

# Sandy Case Study for NEXT GEFS

Period: 10/22 – 10/28/2012

Named: 10/23/2012

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EMC/NCEP

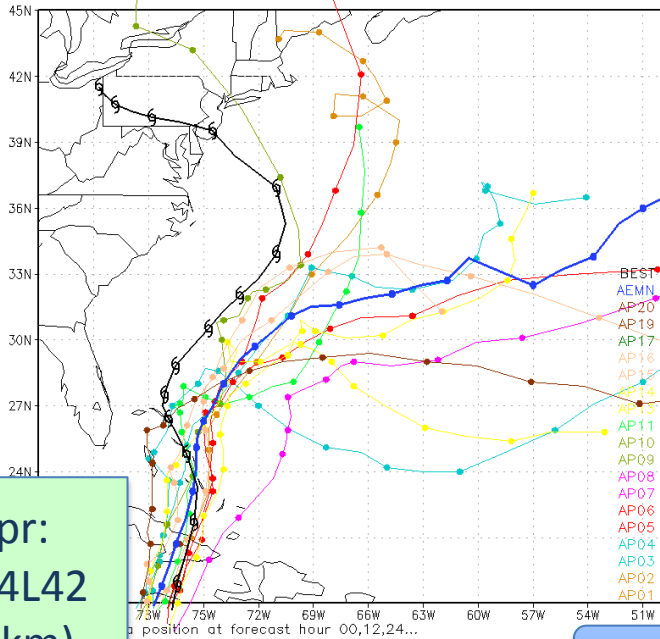
September 15 2014

Acknolegements:  
Dingchen Hou, Xiaqiong Zhou and Jiayi Peng

# Next GFS configuration (plan)

- Model
  - Current: GFS Euler model
  - Plan: GFS Semi-Lagrangian model
- Horizontal resolution
  - Current: T254 (55km for 0-192 hours), T190 (73km for 192-384 hours)
  - Plan: T574 (T382 physics - 34km for 0-168 hours), T382(T254 physics – 55km for 168-384 hours)
- Vertical resolution
  - Current: L42 hybrid levels
  - Plan: L64 hybrid levels to match with GFS and DA
- Computation cost:
  - Current: 84 nodes (+ post process) for 55 minutes
  - Plan: 252 nodes (+ post process) for 1 hour
- Output:
  - Current: every 6-hr for 1\*1 degree pgrb files
  - Plan: every 3-hr for 0.5\*0.5 degree pgrb files
- Challenges:
  - T574L64 configuration will need about 300+ nodes in totally for one hour
    - A estimation is based on dt=900s, dphysics=450s, output every 6 hours, no restart file saving, no STTP
  - Option: T574L42 configuration will use less resources, but the forecast quality will be degraded.

NCEP Ensemble Forecast TC Track Verification 2012102200



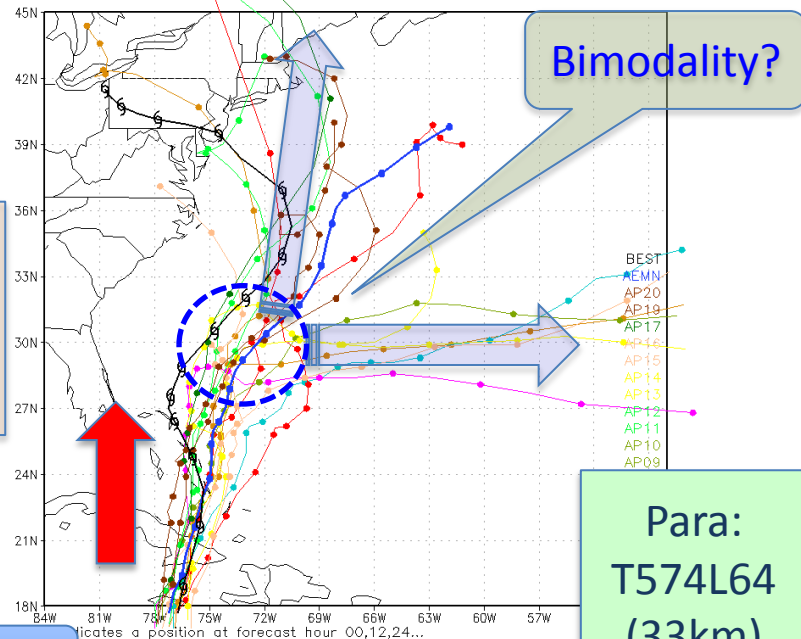
00UTC

Thick blue:  
ensemble  
mean

Opr:  
T254L42  
(55km)

20121022 (8 days)

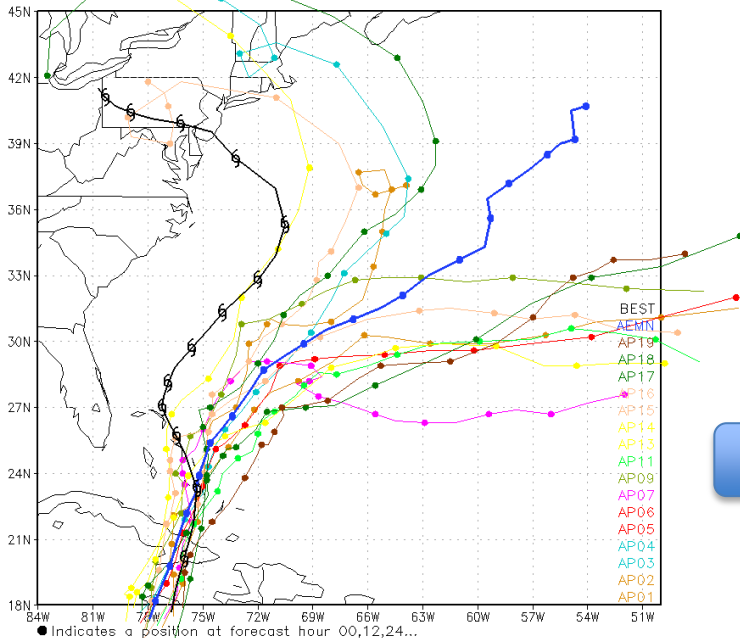
NCEP Ensemble Forecast TC Track Verification 2012102200



Bimodality?

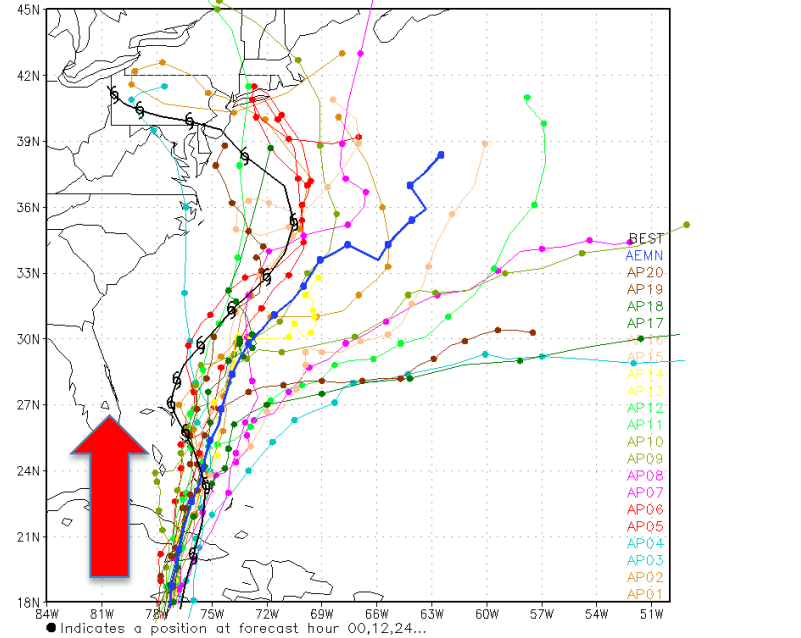
Para:  
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(33km)

NCEP Ensemble Forecast TC Track Verification 2012102206



06UTC

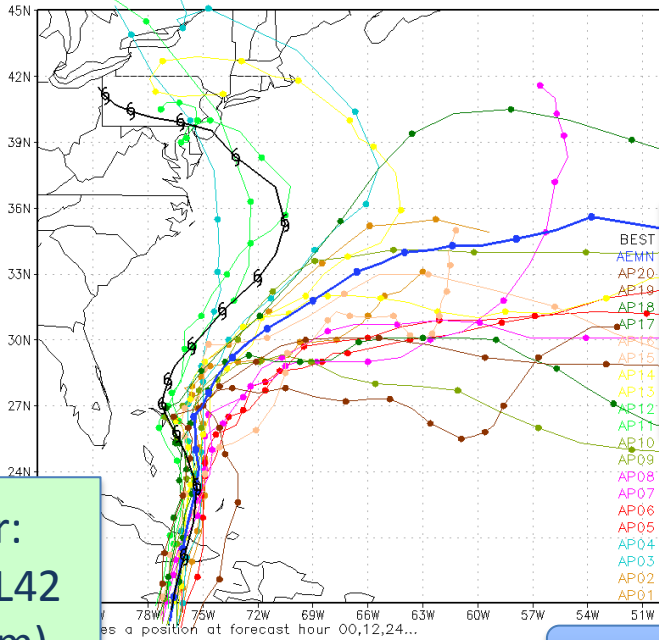
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● Indicates a position at forecast hour 00,12,24...

● Indicates a position at forecast hour 00,12,24...

NCEP Ensemble Forecast TC Track Verification 2012102218



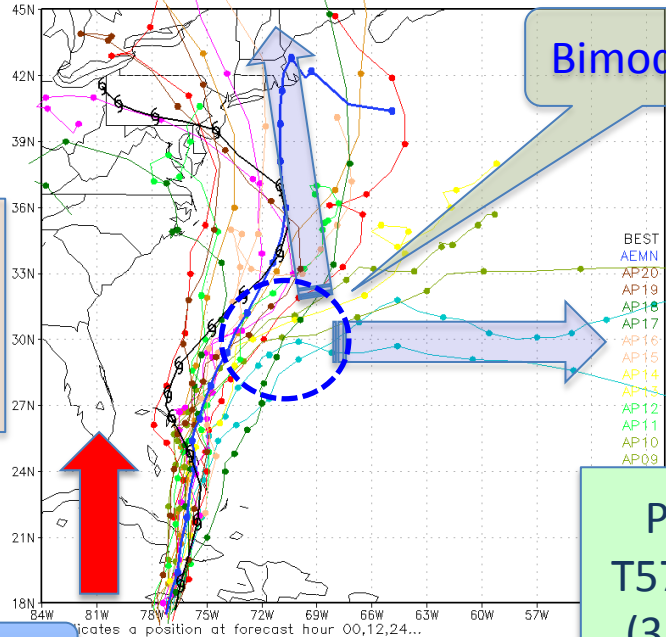
12UTC

Thick blue:  
ensemble  
mean

Opr:  
T254L42  
(55km)

20121022 (7.5 days)

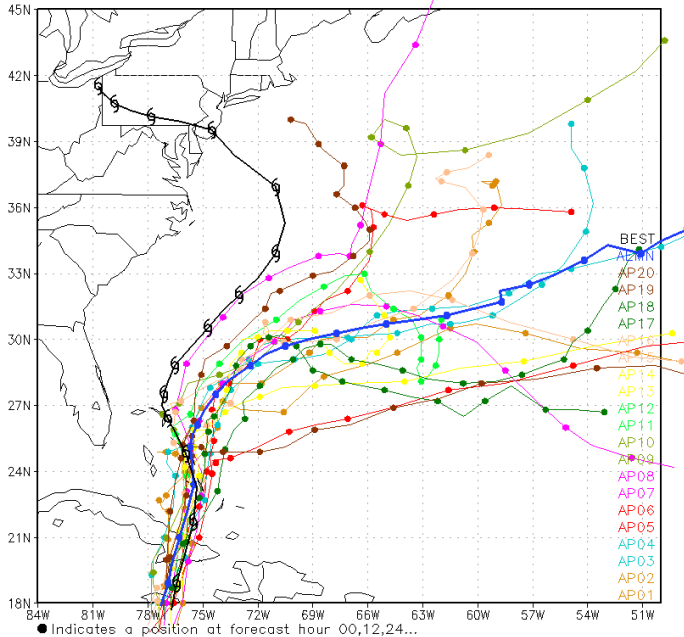
NCEP Ensemble Forecast TC Track Verification 2012102212



Bimodality?

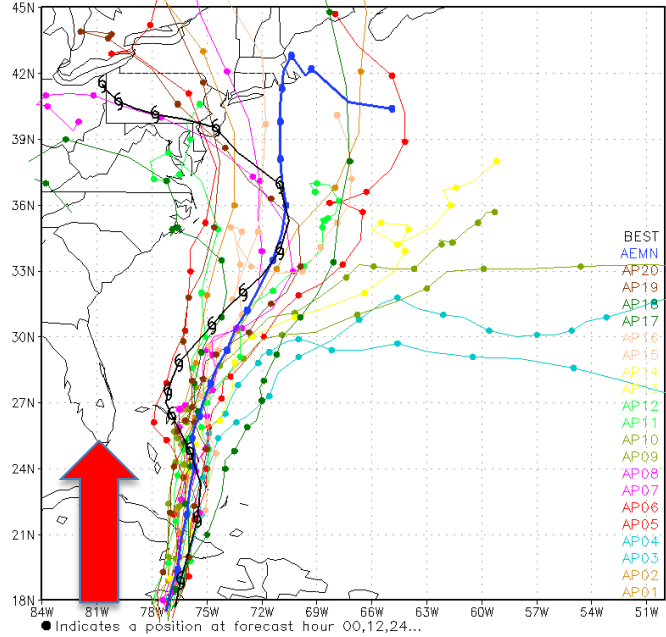
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(33km)

NCEP Ensemble Forecast TC Track Verification 2012102212



18UTC

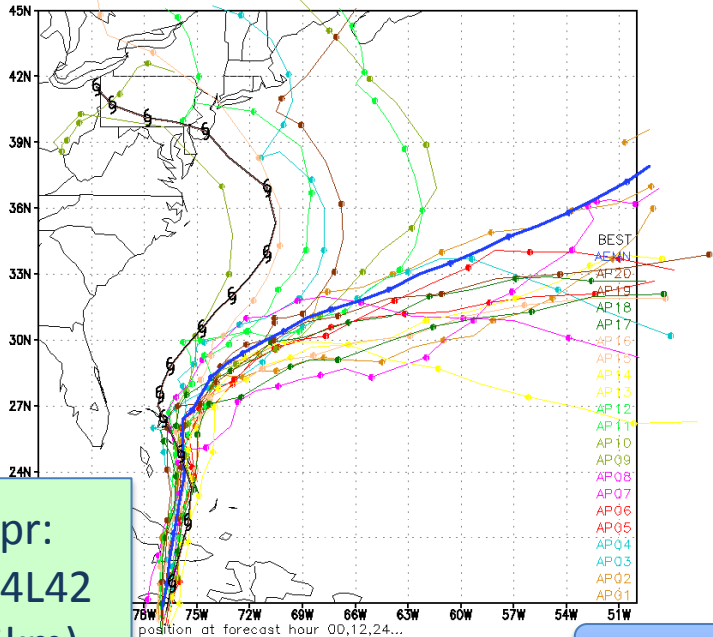
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● Indicates a position at forecast hour 00,12,24...

● Indicates a position at forecast hour 00,12,24...

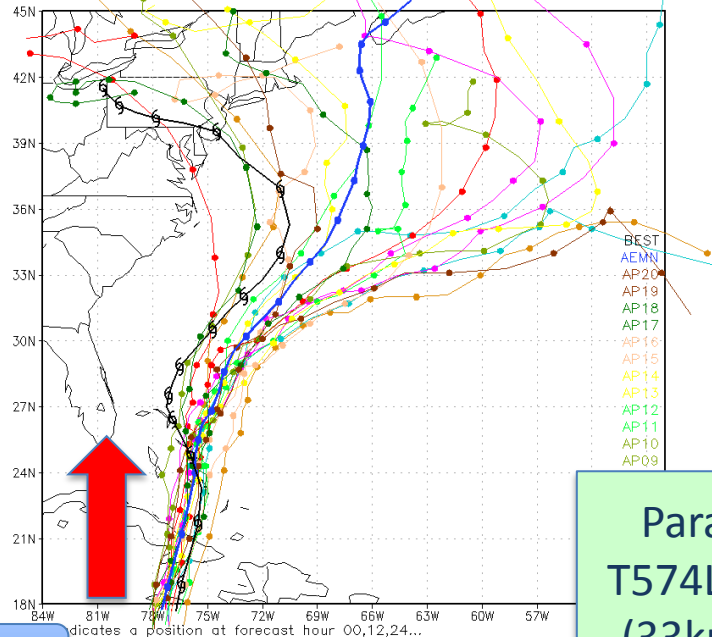
NCEP Ensemble Forecast TC Track Verification 2012102300



00UTC

Opr:  
T254L42  
(55km)

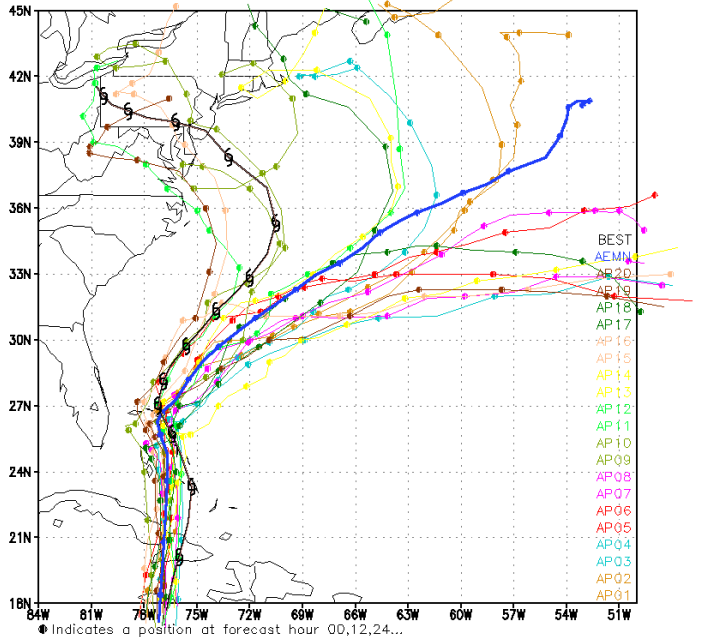
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Para:  
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(33km)

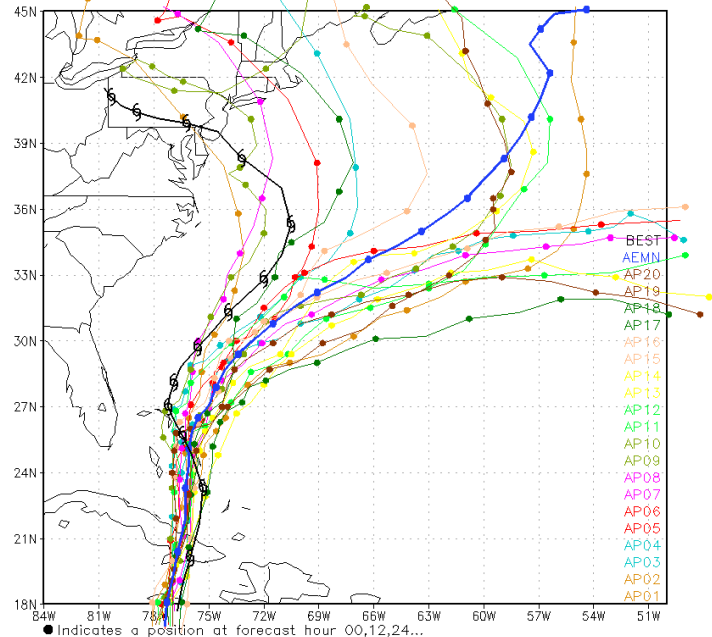
20121023 (7 days)

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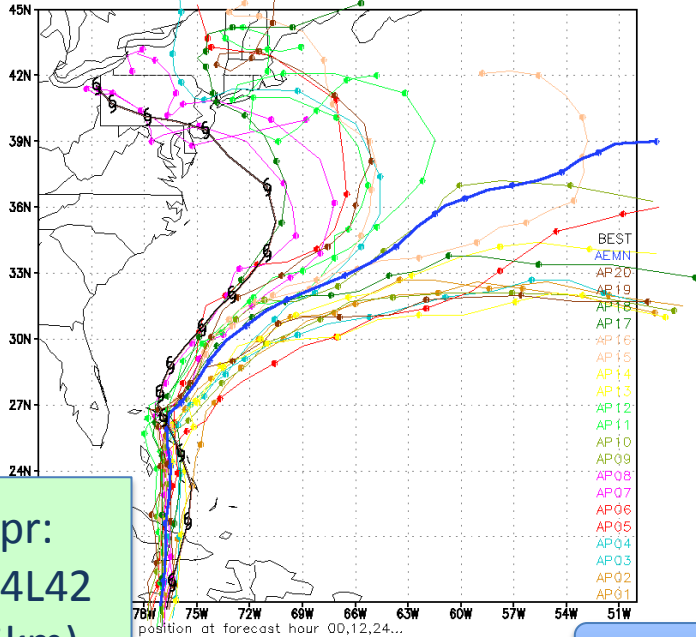


06UTC

NCEP Ensemble Forecast TC Track Verification 2012102306



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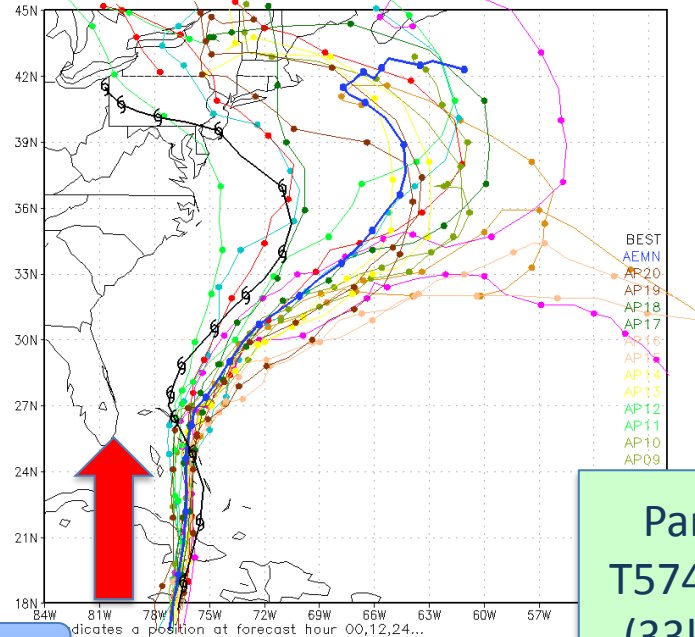


12UTC

Opr:  
T254L42  
(55km)

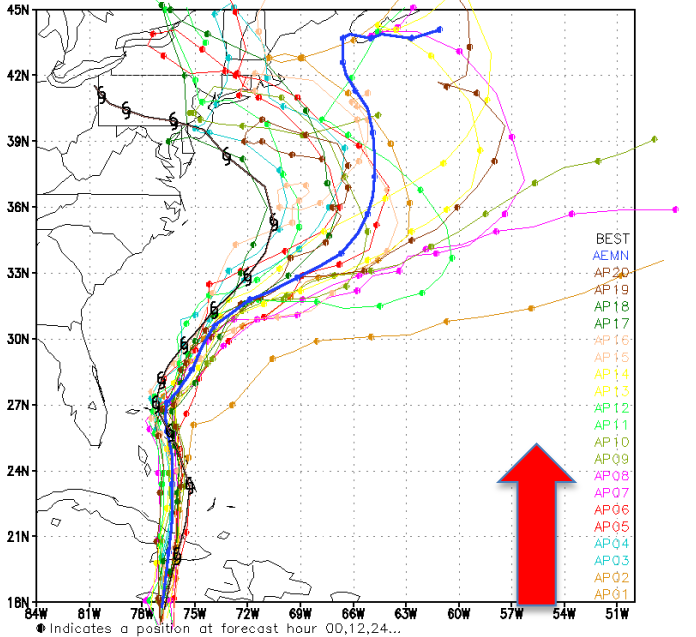
20121023 (6.5 days)

NCEP Ensemble Forecast TC Track Verification 2012102312



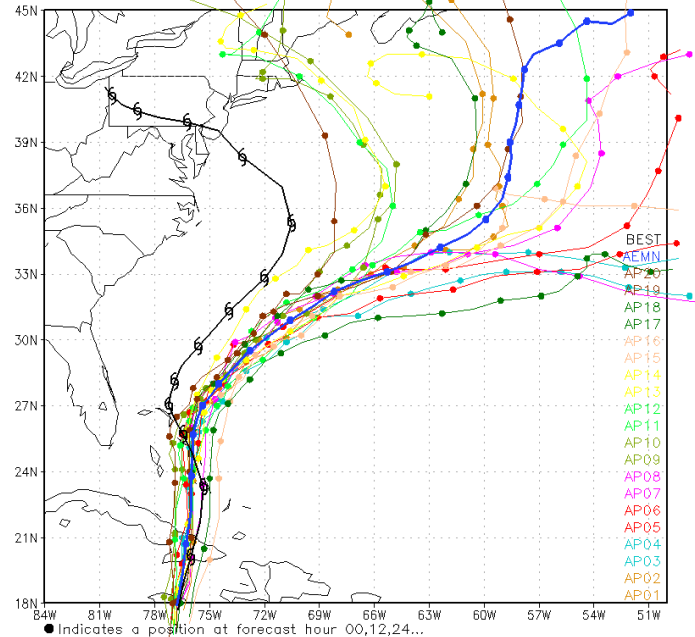
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T574L64  
(33km)

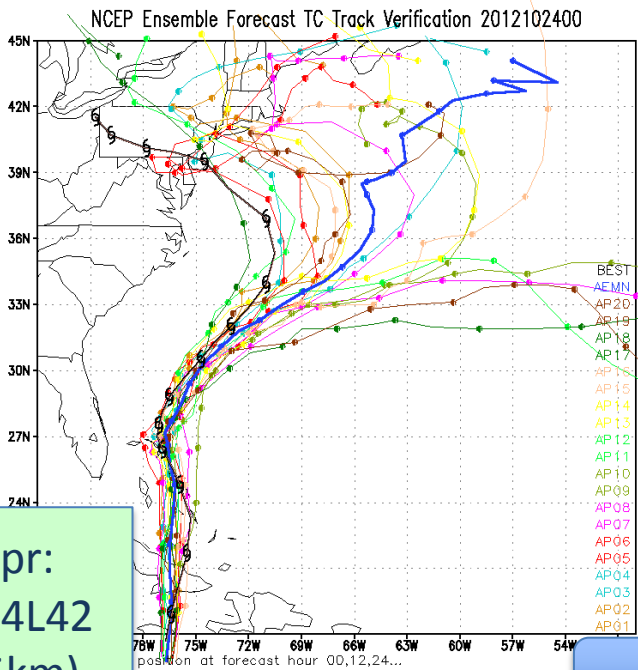
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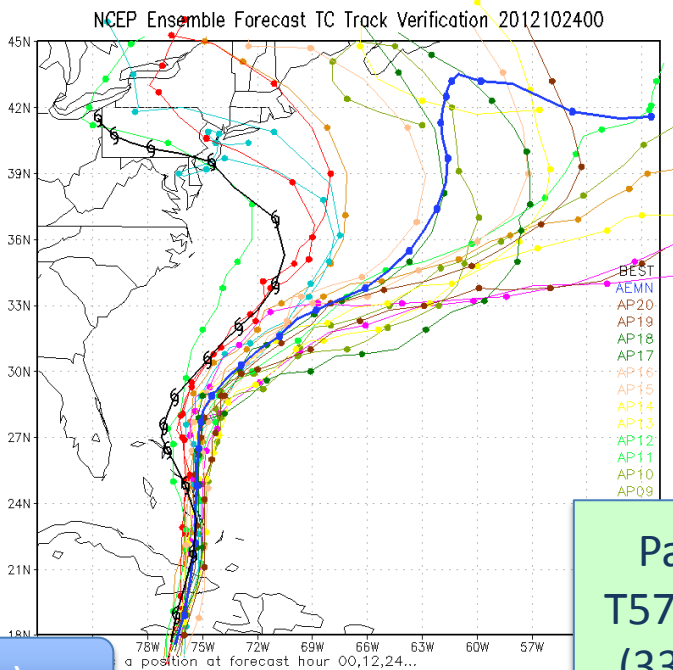
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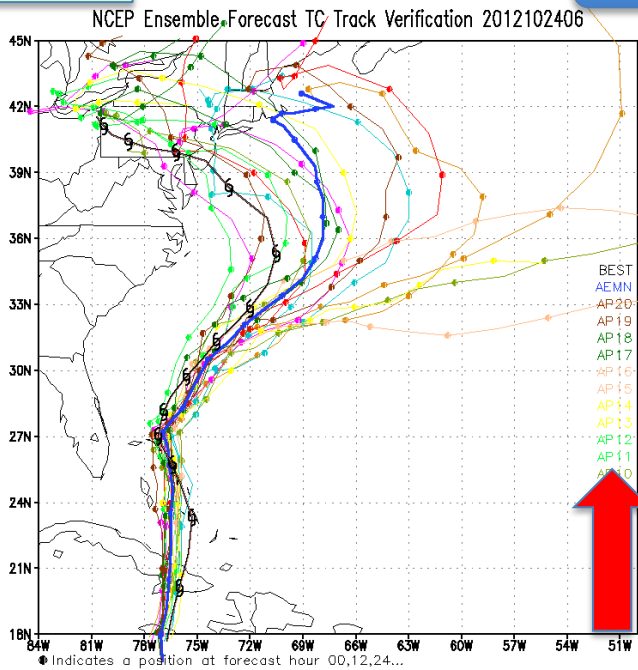
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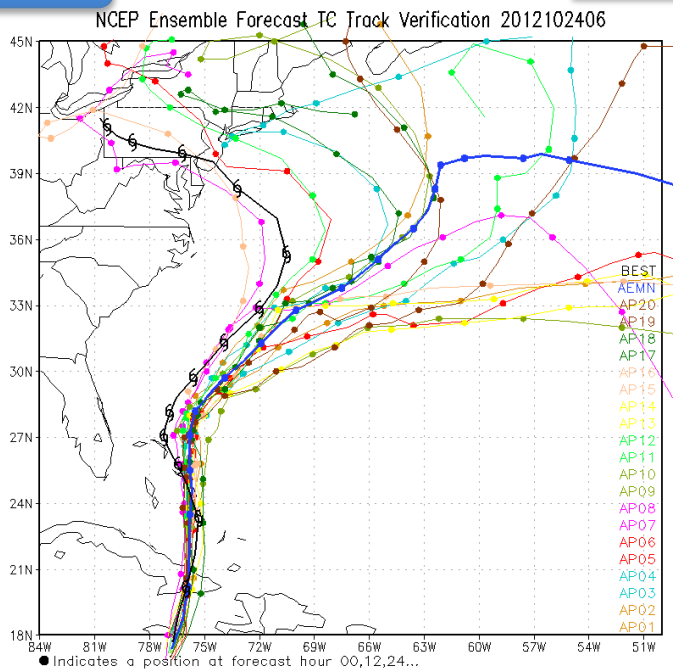
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T574L64  
(33km)

Opr:  
T254L42  
(55km)

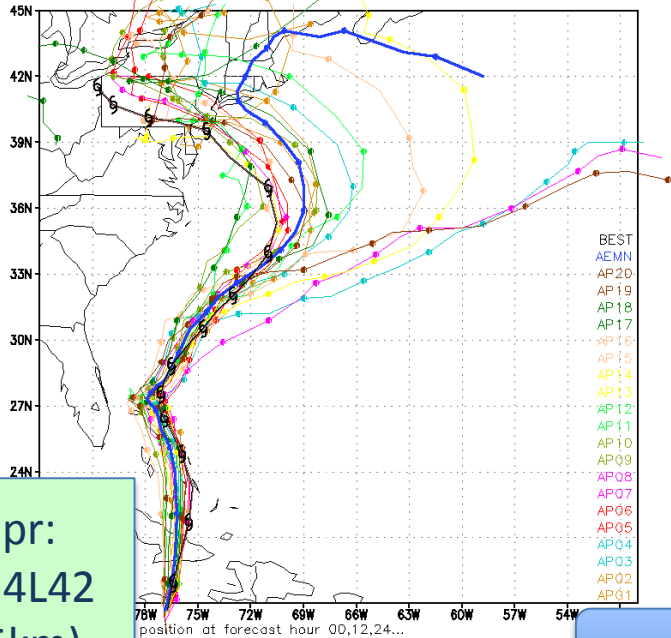
20121024 (6 days)



06UTC

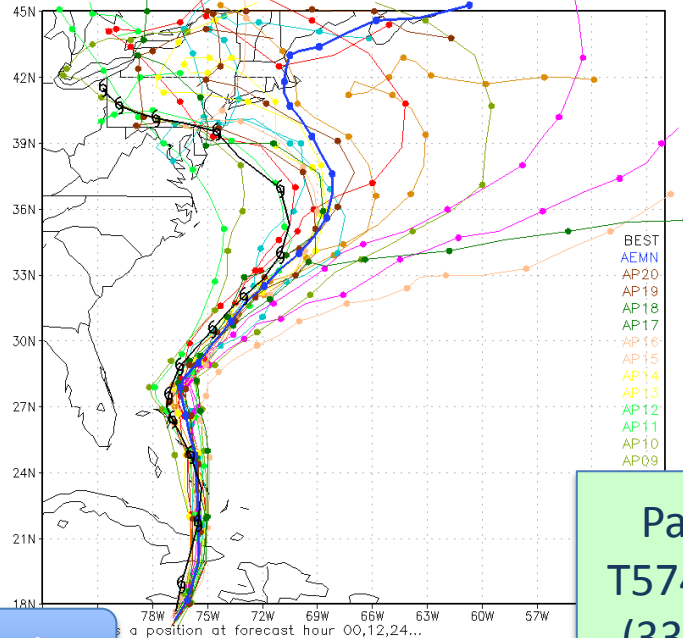


NCEP Ensemble Forecast TC Track Verification 2012102412



12UTC

NCEP Ensemble Forecast TC Track Verification 2012102412

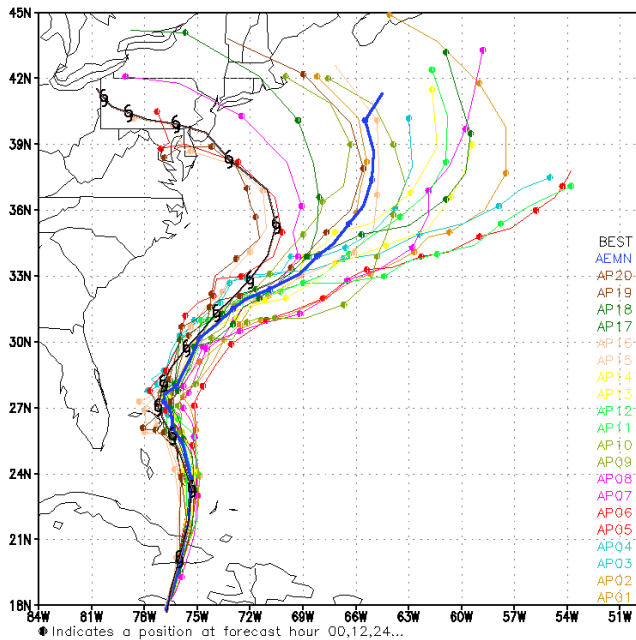


Para:  
T574L64  
(33km)

Opr:  
T254L42  
(55km)

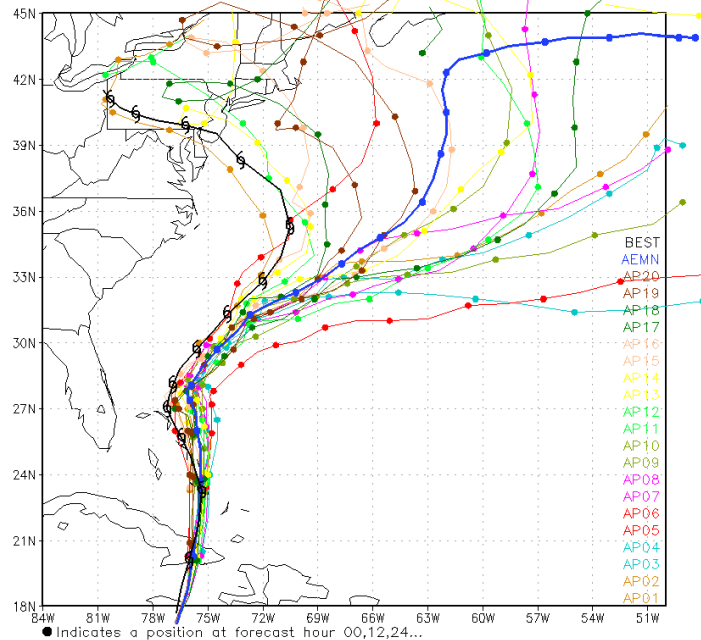
20121024 (5.5 days)

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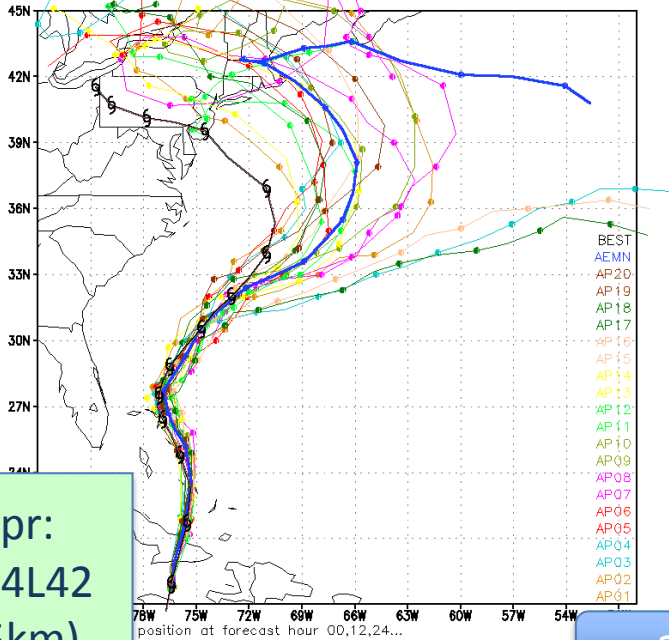
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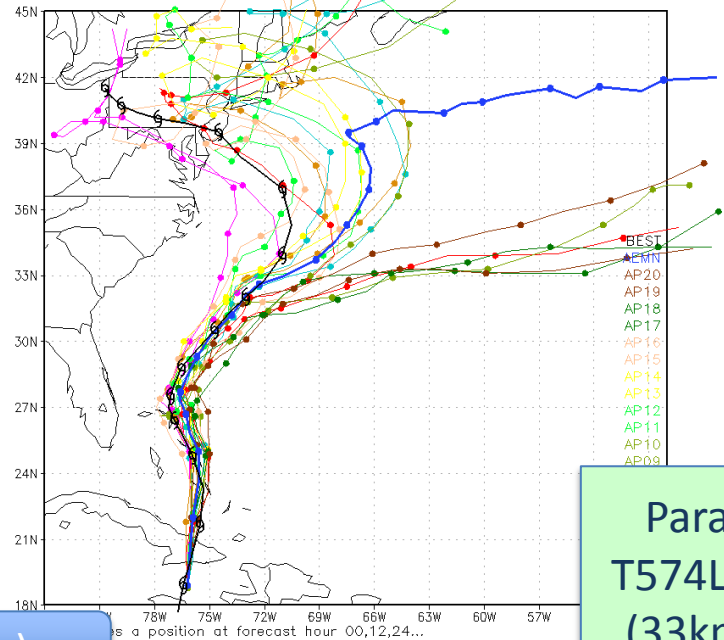


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00UTC

NCEP Ensemble Forecast TC Track Verification 2012102500

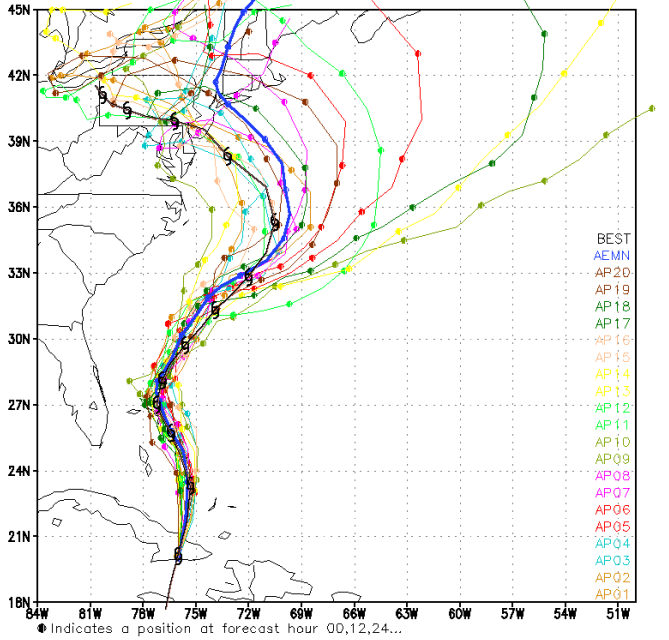


Opr:  
T254L42  
(55km)

Para:  
T574L64  
(33km)

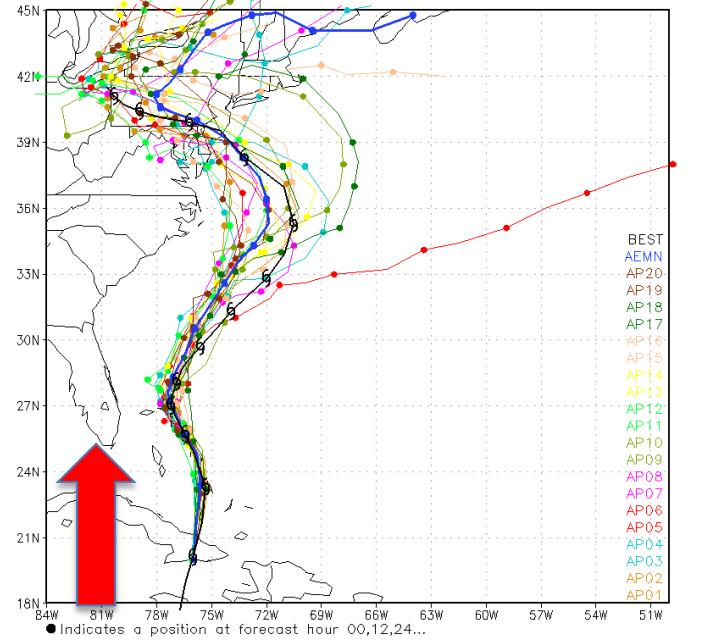
20121025 (5 days)

NCEP Ensemble Forecast TC Track Verification 2012102506



06UTC

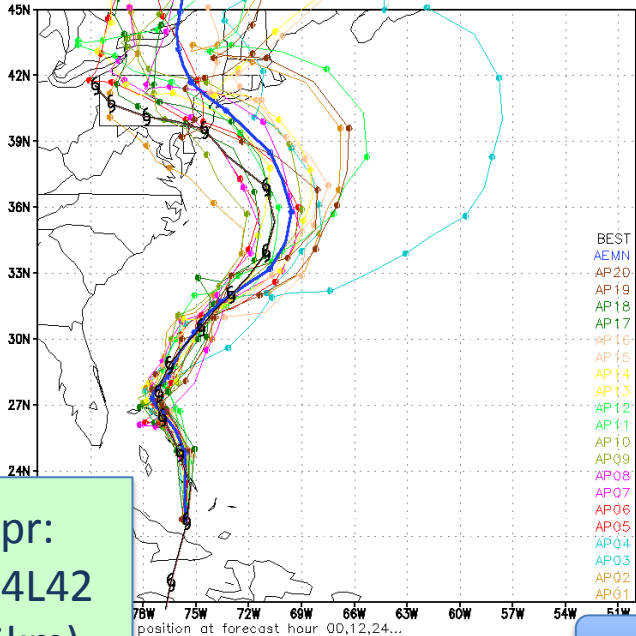
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• Indicates a position at forecast hour 00,12,24...

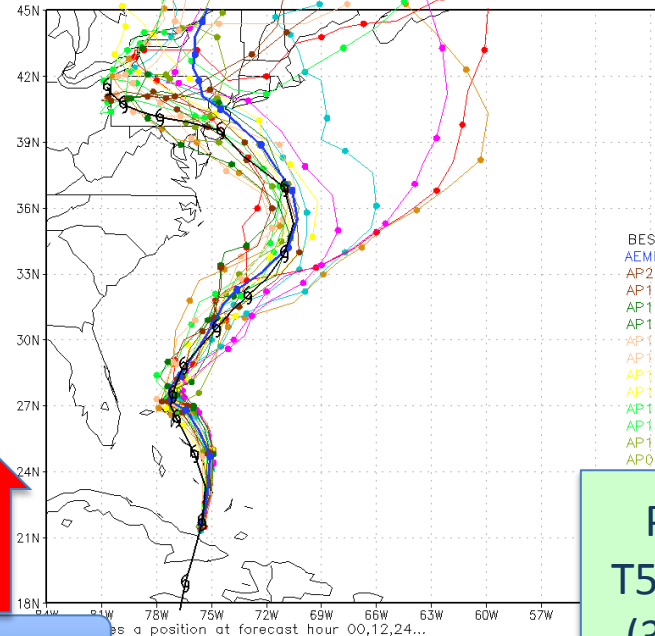
• Indicates a position at forecast hour 00,12,24...

NCEP Ensemble Forecast TC Track Verification 2012102512



12UTC

NCEP Ensemble Forecast TC Track Verification 2012102512

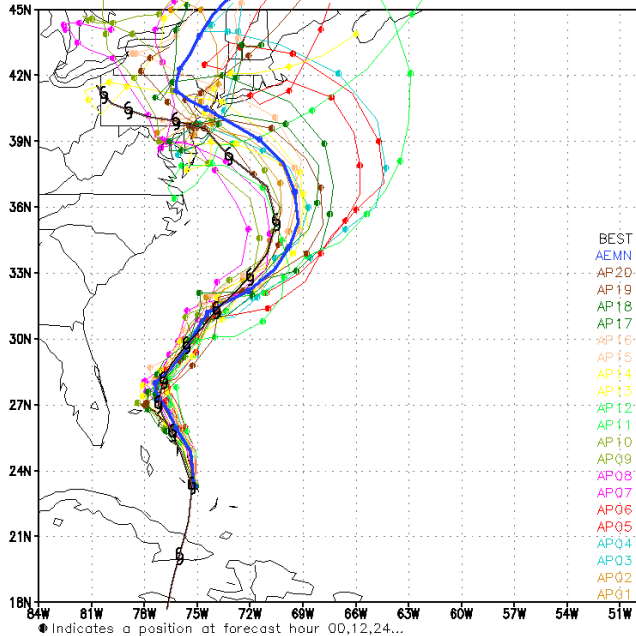


Para:  
T574L64  
(33km)

Opr:  
T254L42  
(55km)

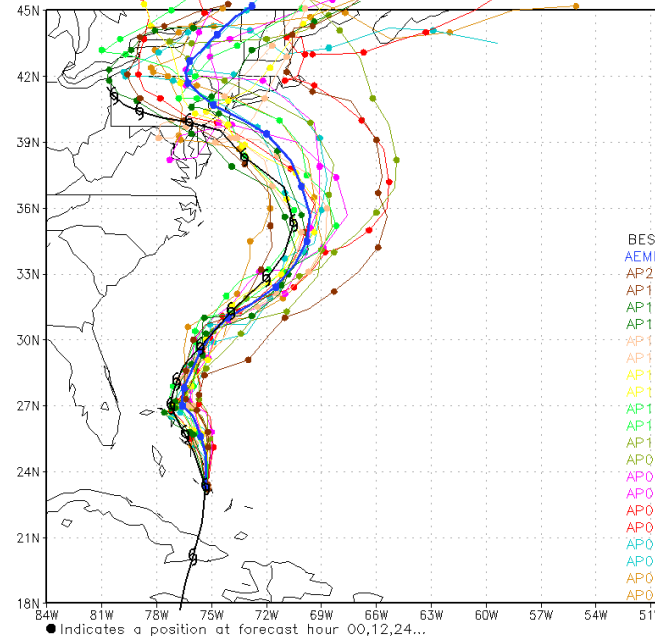
20121025 (5 days)

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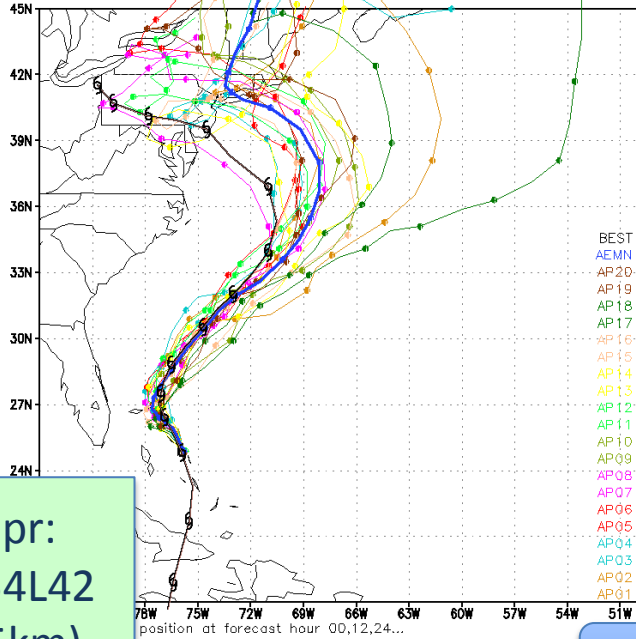


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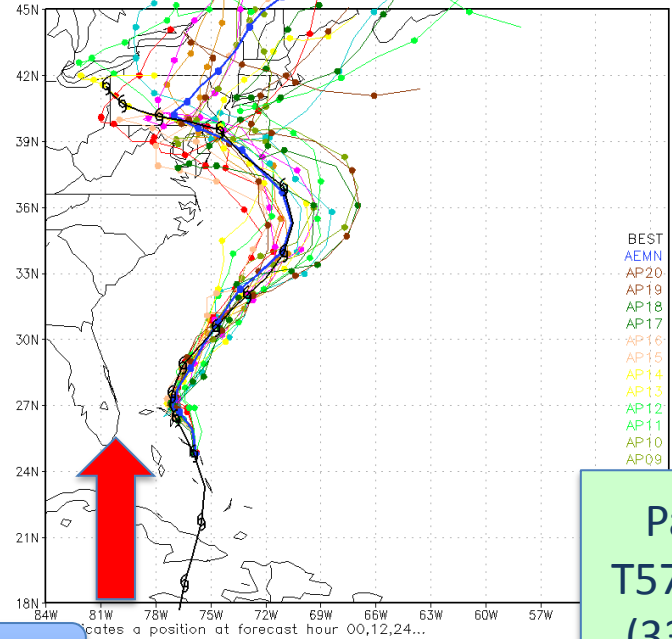


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00UTC

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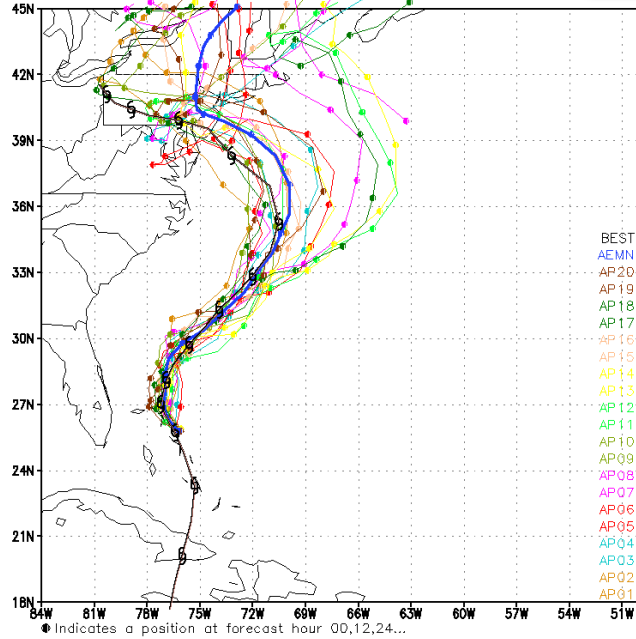


Para:  
T574L64  
(33km)

Opr:  
T254L42  
(55km)

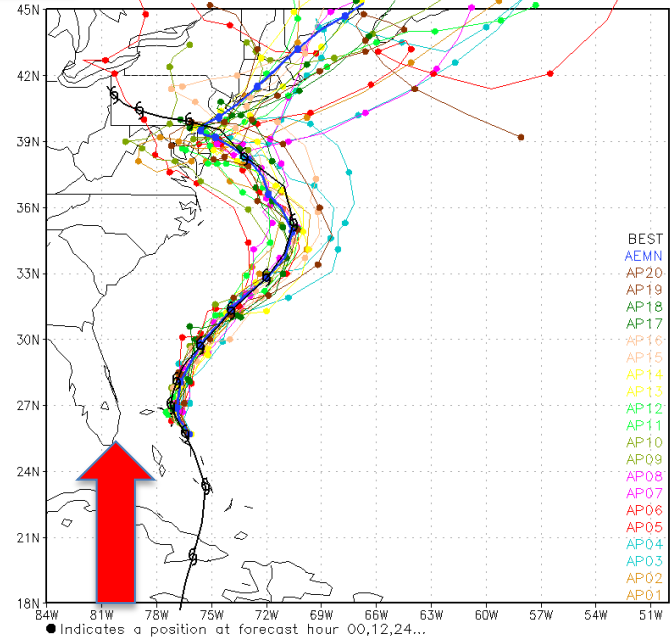
20121026 (4 days)

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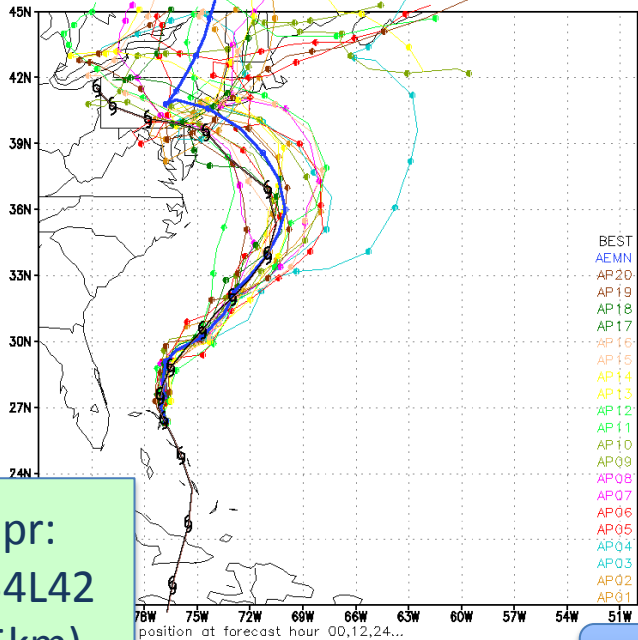


06UTC

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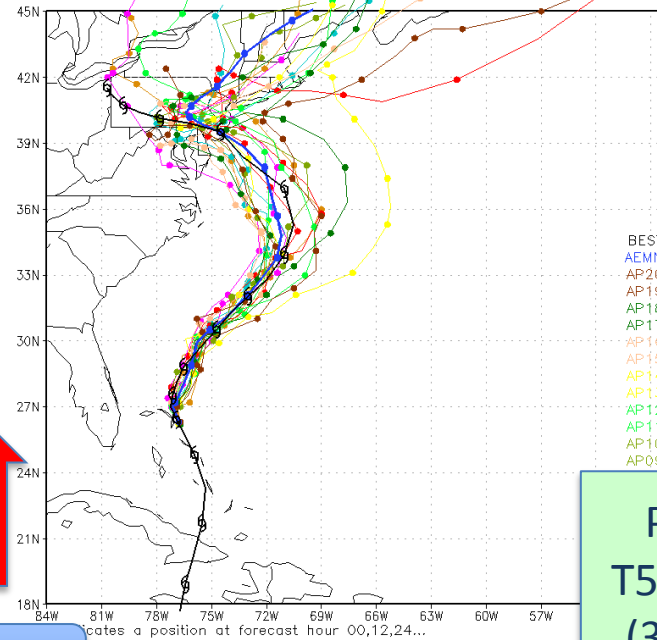


NCEP Ensemble Forecast TC Track Verification 2012102612



12UTC

NCEP Ensemble Forecast TC Track Verification 2012102612

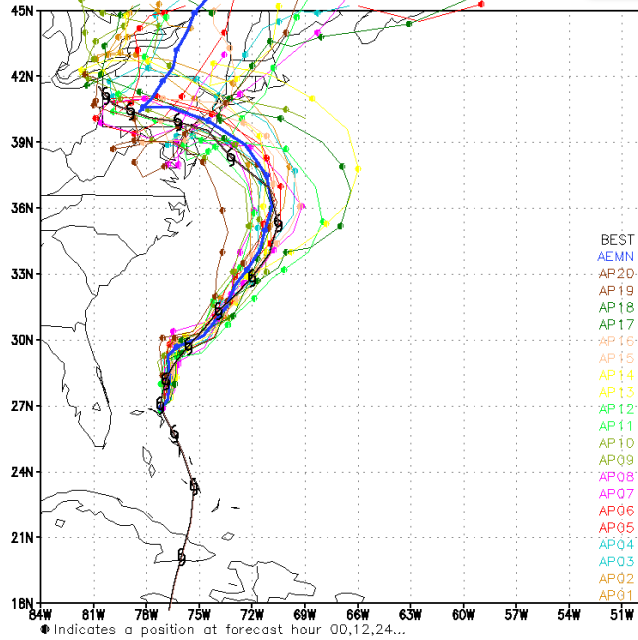


Para:  
T574L64  
(33km)

Opr:  
T254L42  
(55km)

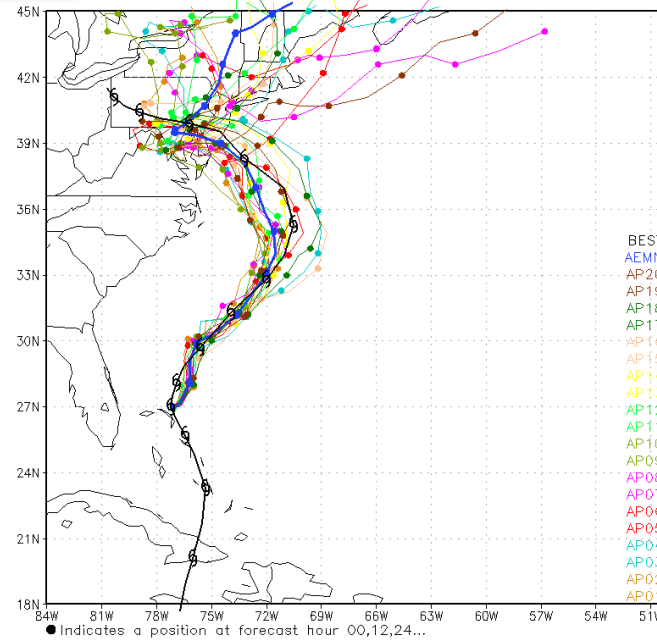
20121026 (3.5 days)

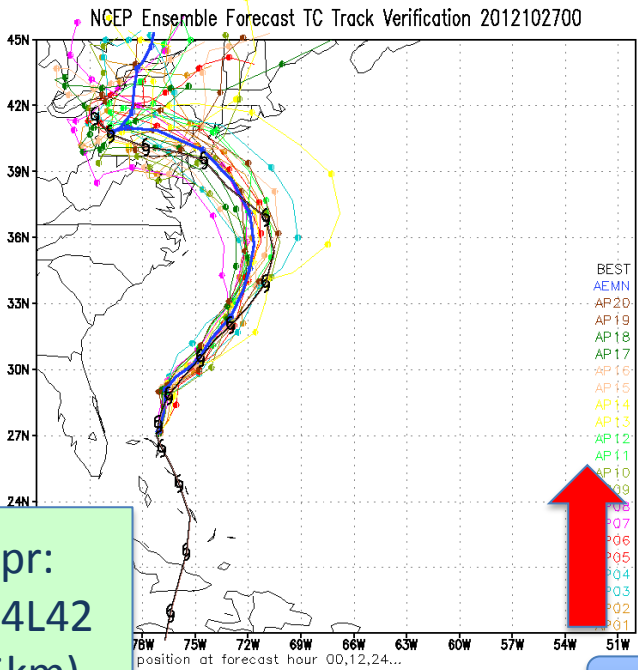
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18UTC

NCEP Ensemble Forecast TC Track Verification 2012102618

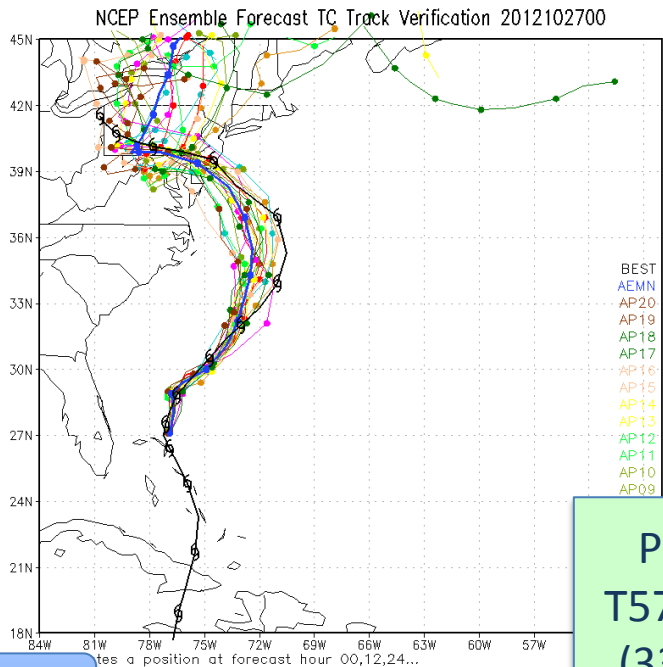




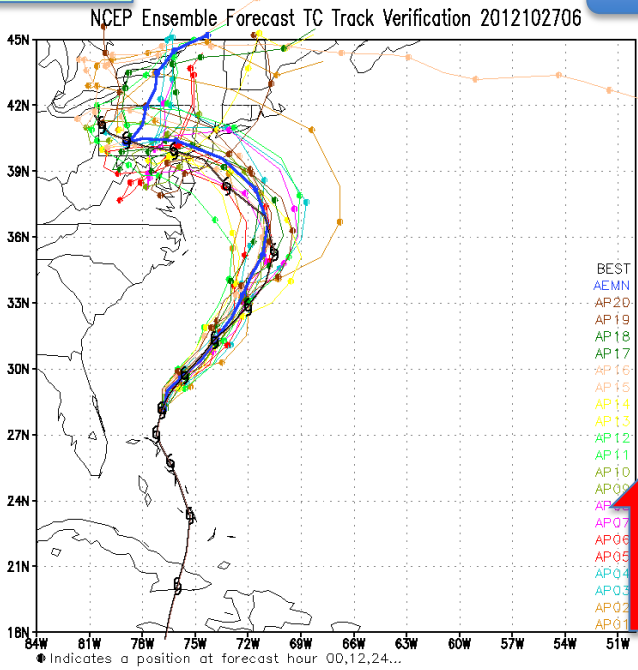
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Opr:  
T254L42  
(55km)

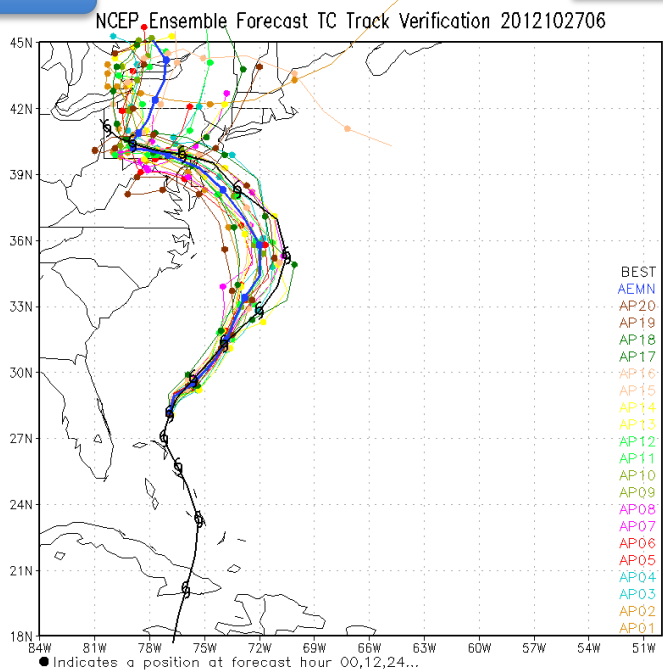
20121027 (3 days)



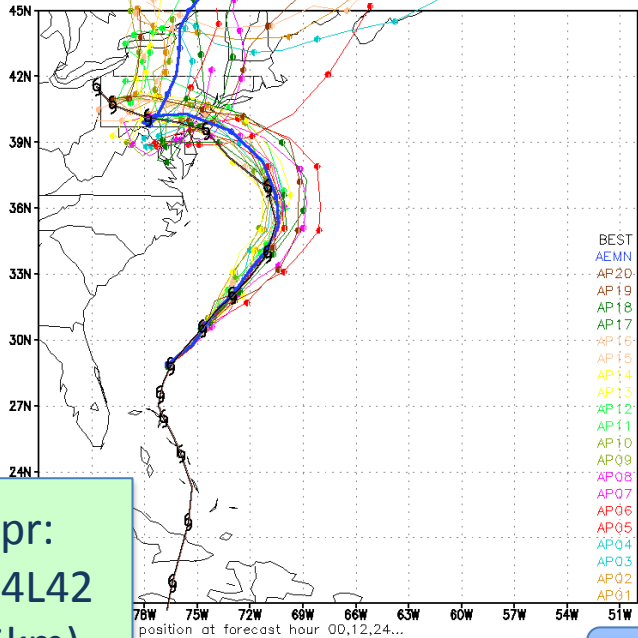
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(33km)



06UTC



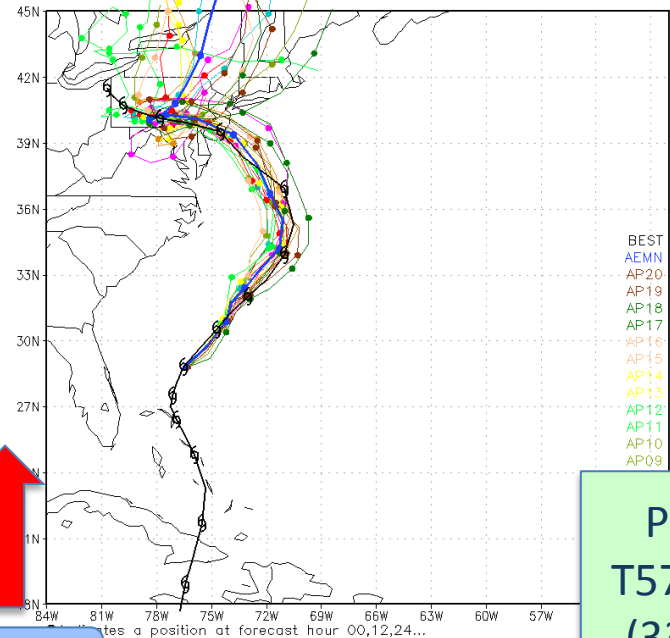
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12UTC

Opr:  
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(55km)

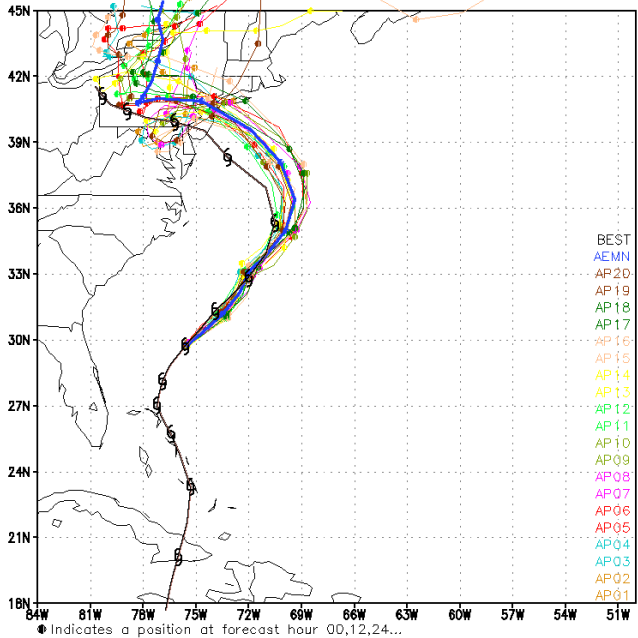
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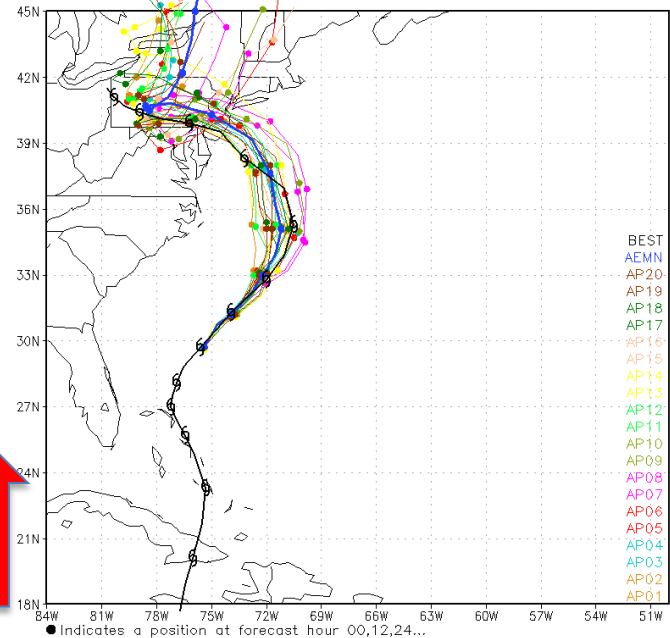
20121027 (2.5 days)

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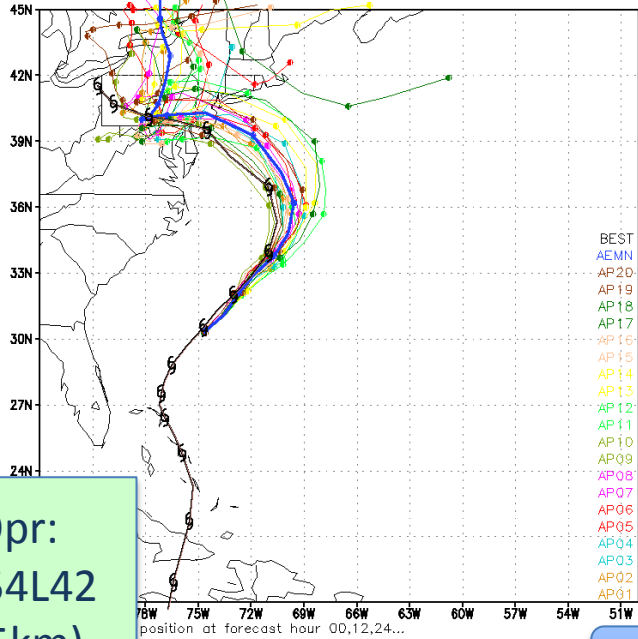


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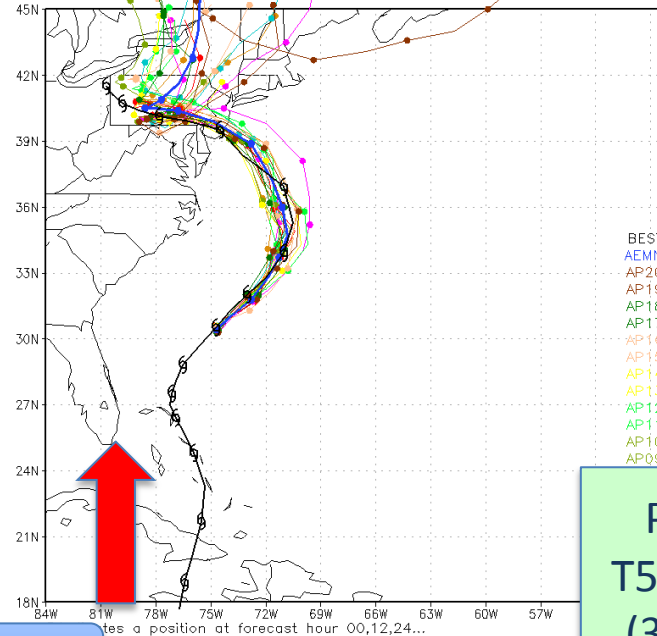
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Opr:  
T254L42  
(55km)

00UTC

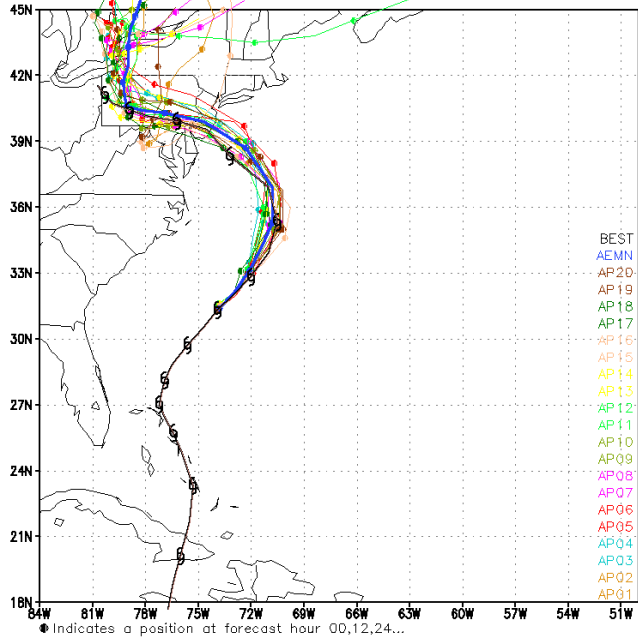
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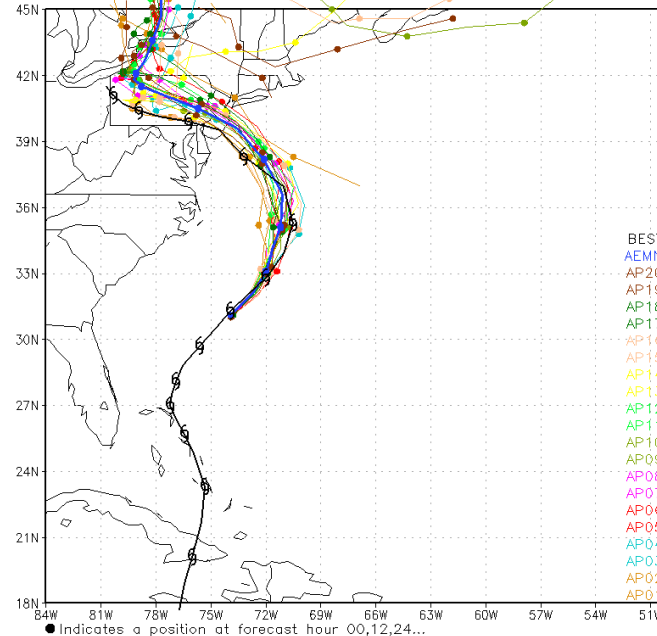
20121028 (2 days)

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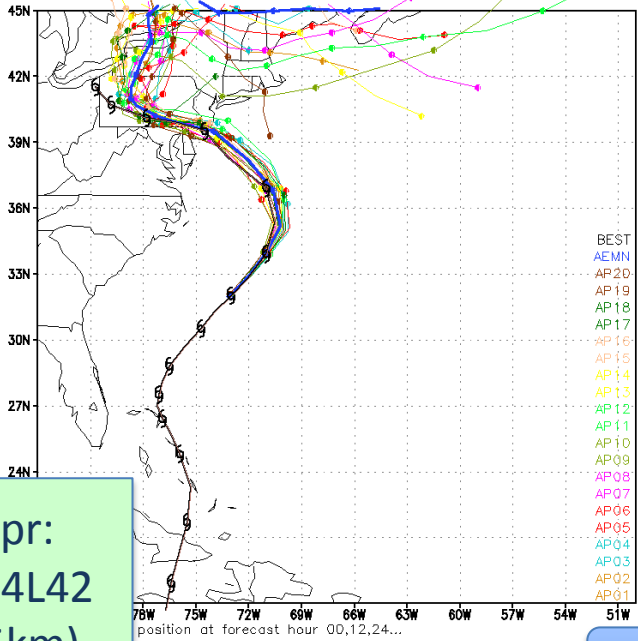


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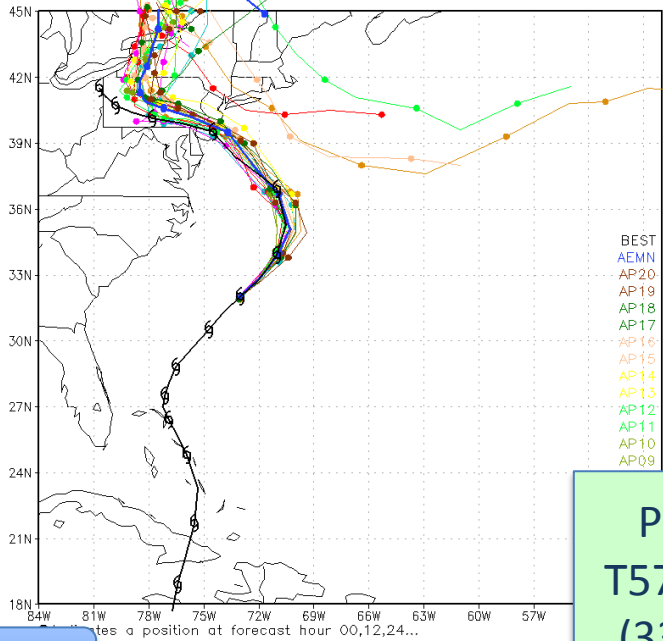


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12UTC

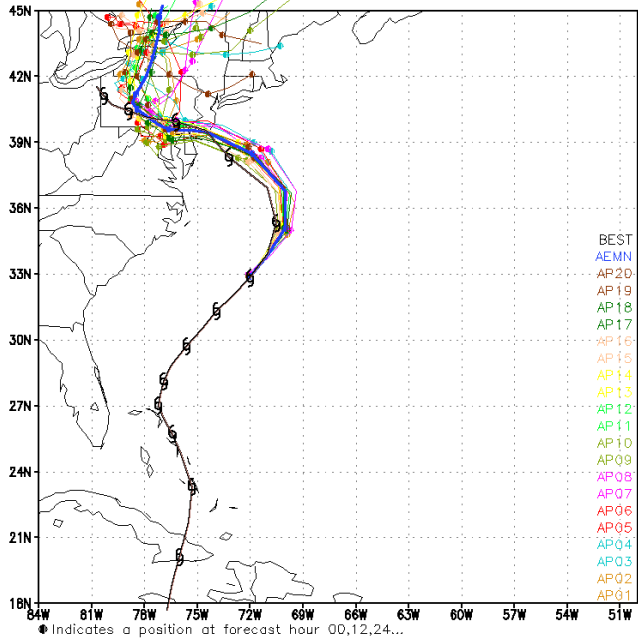
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Para:  
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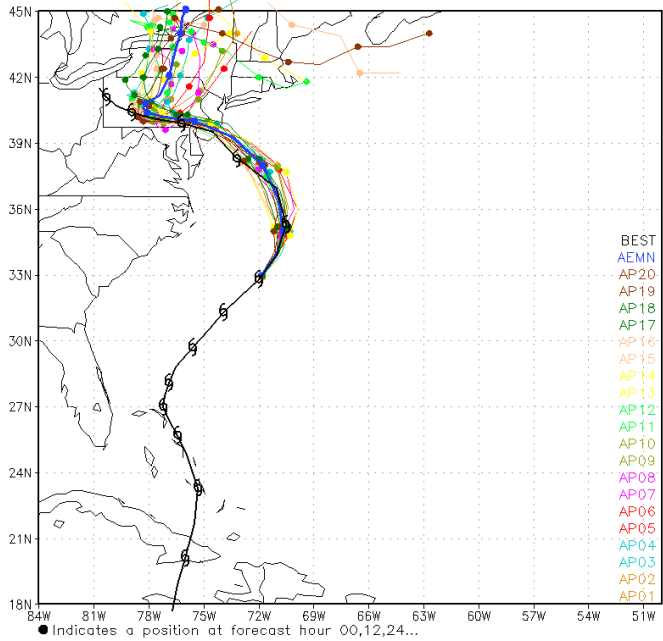
20121028 (2 days)

NCEP Ensemble Forecast TC Track Verification 2012102818



18UTC

NCEP Ensemble Forecast TC Track Verification 2012102818



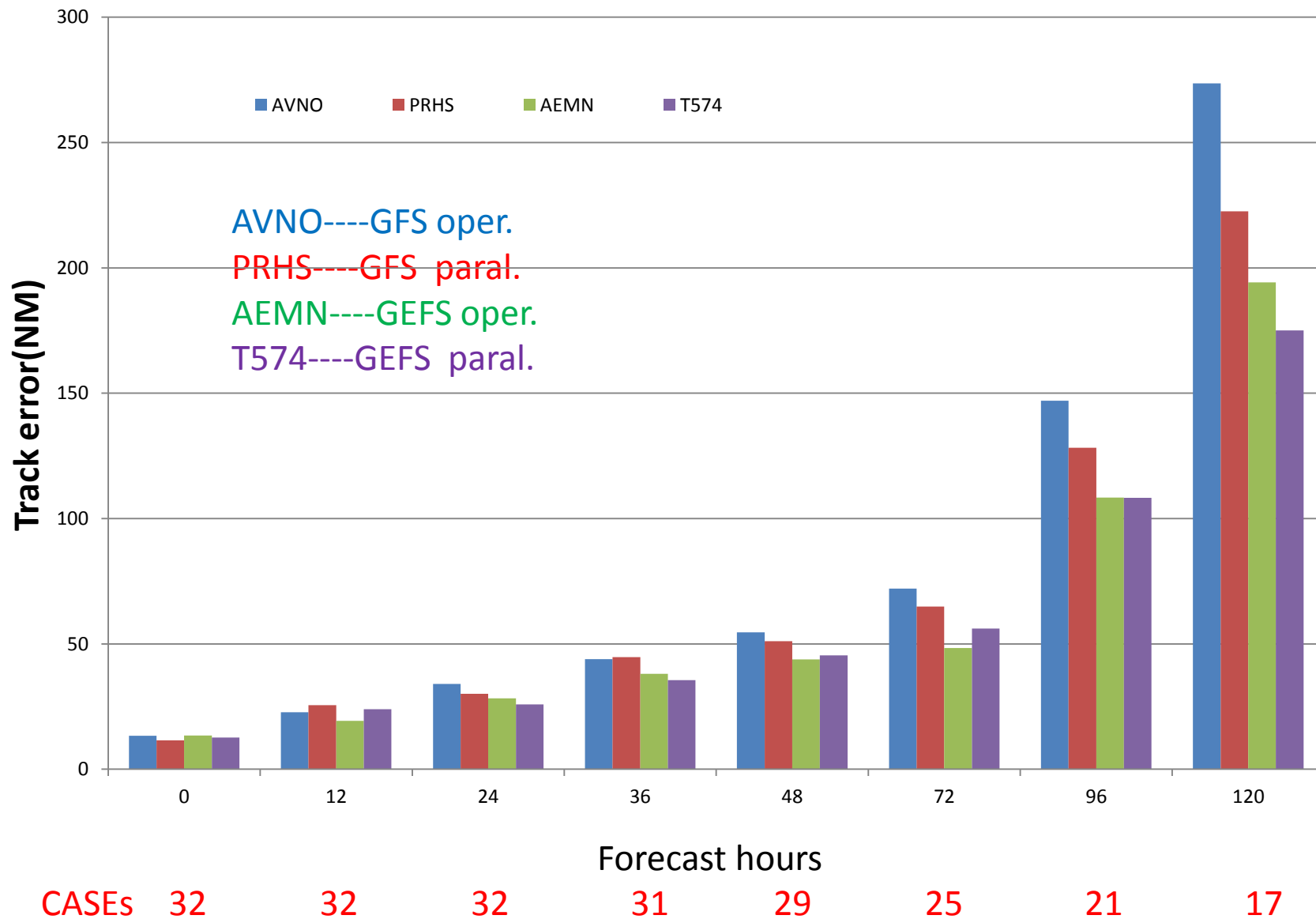
Opr:  
T254L42  
(55km)

● Indicates a position at forecast hour 00,12,24...

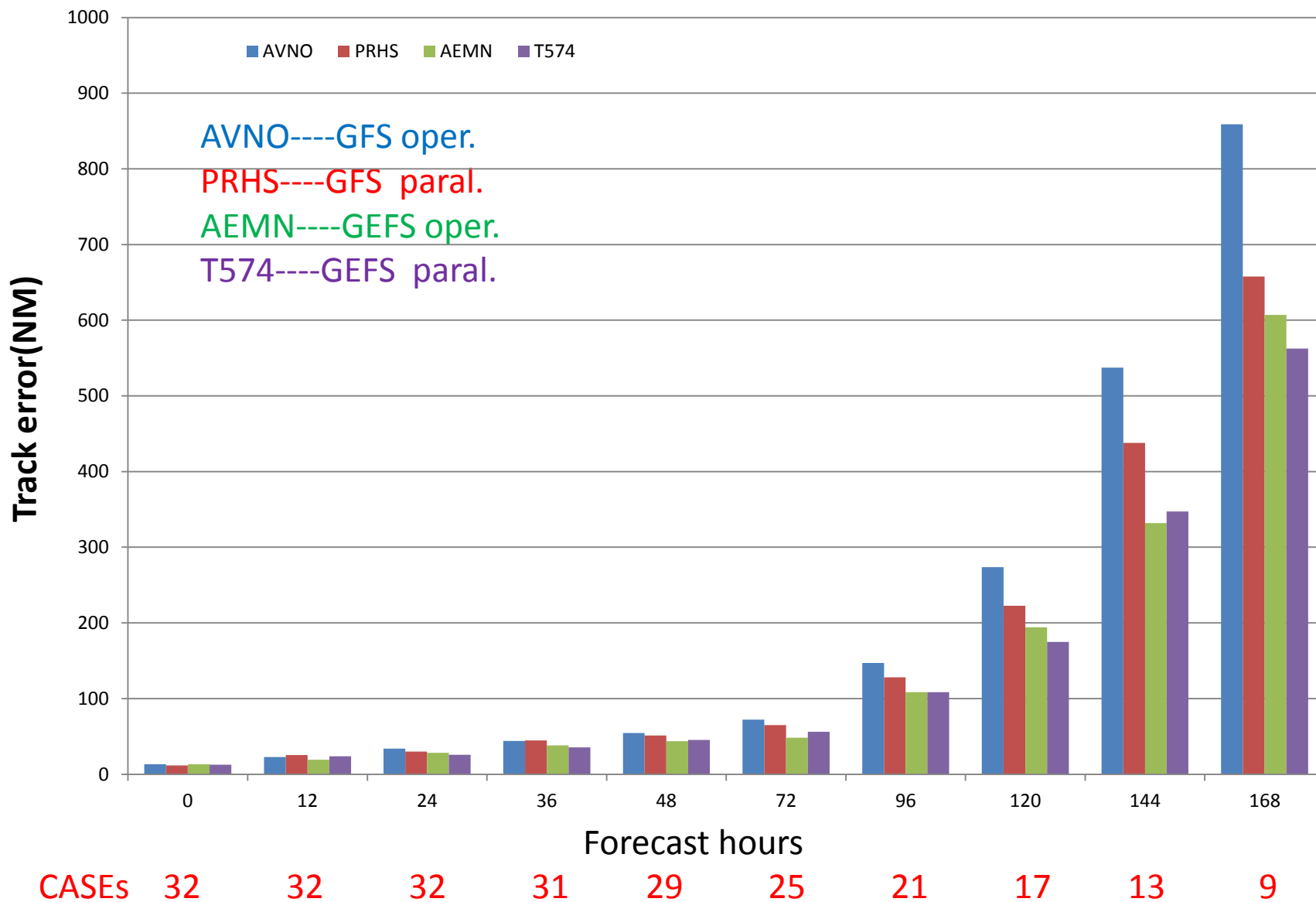
● Indicates a position at forecast hour 00,12,24...



# 2012 Sandy Track Verifications (5-days)



# 2012 Sandy Track Verifications (7-days)



# Short Summary

- Higher resolution and new model improve the forecast skill for most lead-time, especially for longer lead-time (day 7-8).
- Higher resolution and new model have excellent predictability around 8-days
- Bimodality of forecast tracks is clearly for early lead-time – around 30-32N
- Very good forecasts for short lead-time (less than 4-5 days) of both production and parallel
- Problem/concern:
  - Forecast inconsistency from cycle to cycle since initial condition changes, especially for Oct. 23 - 24