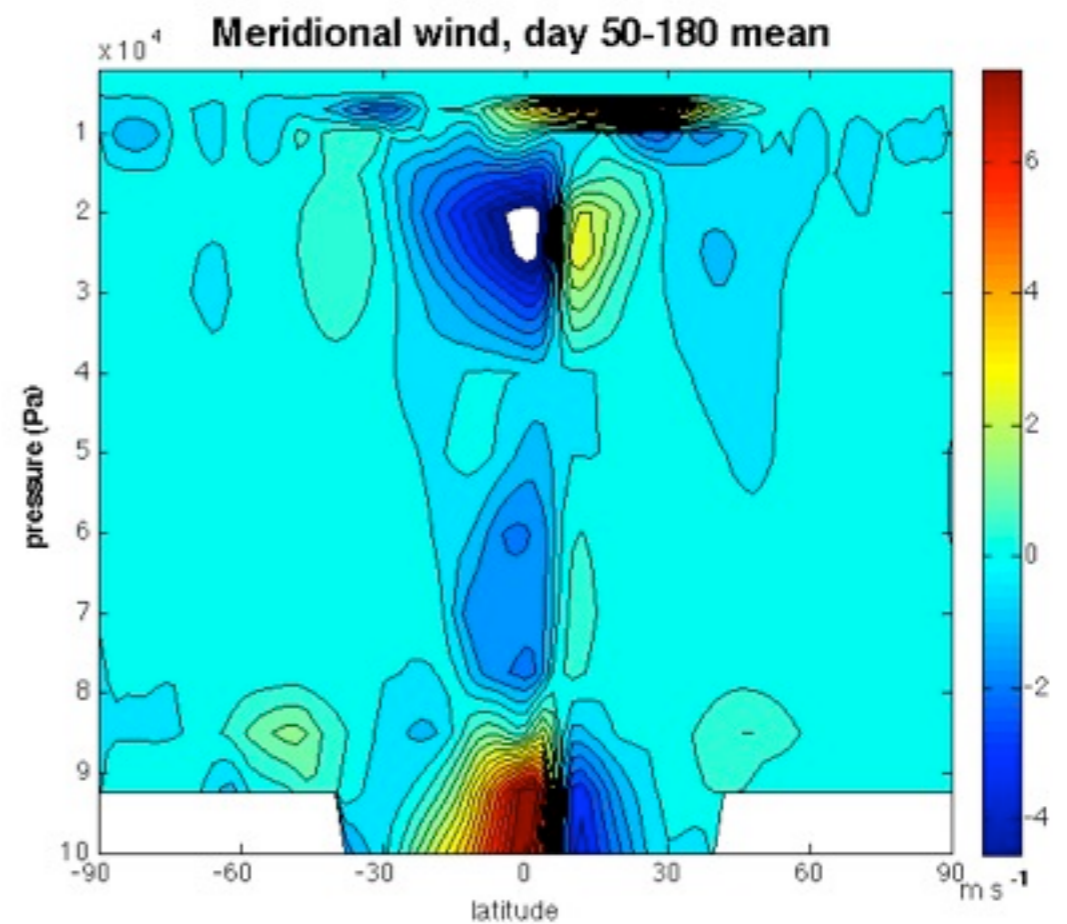
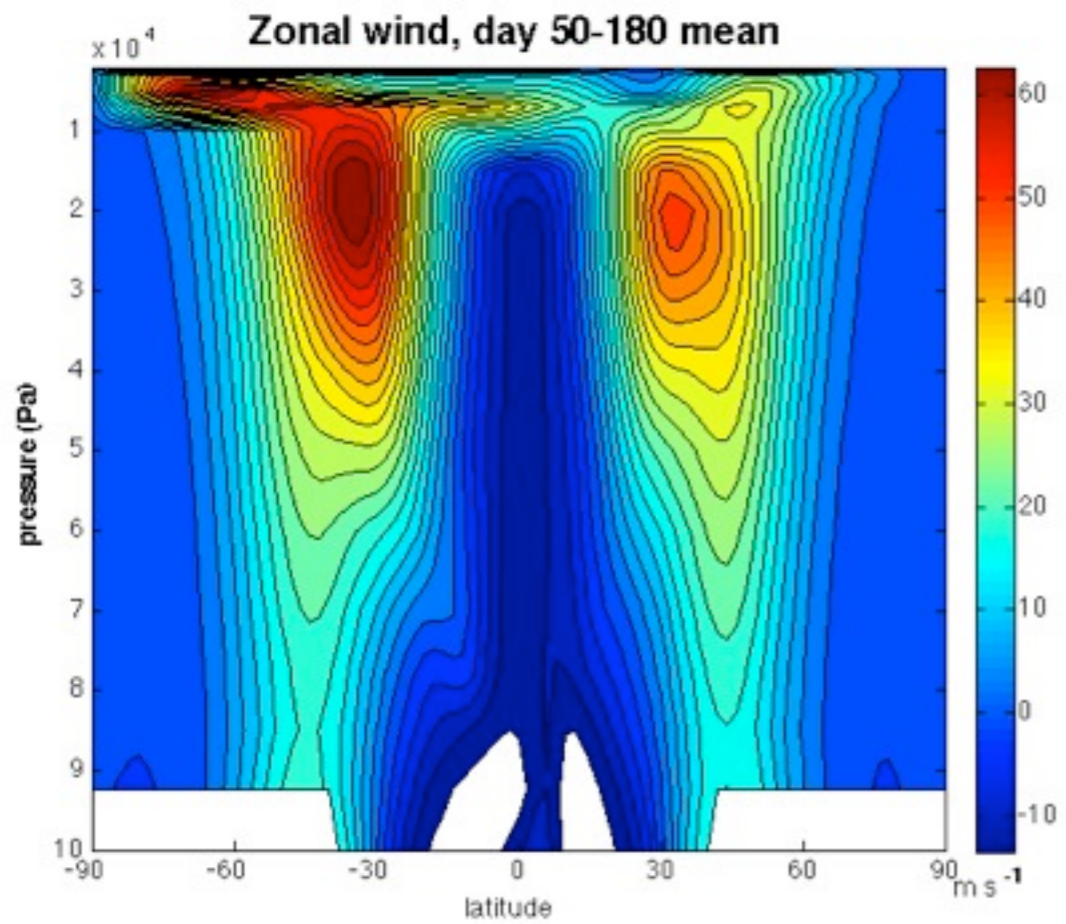
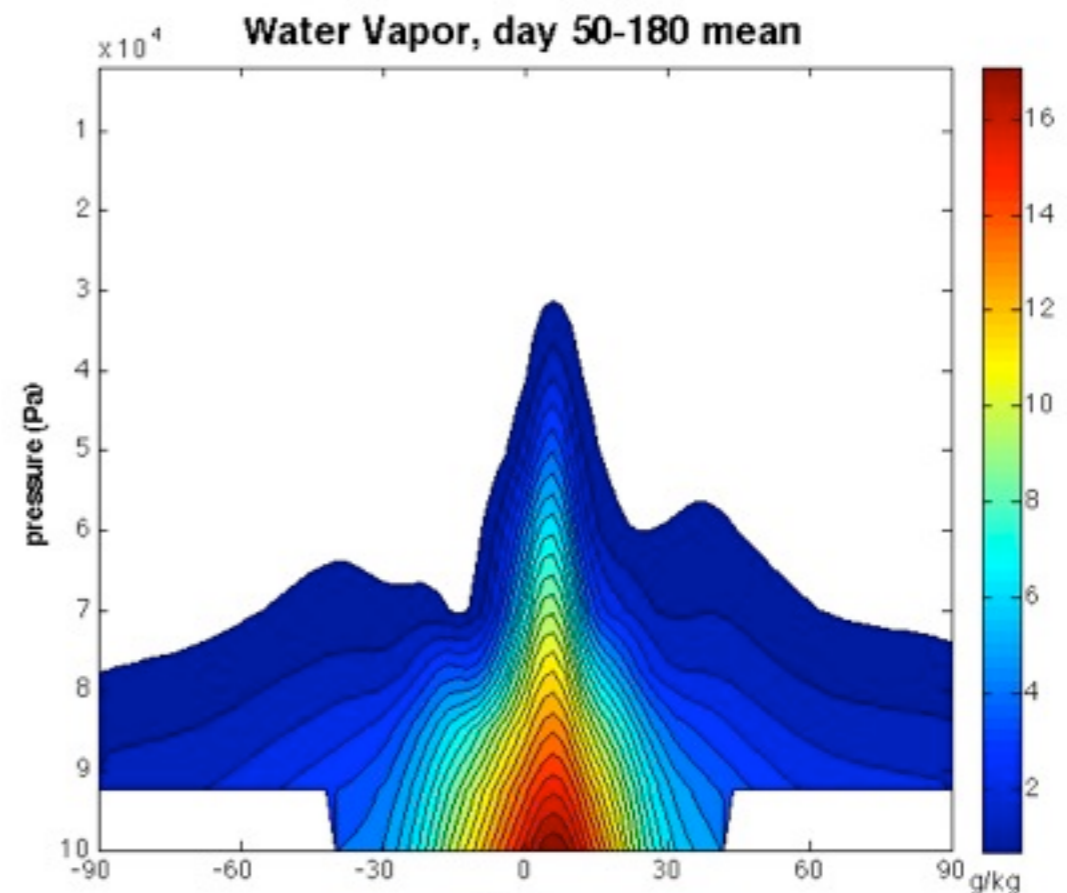
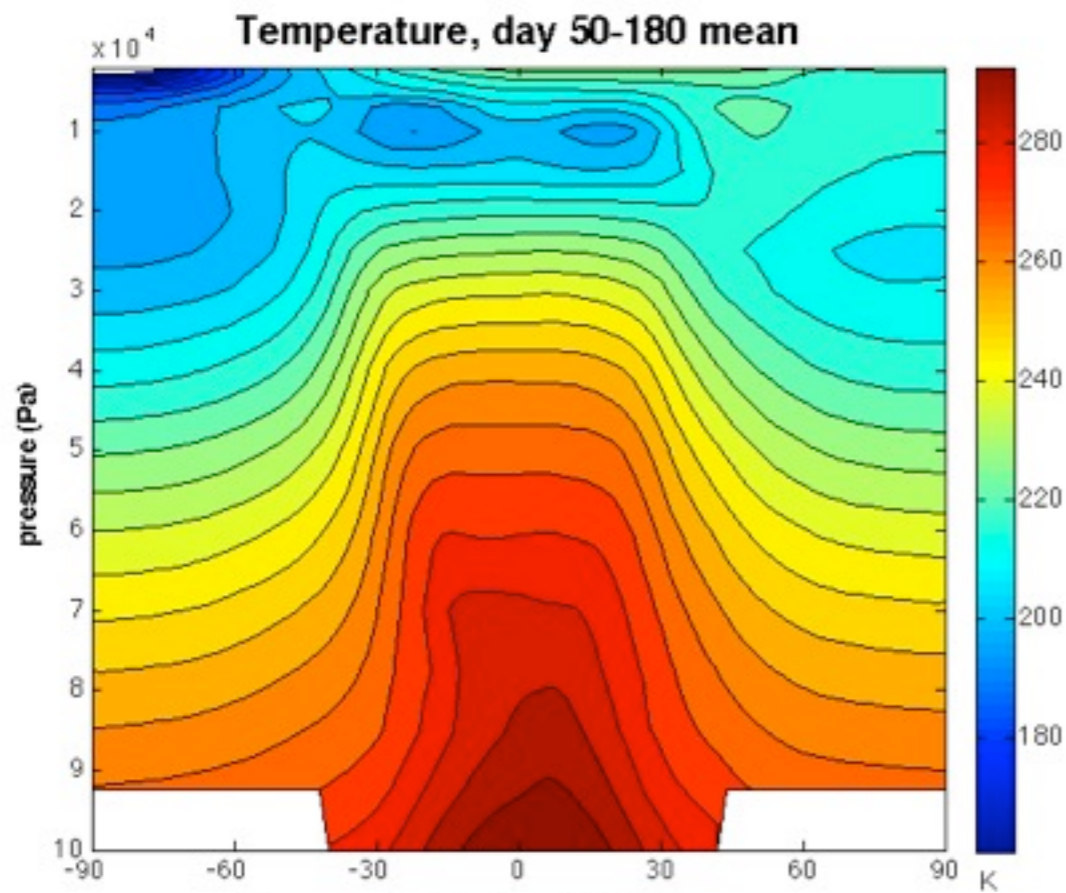
- First, I merged the two dynamical cores into one using preprocessor directives. This is integrated with other UZIM features such as GIO, the parallel IO package.
- The UZIM C-P staggering had to be reconciled to SAM Lorenz staggering.
- UZIM layer interfaces become mid-layer in SAM, and UZIM mid-layer surfaces become SAM layer interfaces. T and q pass back and forth with no vertical interpolation.
- Vertically interpolated UZIM winds are passed into SAM.

# Testing

- Unreasonable sigma-coordinate climatology until last week when I discovered no surface wind stress.
- Yesterday's run shows a more reasonable climatology established.



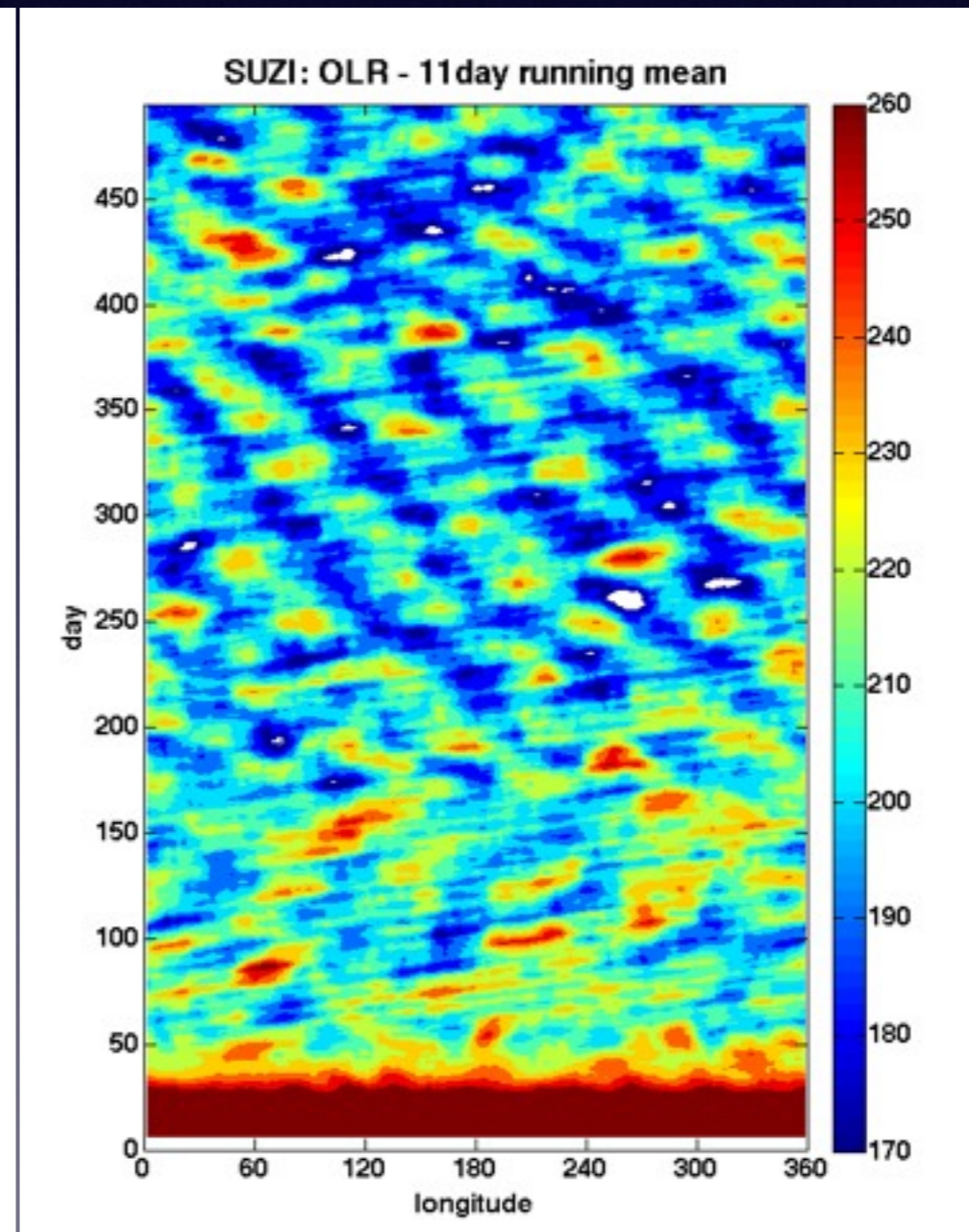
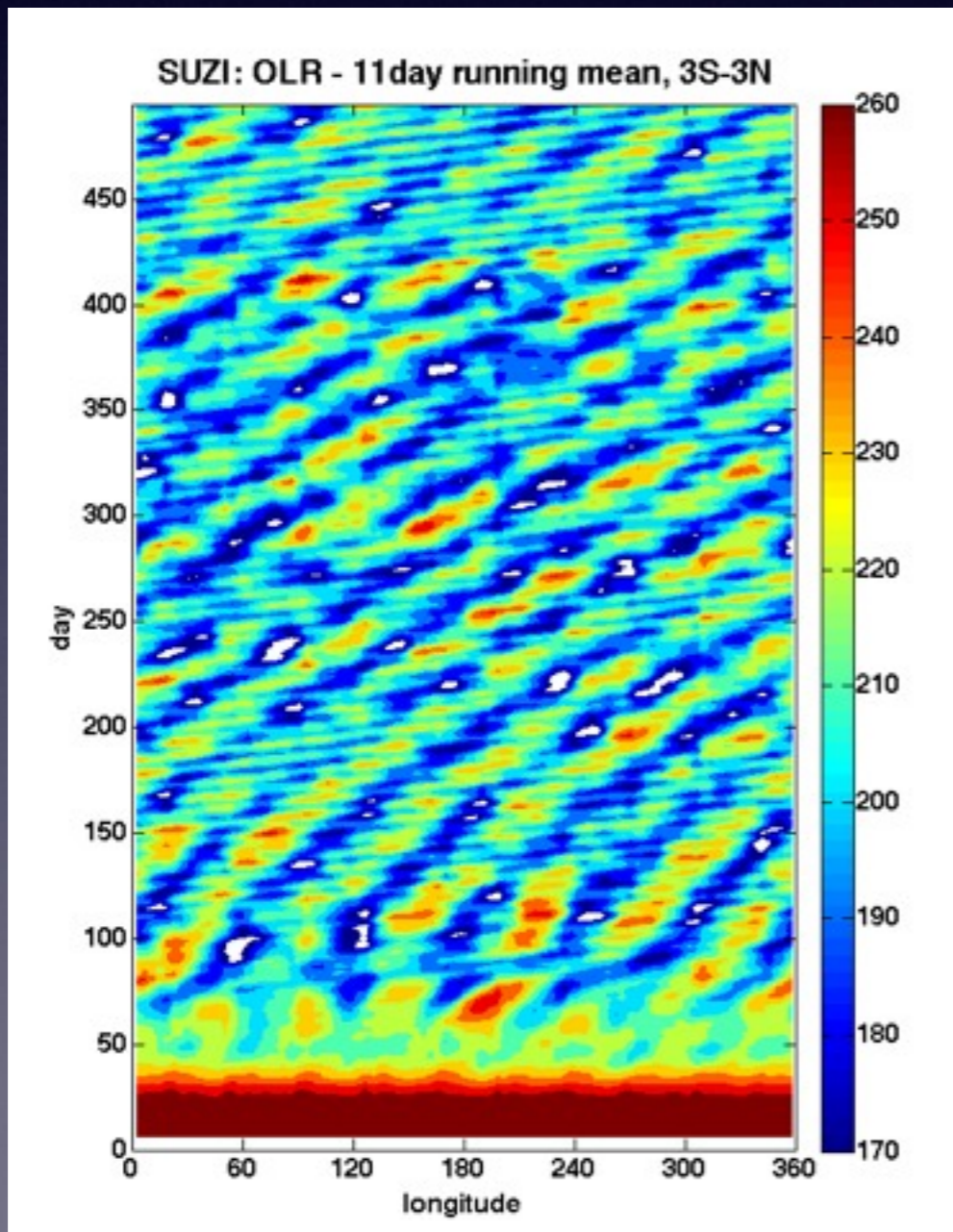
# More Sigma Climatology



# Tropical Variability - Z

- Z-coordinate model now exhibiting a slow propagation (~200-300 days). Wave number 5 and westward at 10242 (225km), Wave number 6 and eastward at 2562. When the averaging band is narrowed a 40-day eastward propagation is visible in both.

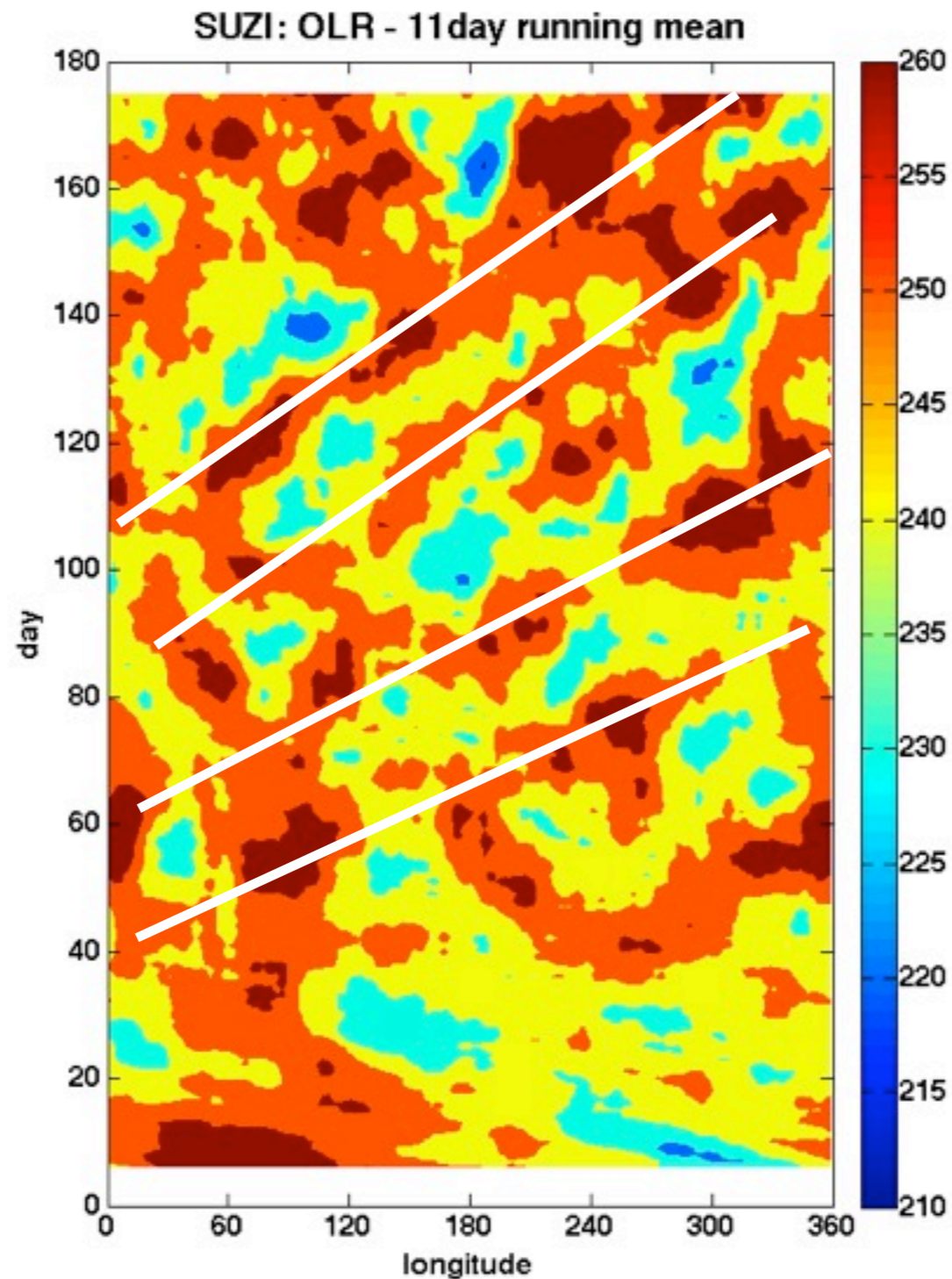
2562



10242

# Tropical Variability - Sigma

- I grabbed what output I could this morning - 180 days. It remains to be seen what the verdict should be. (10242)



# Summary

- Both vertical coordinates in UZIM now have super-parameterization (SUZI) that produce reasonable zonal mean climatologies.
- Have to figure out why the long-period tropical variability and the preference for wave numbers 5 and 6.
- Sigma-coordinate implementation paves the way for realistic earth simulations
- Exploring pathways to higher parallelization.