VERIFICATIONS OF THE NEW OPERATIONAL 27:9:3 km HWRF for 2010-2011 Stratified by Initial Storm Intensity and Shear

Presented by

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DTC

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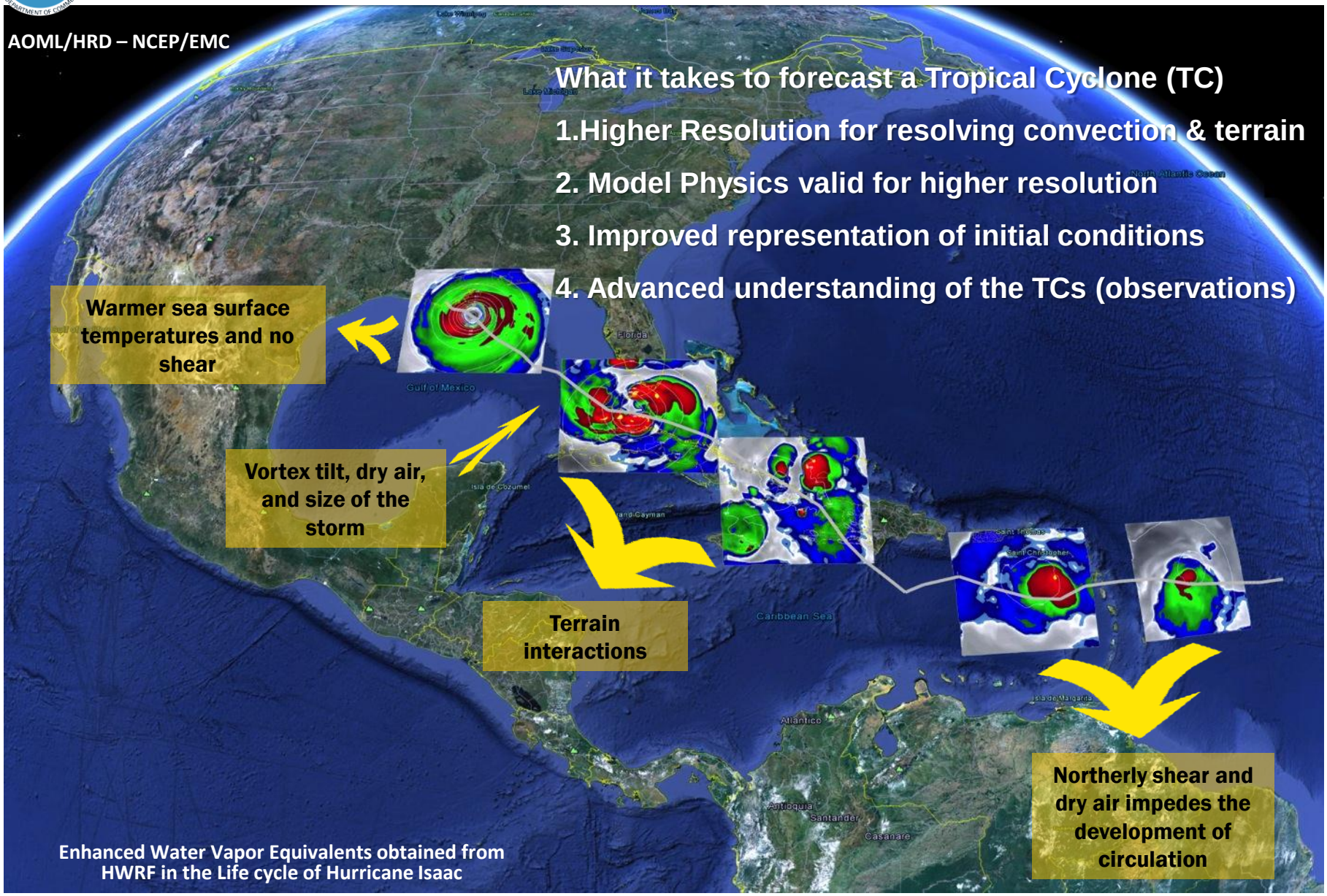
HWRF: Advancing Track and Structure Predictions



SUMMARY OF HWRF VERSIONS

PREVIOUS OPERATIONAL HWRF 27:9 km

- Operational version from 2007-2011

H3GP 27:9:3 km TRIPLE NESTED VERSION

- Real-time testing for 2011 season
- Numerous Modifications over HWRF & HWRFX
- Verified for 4-years of runs (2008-2011

NEW OPERATIONAL HWRF 27:9:3 km TRIPLE NESTED VERSION

- Operational version starting 2012
- Numerous Modifications over H3GP (by EMC)

Reference:

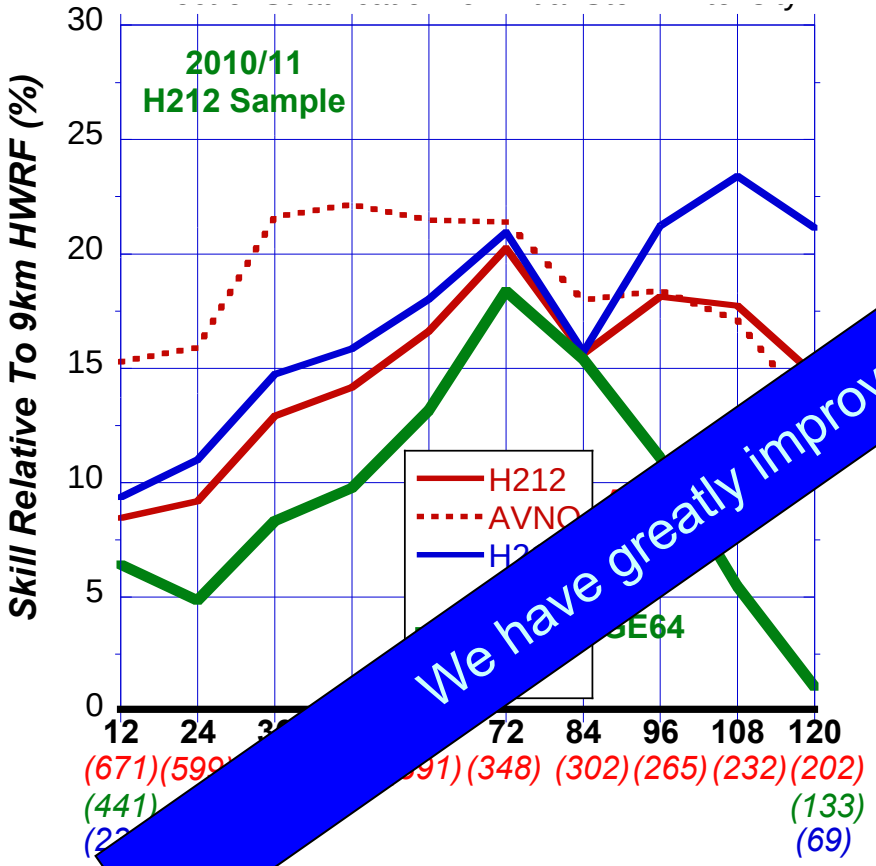
Gopalakrishnan, S. G., F. D. Marks, Xuejin Zhang, J.-W. Bao, K.-S. Yeh, and R. Atlas, 2011: The Experimental HWRF System: A Study on the Influence of Horizontal Resolution on the Structure and Intensity Changes in Tropical Cyclones using an Idealized Framework. Mon. Wea. Rev. 1762–1784

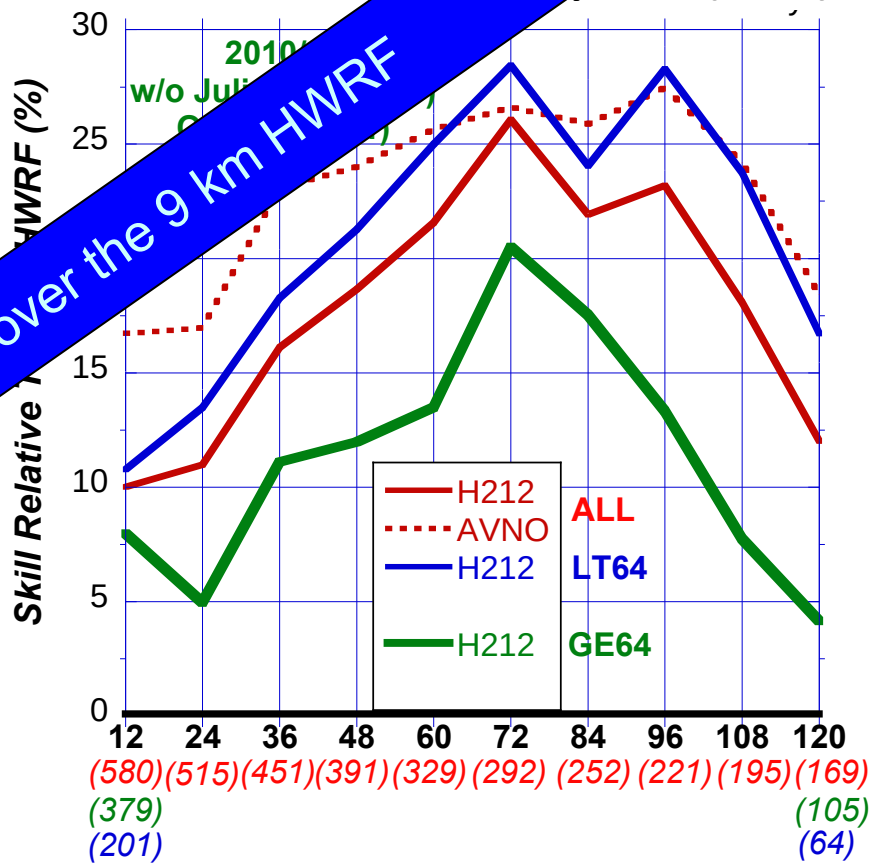
Stratified Track Forecast Skill

2010-2011 Seasons Retrospective Runs

H212 (27:9:3 km) & GFS (AVN0) relative to HWRF (27:9 km)

All Cases/Initially <Hurricane/Initially Hurrica





We have greatly improved over the 9 km HWRF

H21 Large improvement over HWRF
(More improvement for <H)
Much closer to AVN0 – equal ≥72h

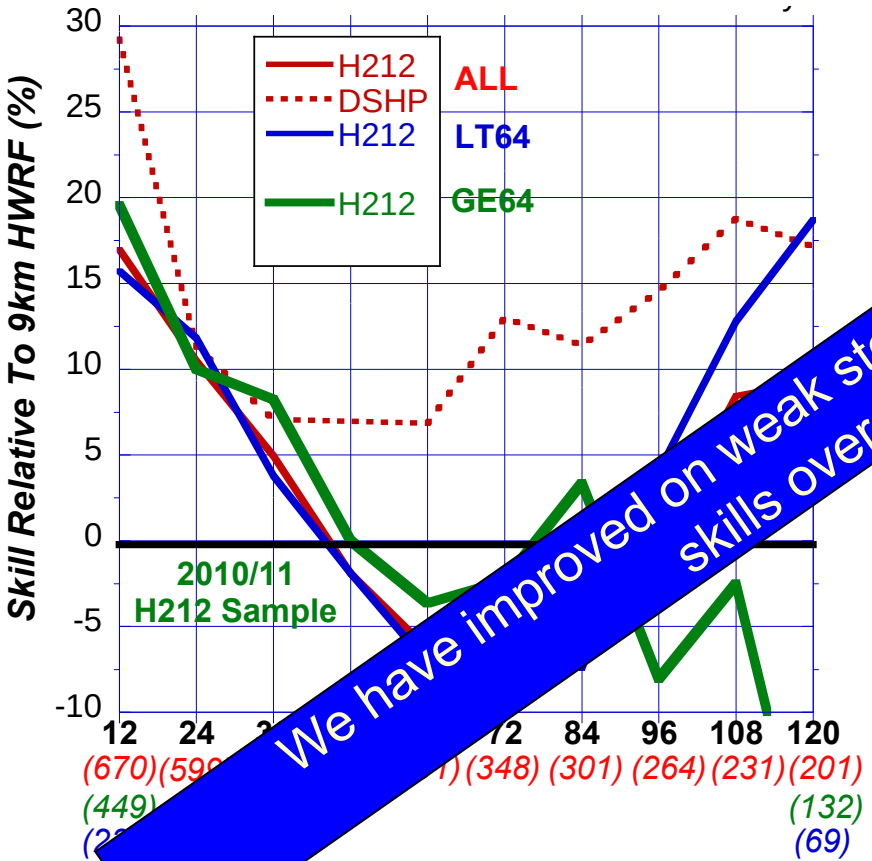
H212: Larger improvement over HWRF
(More improvement for <H)
Much closer to AVN0

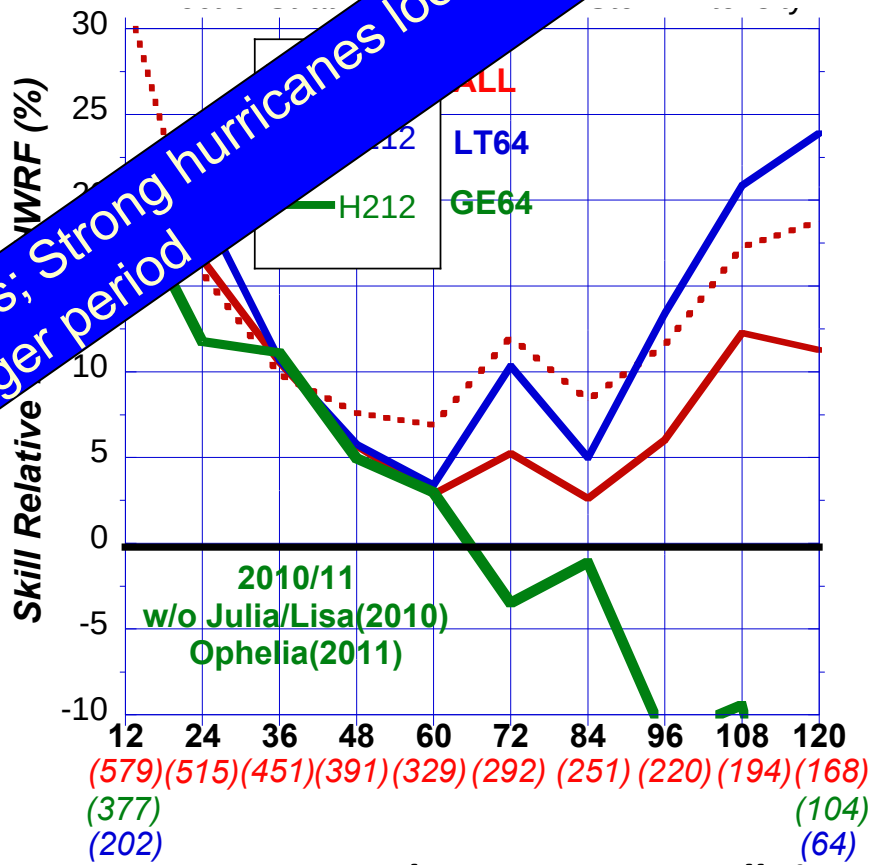
Stratified Intensity Forecast Skill

2010-2011 Seasons Retrospective Runs

H212 (27:9:3 km) & DSHP relative to HWRF (27:9 km

All Cases/Initially <Hurricane/Initially Hurrica





We have improved on weak storms; Strong hurricanes loose skills over longer period

H212: ed over HWRF (esp. thru 24h*)
& except from 48-96h
Has problem with HR after 84h

H212: Improved over HWRF at all times
(esp. thru 24h*) esp. for <H
Has problem with HR after 84h

(*) Much better initialization?

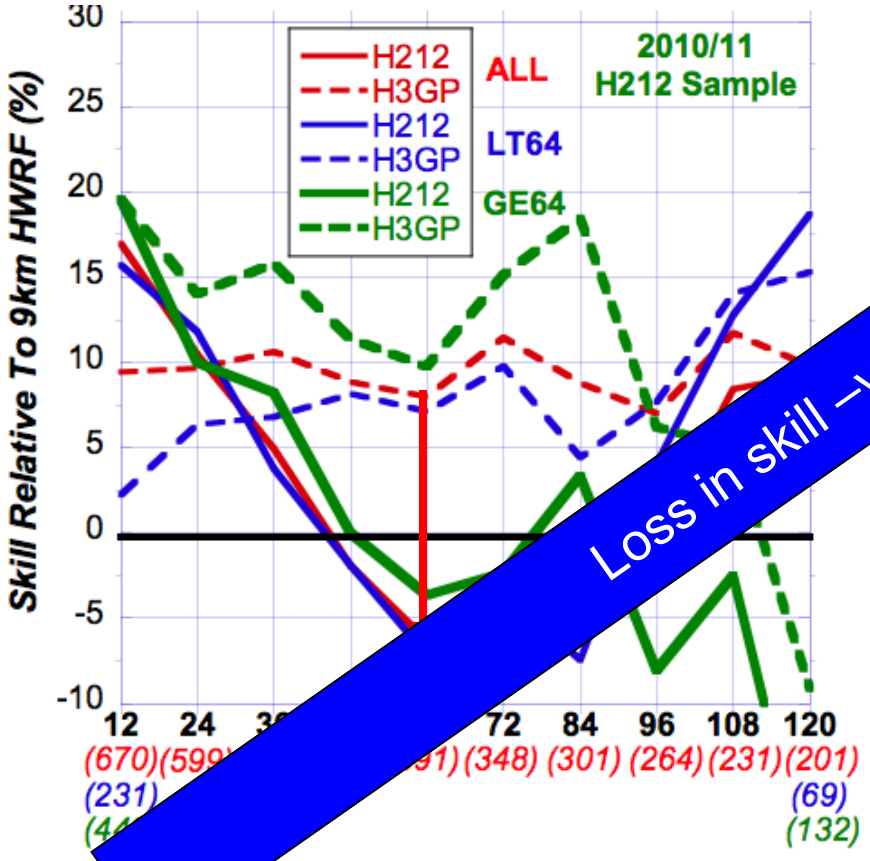
Stratified Intensity Forecast Skill

2010-2011 Seasons Retrospective Runs

H212/H3GP (27:9:3 km) relative to HWRF (27:9 km)

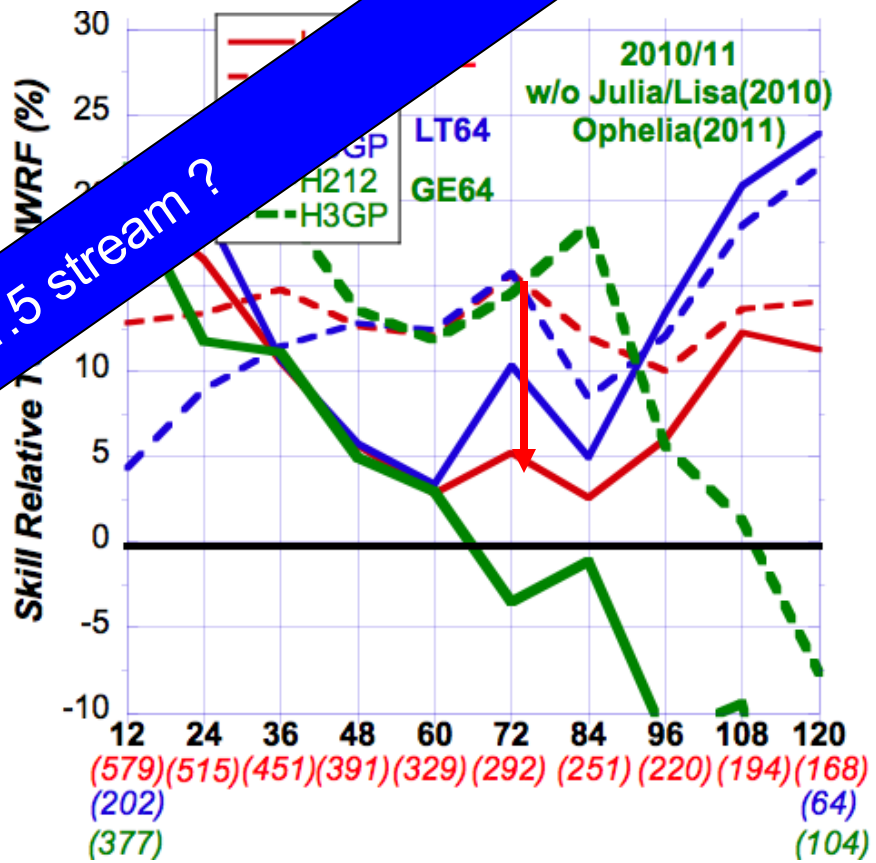
All Cases/Initially <Hurricane/Initially Hurrica

All Storms



H212: ...oved over HWRF (esp. thru 36h*)
& except from 48-96h
BUT H3GP better than H212 & HWRF
(*) Much better initialization?

w/o Julia, Lisa (...phelia (2011)



H212: Improved over HWRF at all times
(esp. thru 24h*) esp. for <H
Has problem with HR after 84h
BUT H3GP better than H212 & HWRF

Loss in skill –vs- 1.5 stream ?

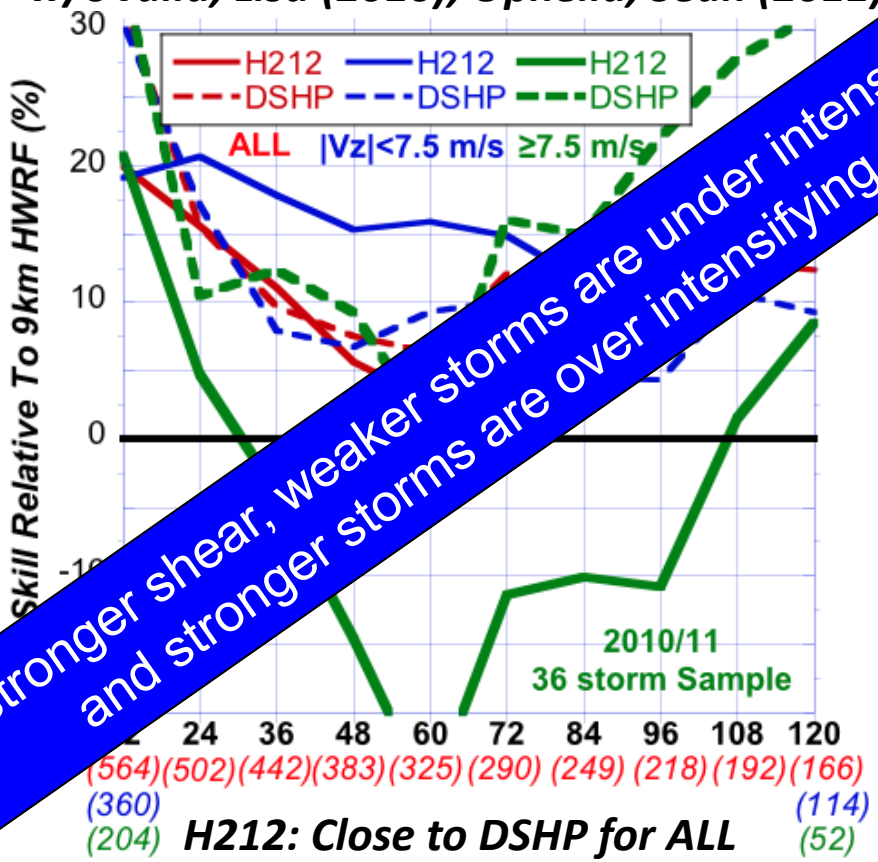
Intensity Forecast Skill Stratified by Initial Vertical Shear |Vz|

2010-2011 Seasons Retrospective Runs

H212/H3GP (27:9:3 km) relative to HWRF (27:9 km)

All Cases/|Vz|<7.5m/s/|Vz|≥7.5m/s

w/o Julia, Lisa (2010), Ophelia, Sean (2011)



With stronger shear, weaker storms are under intensifying and stronger storms are over intensifying

H212: Close to DSHP for ALL

Better than DSHP for Low Shear

But Much worse for High Shear!

H212 better than HWRF except for High Shear. NOTE H212 (High Shear) good at 12 h

Scope for Future Improvements

- **TRACK and STRUCTURE improvements**
  - Significant
  - Basin Scale shows promise

- **INTENSITY** ***(Why is H3GP better for intensity?)***

  - Why did we loose some skill in transitions from 1.5 to 1.
  - Changes to physics ? Initial conditions ?