HRS on WJET

Xuejin Zhang, Sundaraman Gopalakrishnan, Jian-wen Bao & Kevin Yeh

Domain and resolution

- Large domain
  - Horizontal: 476 × 926 (~8500 km × 8300 km)
  - Vertical: 43 levels
  - Model top: 50 hPa
  - Time step: 18 s
  - Horizontal resolution: 0.06°
- Nest domain
  - Horizontal: 146 × 290 (~440 km × 570 km)
  - Vertical: 43 levels
  - Model top: 50 hPa
  - Time step: 6 s
  - Horizontal resolution: 0.02°

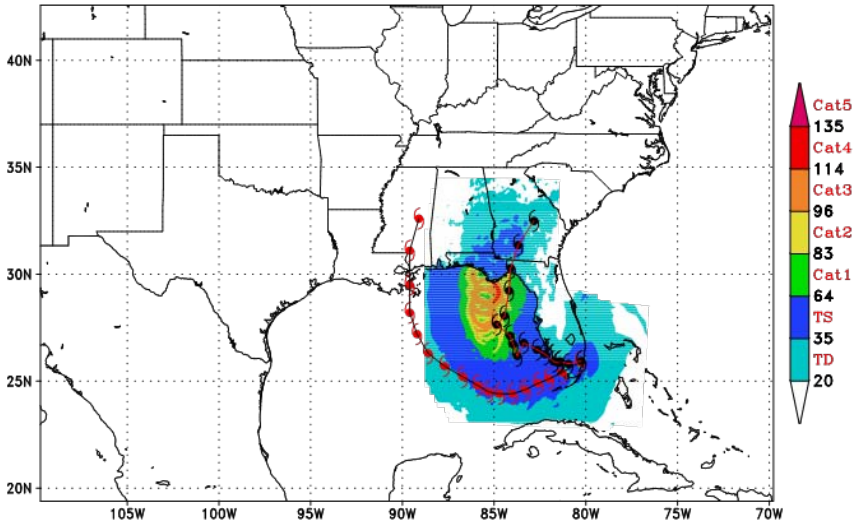
Physics

Physics scheme	Large domain	Nest domain
Microphysics	Ferrier scheme	Ferrier Scheme
Radiation—Long wave	RRTM	RRTM
Radiation—Short wave	Dudhia Scheme	Dudhia
Surface layer	GFDL surface scheme	GFDL surface scheme
Land surface	NMM LSM	NMM LSM
PBL	GFS scheme	GFS scheme
Cumulus parameterization	SAS	No SAS
Momentum mixing	No	No

Configuration on WJET

- PGI compiler
- WPS: 8 processors, ~10 min
- real_nmm: 8 processors, ~ 10min
- wrf_nmm:
  - 128 processors: ~5.5 hours (6)
  - 256 processors; ~4.0 hours (8)
- Diapost: 1 processor, <10min

Katrina 2005092600



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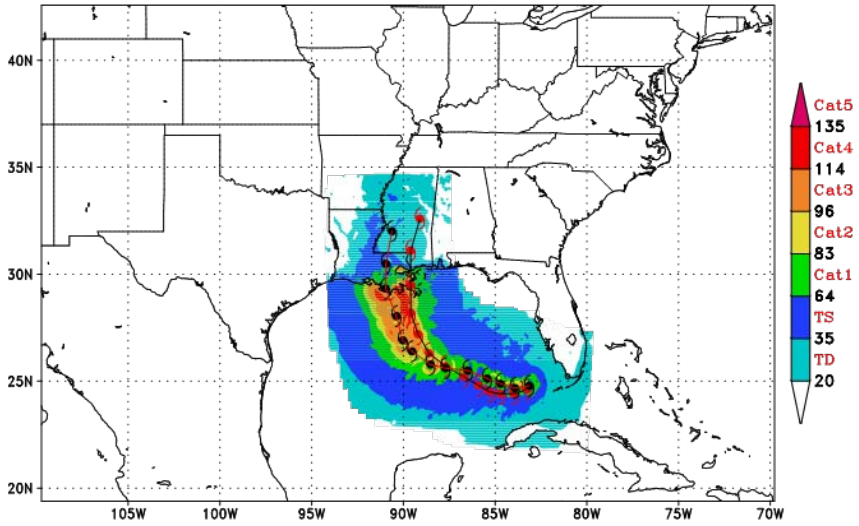

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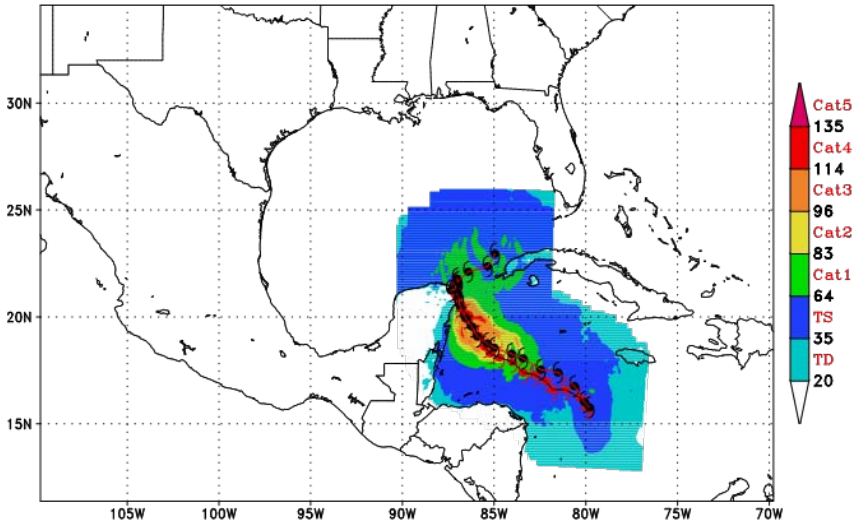

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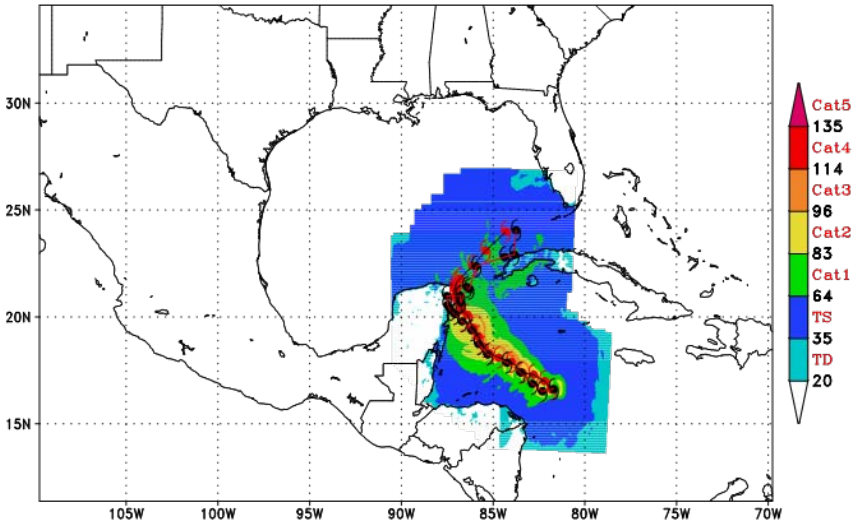
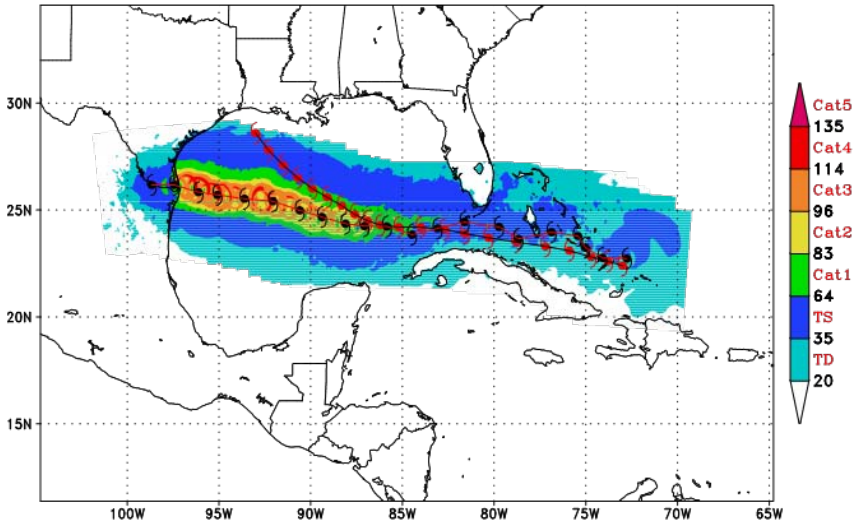
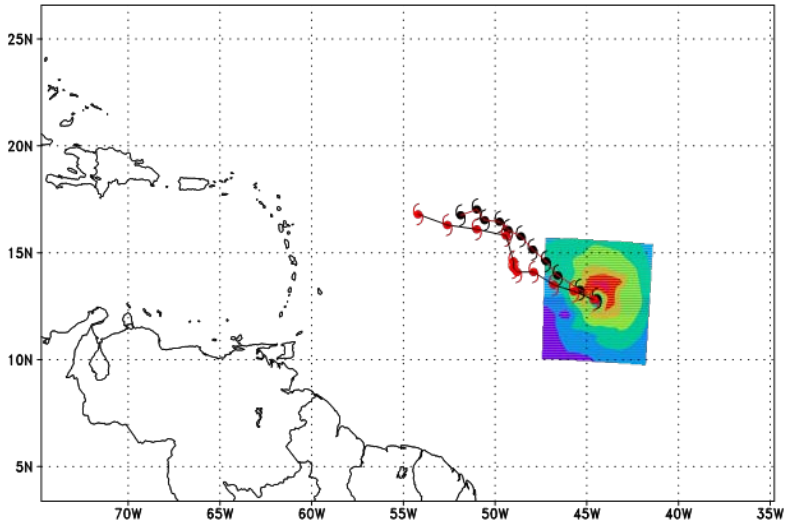


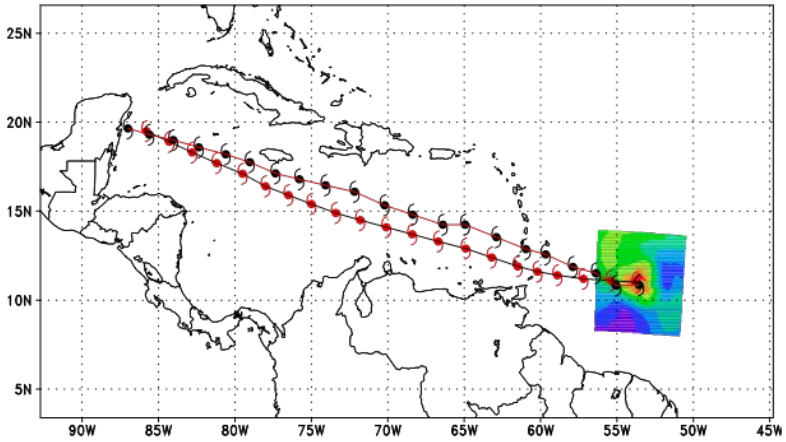
Rita 2005091900



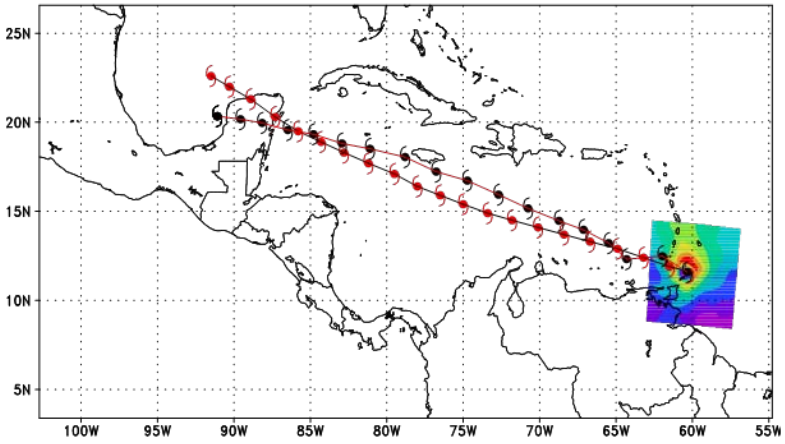
Karen 2007072700



Emily 2005071300



Emily 2005071400



Summary

- Model compiled by PGI can run on WJET with multiple processors
  - Double the number of processors can reach up to 30% gain
- Model has processor dependency as many models do
  - Model is reproducible for a given set of processors
  - The tracks are consistent
  - The intensities have more noticeable change
  - Possible causes:
    - SAS
    - Advection scheme
    - Other physical processes
    - Some code may not bit reproducible
- Model looks sensitive to terrain
- To do list
  - Model intensity evaluation
  - Terrain treatment
  - Model initial vortex

Acknowledge

- Christopher Harrop (ESRL/GSD)
- Ligia Bernardet (DTC)
- Shaowu Bao (DTC)
- HFIP leadership