HWRF test plan for 2012 implementation (individual upgrades)

HR12	H061	H062	H063	H064
Baseline	GFS Shallow convection and new PBL	Tuning of Microphysics parameters (NCW, NLImax, fall speed and so on)	H061+ H062	New GSI
Triple nested HWRF (27-9-3km) Include new vortex initialization	Uses GFS shallow convection and PBL scheme implemented in July 2010	Tune some microphysics parameters suggested by Eric and Brad	Combination of shallow convection , PBL and Microphysics	New community GSI (run in Jet and CCS without failures)
Test cases: All 2011 cases in ALT and EP (about 600 cases)	Priority cases	Priority cases	All 2011 cases in ALT and EP (about 600 cases)	Priority cases
Dec. 31, 2011	Jan. 31, 2012	Jan. 31, 2012	Feb. 28, 2012	Jan.15, 2012

- Suggested priority cases: ATL: Earl (41), Harvey (14), Irene (33), Katia(51), Maria (35) , Ophelia(48) and Rina (20): total 242 runs.

- Final code will be delivered to NCO by March 15 2012.
- NCO code test will be finished by Apr 15 2012, and the 2012 HWRF implementation is scheduled at May 15, 2012.

According to the results of pre-baseline tests, 2012 baseline configurations are defined:

Physics

- **Critical Richardson number = 0.25 (original 0.5)**
- **pgcon = 0.55, 0.2, 0.2**
- **COAC = 0.75, 3.0, 3.0**
- **sas_mass_flux = 0.5, 0.5, 0.5**
- **alpha = 1.0, 0.5, 0.5**

New 3km initialization

New nest motion algorithm

No GSI

2010 ATL:

ALEX (01L)	2010062600 – 2010070106	(22 cycles)
TWO (02L)	2010070806 - 2010070812	(2)
BONNIE (03L)	2010072212 – 2010072418	(10)
COLIN (04L)	2010080218 – 2010080812	(24)
FIVE (05L)	2010081100 – 2010081706	(26)
DANIELLE (06L)	2010082118 - 2010083018	(37)
EARL (07L)	2010082512 – 2010090412	(41)
FIONA (08L)	2010083100 – 2010090318	(16)
GASTON (09L)	2010090112 – 2010090800	(27)
HERMINE (10L)	2010090600 – 2010090800	(9)
IGOR (11L)	2010090812 – 2010092112	(53)
JULIA (12L)	2010091212 - 2010092012	(29)
KARL (13L)	2010091418 – 2010091806	(15)
LISA (14L)	2010092100 - 2010092612	(23)
MATTHEW (15L)	2010092318 - 2010092612	(12)
NICOLE (16L)	2010092812 - 2010093006	(8)
OTTO (17L)	2010100606 – 2010101006	(17)
PAULA (18L)	2010101118 – 2010101506	(15)
RICHARD (19L)	2010102100 - 2010102612	(23)
SHARY (20L)	2010102900 – 2010103018	(8)
TOMAS (21L)	2010102918 – 2010110718	(37)

TOTAL : 454

2010 EP:

BLAS (03E)	2010061712 - 2010062118	(18)
CELIA (04E)	2010061906 – 2010062900	(40)
DARBY (05E)	2010062300 – 2010062900	(25)
SIX (06E)	2010071500 – 2010071618	(8)
ESTELLE (07E)	2010080600 – 2010081012	(19)
EIGHT (08E)	2010082012 – 2010082112	(5)
FRANK (09E)	2010082118 – 2010082812	(28)
TEN (10E)	2010090306 – 2010090406	(5)
ELEVEN (11E)	2010090400 - 2010090412	(3)
GEORGETTE (12E)	2010092112 – 2010092300	(7)

TOTAL: 158

TOTAL 2010: 612 cycles

2011 ATL:

ARLENE (01L) 2011062900 – 2011063018 (8)
BRET (02L) 2011071718 – 2011072212 (21)
CINDY (03L) 2011072018 - 2011072218 (9)
DON (04L) 2011072718 – 2011073000 (10)
EMILY (05L) 2011080200 – 2011080712 (23)
FRANKLIN (06L) 2011081300 – 2011081318 (4)
GERT (07L) 2011081400 – 2011081612 (11)
HARVEY (08L) 2011081900 – 2011082206 (14)
IRENE (09L) 2011082100 - 2011082818 (32)
TEN (10L) 2011082506 - 2011082618 (7)
JOSE (11L) 2011082812 - 2011082906 (4)
KATIA (12L) 2011082906 – 2011091012 (50)
LEE (13L) 2011090200 - 2011090500 (13)
MARIA (14L) 2011090618 - 2011091612 (40)
NATE (15L) 2011090718 - 2011091106 (15)
OPHELIA (16L) 2011092100 – 2011100306 (50)
PHILIPPE (17L) 2011092406 - 2011100812 (58)
RINA (18L) 2011102318 - 2011102812 (20)
SEAN (19L) 2011110812 – 2011111118 (14)

TOTAL: 463

2011 EP:

ADRIAN (01E)	2011060718 – 2011061212	(20)
BEATRIZ (02E)	2011061912 – 2011062112	(9)
CALVIN (03E)	2011070712 – 2011071000	(11)
DORA (04E)	2011071812 – 2011072418	(26)
EUGENE (05E)	2011073112 – 2011080606	(24)
FERNANDA (06E)	2011081600 – 2011082000	(17)
GREG (07E)	2011081618 - 2011082106	(19)
EIGHT (08E)	2011083112 – 2011083118	(2)
HILRARY (09E)	2011092106 – 2011093012	(38)
JOVA (10E)	2011100600 – 2011101218	(28)
IRWIN (11E)	2011100606 – 2011101618	(43)
TWELVE (12E)	2011101206 – 2011101218	(3)
KENNETH (13E)	2011111918 – 2011112506	(23)

TOTAL: 263

TOTAL 2011: 726

TOTAL OF 2010 and 2011: 1338

Zhan Zhang: subset of the cases in CCS in order to make sure the quality of the forecast
Earl, Celia, Irene, Katia, Maria, Ophelia and Rina: TOTAL: 273

Following runs will be made in Jet

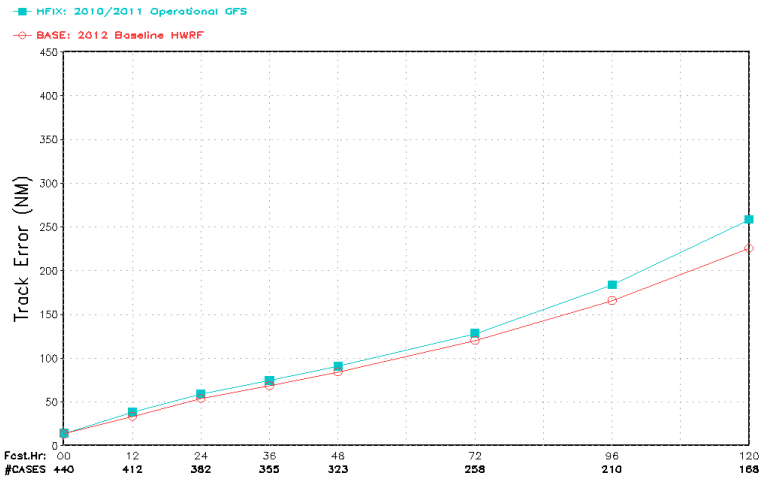
Young Kwon, Sam Trahan, Qingfu Liu : all 2010 cases with Irene, Katia, Maria, Ophelia, Rina, Phillip and Irwin
Sam: Irene, Katia, Maria, Ophelia, Rina, Phillip and Irwin
Young: Alex to Lisa
Qingfu: Mattew to Tomas and all 2010 EP

Weiguo Wang: all 2011 EP except Irwin : TOTAL: 220

Chanh Kieu: All 2011 ATL storms except Irene, Katia, Maria, Ophelia, Philip, and Rina : TOTAL: 213

Average Track Errors (NM)

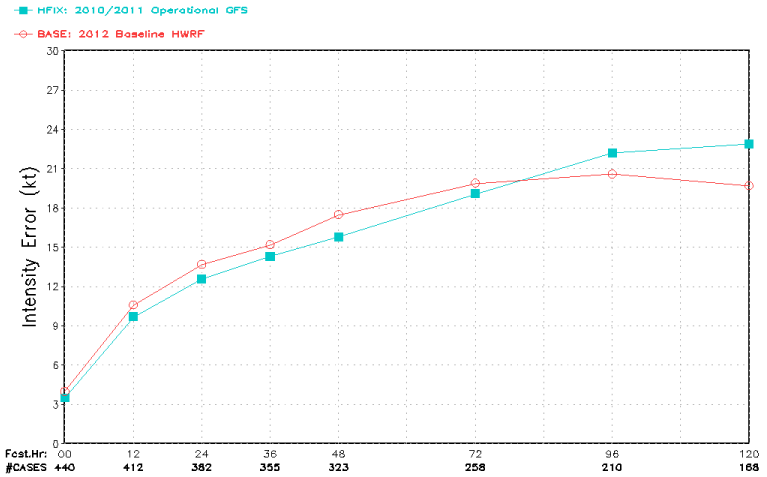
Statistics Plots – All 2010/2011 Atlantic Storms



NCEP Hurricane Forecast Project

Average Intensity Errors (kt)

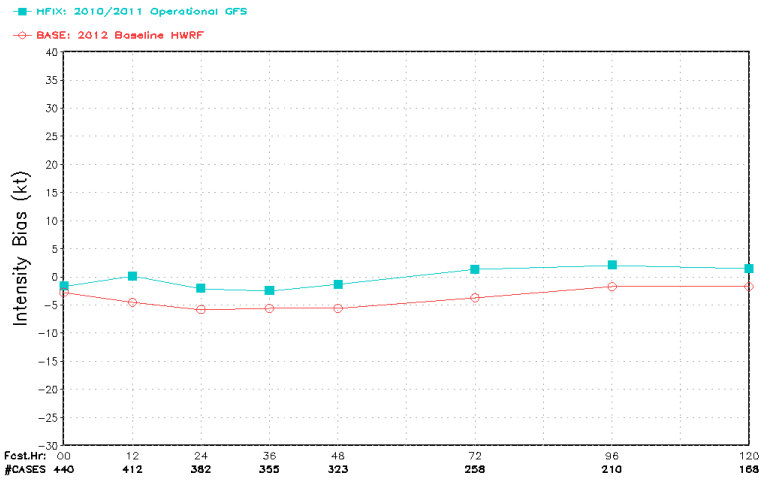
Statistics Plots – All 2010/2011 Atlantic Storms



NCEP Hurricane Forecast Project

Intensity Bias (kt)

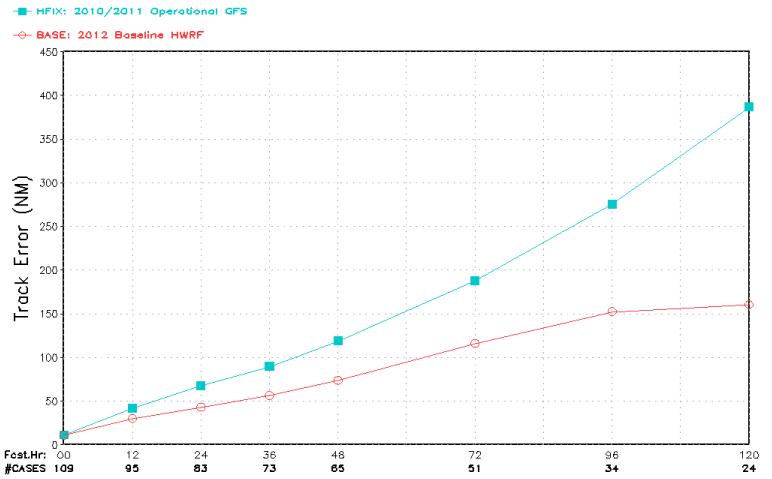
Statistics Plots – All 2010/2011 Atlantic Storms



NCEP Hurricane Forecast Project

Average Track Errors (NM)

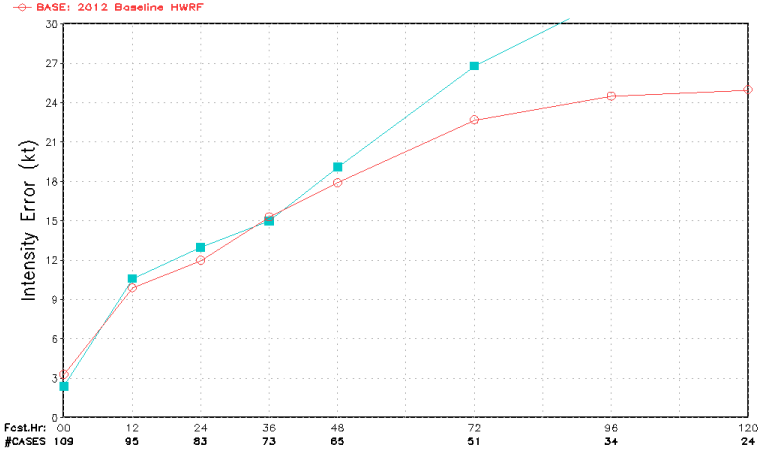
Statistics Plots – All 2010/2011 E-Pac Storms



NCEP Hurricane Forecast Project

Average Intensity Errors (kt)

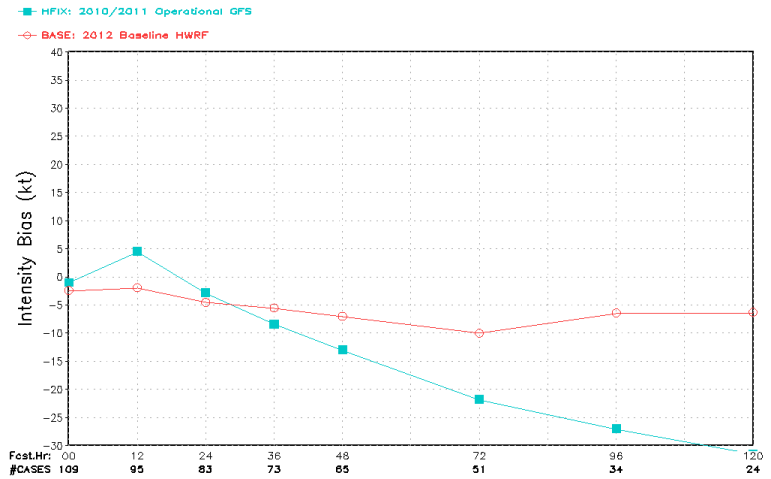
Statistics Plots – All 2010/2011 E-Pac Storms



NCEP Hurricane Forecast Project

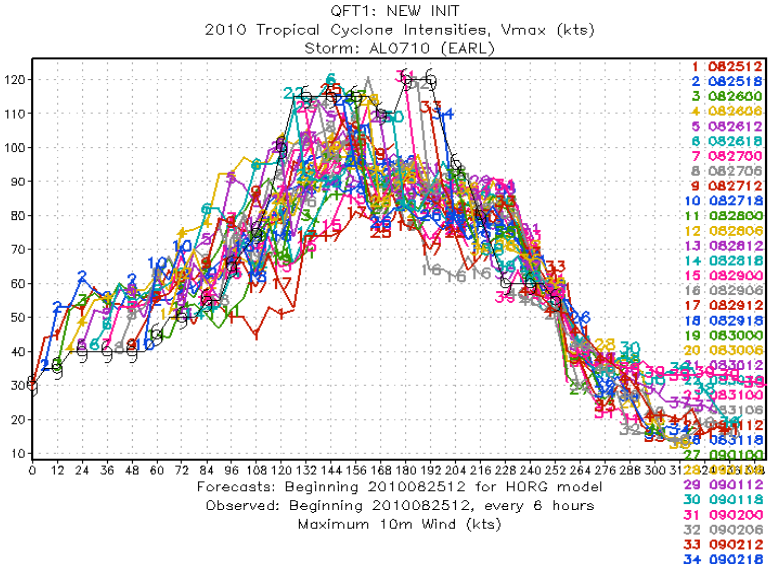
Intensity Bias (kt)

Statistics Plots – All 2010/2011 E-Pac Storms

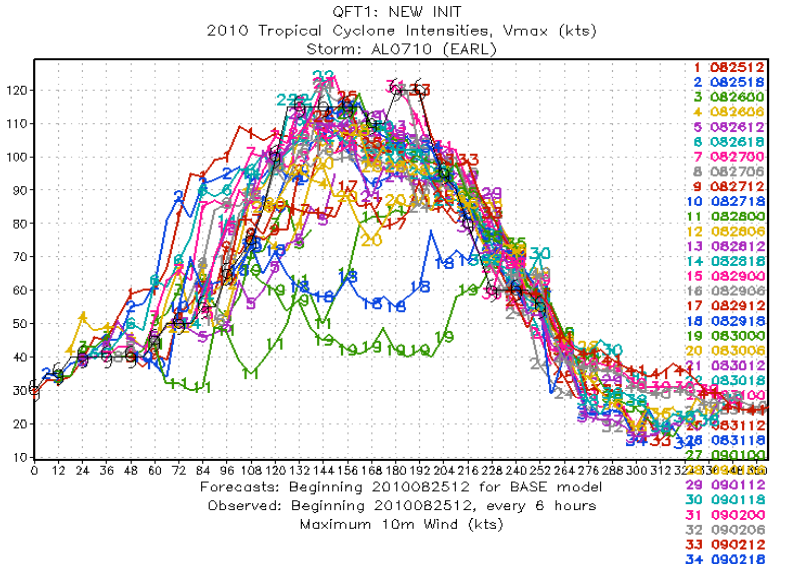


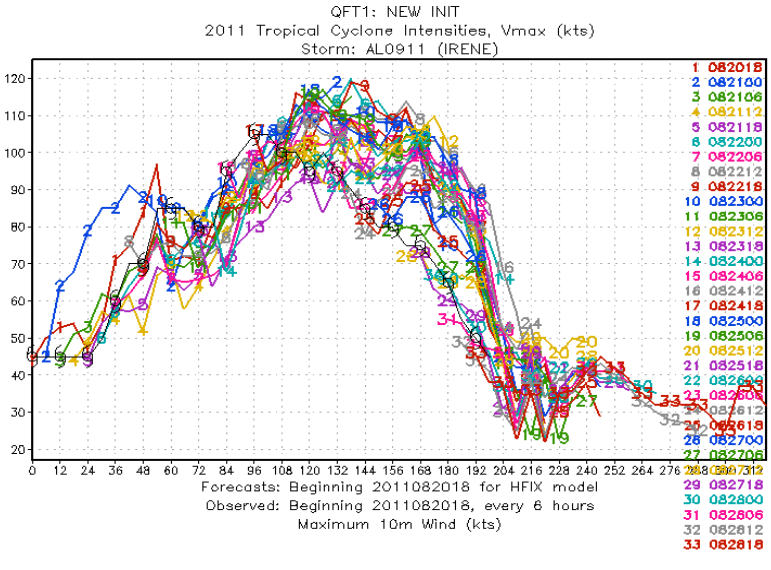
NCEP Hurricane Forecast Project

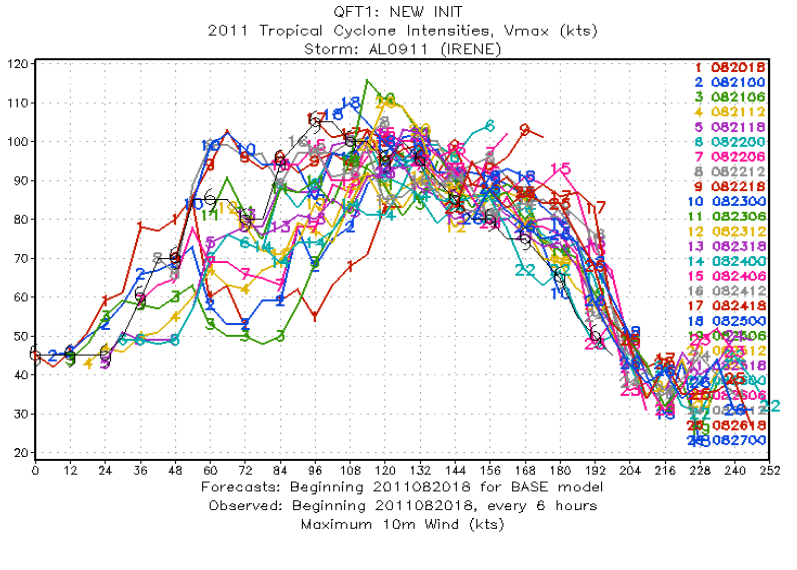
OPERATIONAL HWRF



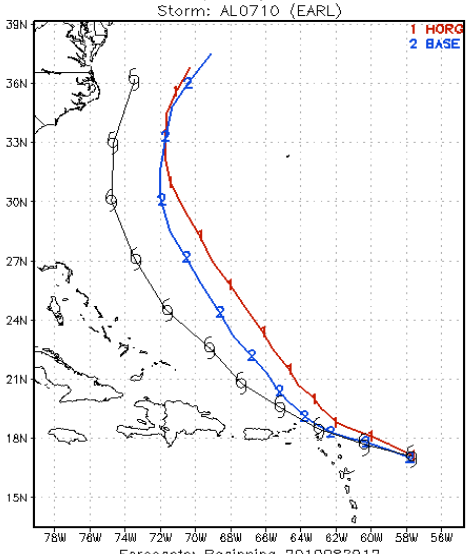
2012 BASELINE



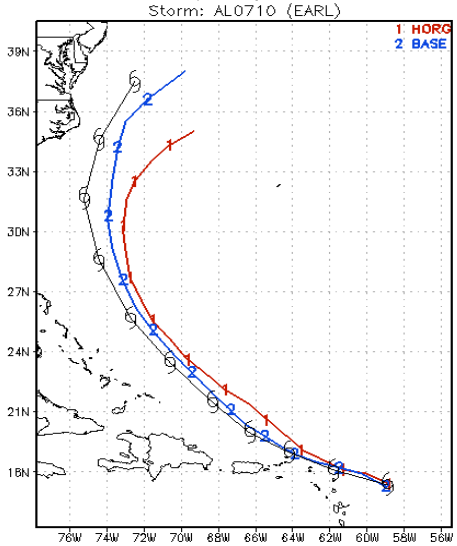




QFT1: NEW INIT
2010 Tropical Cyclone Tracks
Storm: AL0710 (EARL)

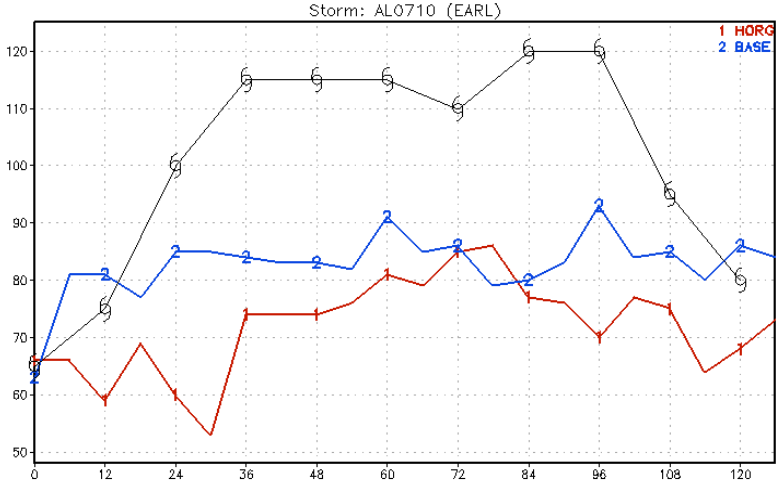


QFT1: NEW INIT
2010 Tropical Cyclone Tracks
Storm: AL0710 (EARL)



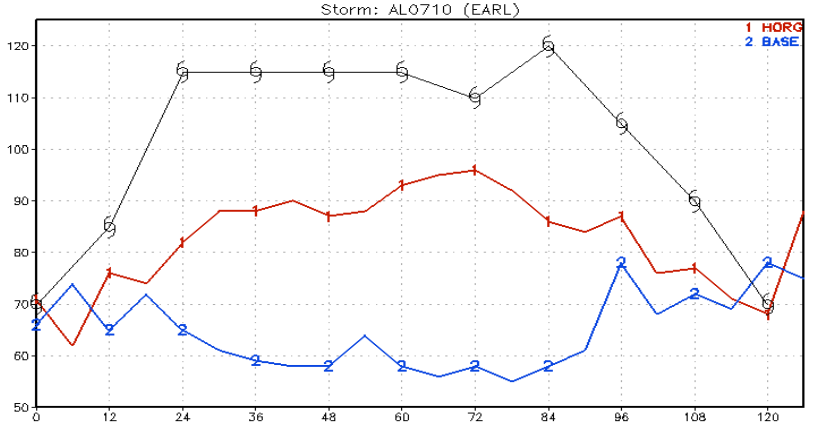
Forecasts: Beginning 2010082918
Observed: Beginning 2010082918, every 12 hours

QFT1: NEW INIT
2010 Tropical Cyclone Intensities, Vmax (kts)
Storm: AL0710 (EARL)

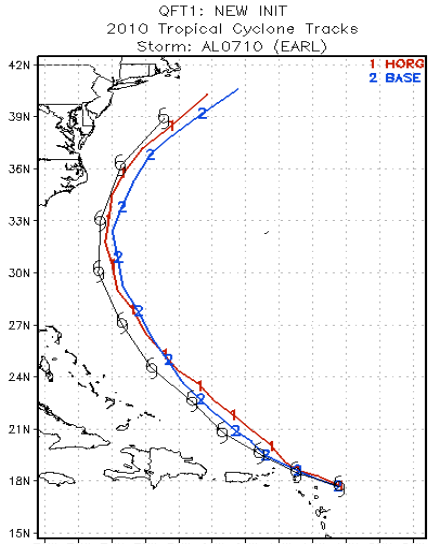


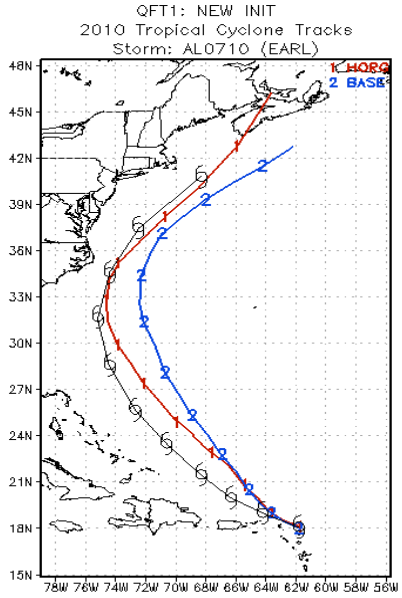
Forecasts: Beginning 2010082912
Observed: Beginning 2010082912, every 12 hours
Maximum 10m Wind (kts)

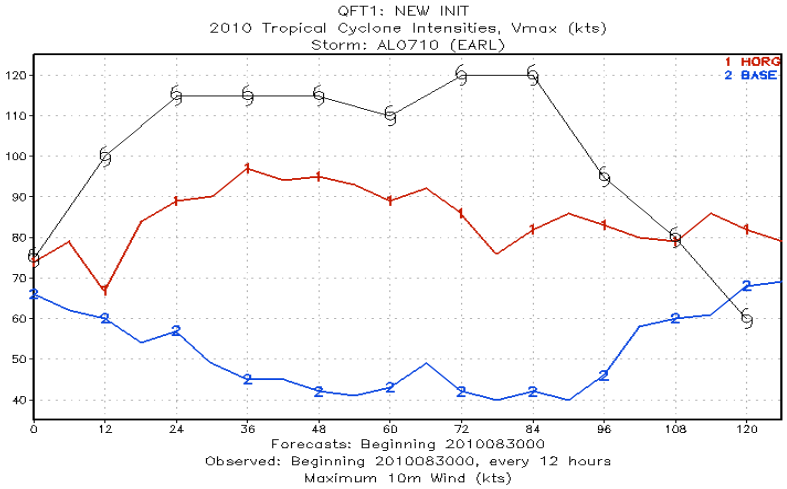
QFT1: NEW INIT
2010 Tropical Cyclone Intensities, Vmax (kts)
Storm: AL0710 (EARL)

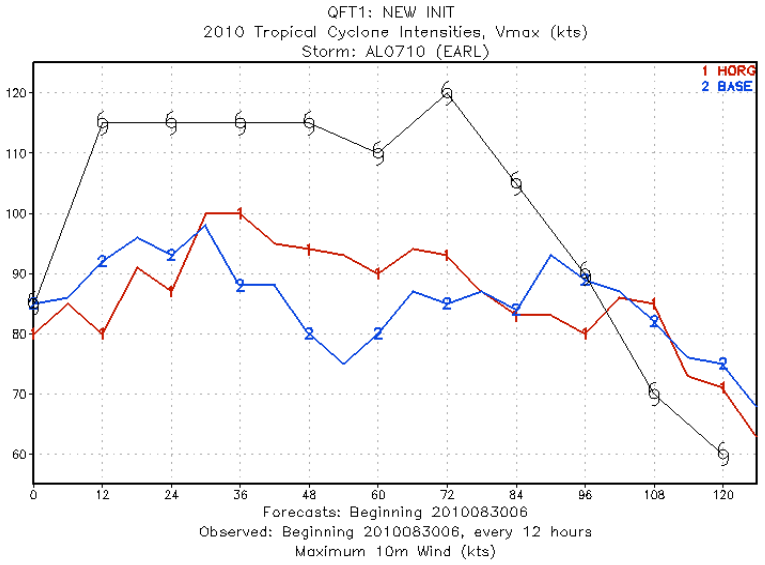


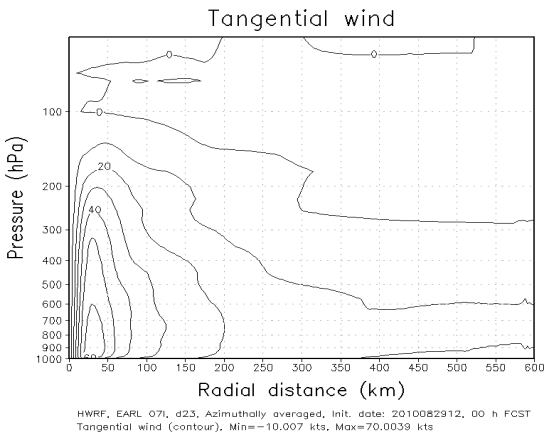
Forecasts: Beginning 2010082918
Observed: Beginning 2010082918, every 12 hours
Maximum 10m Wind (kts)

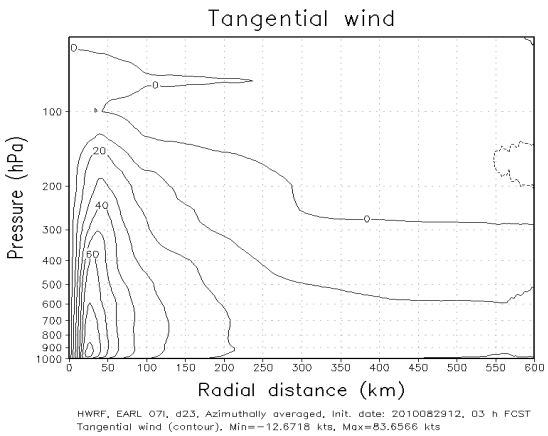


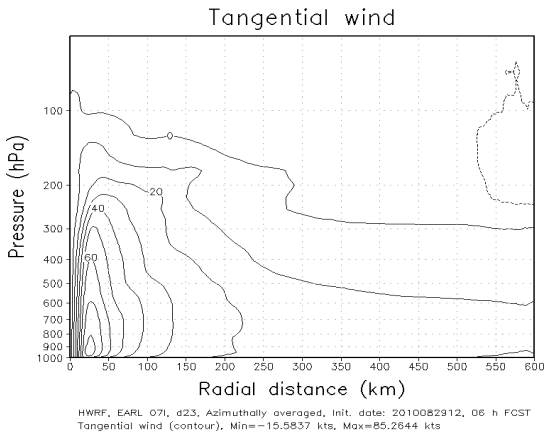




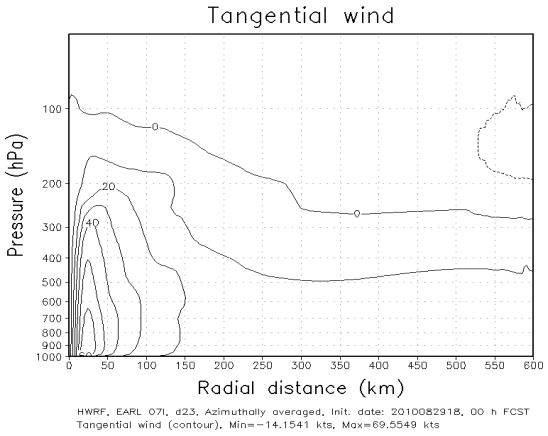


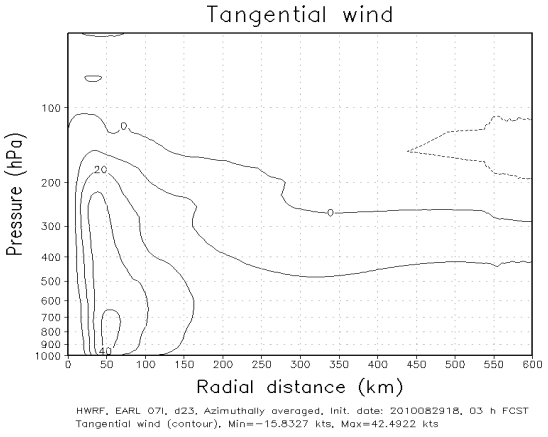


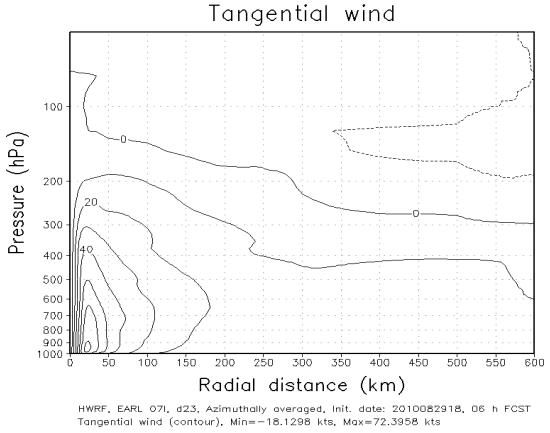




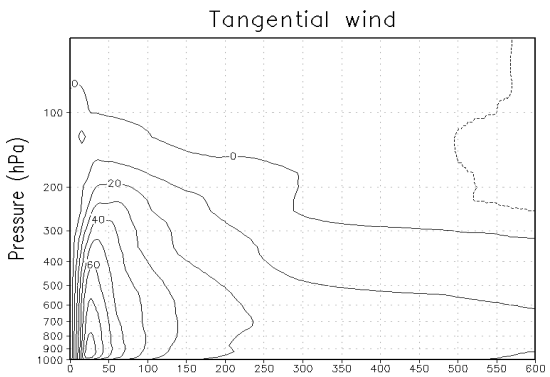
Initial Time: 082912



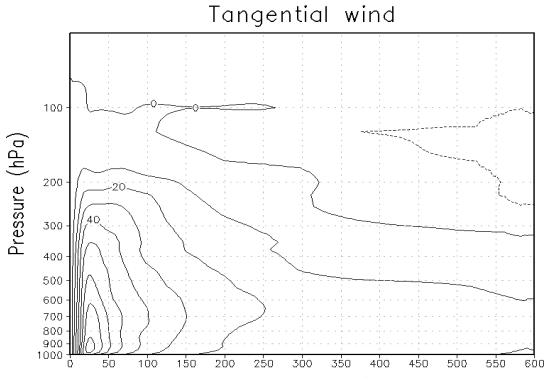




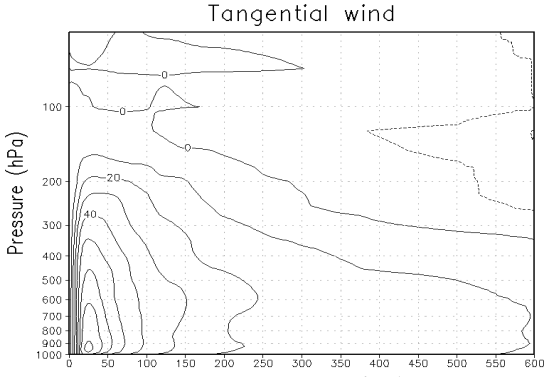
Initial Time: 082918



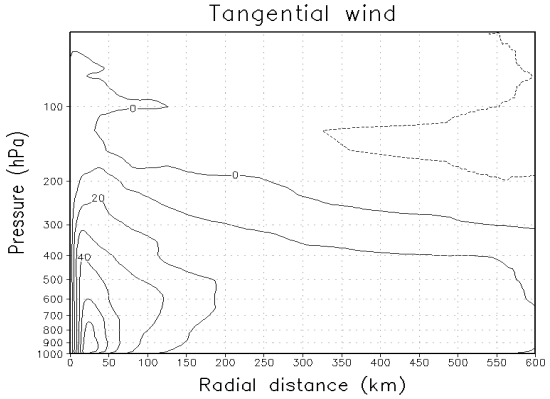
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082912, 09 h FCST
Tangential wind (contour), Min=-18.6491 kts, Max=87.4891 kts



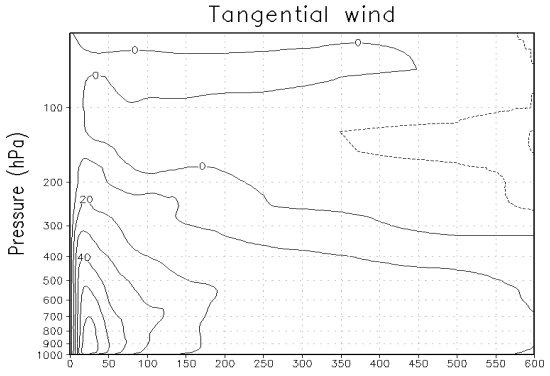
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082912, 12 h FCST
Tangential wind (contour), Min=-18.0598 kts, Max=84.4843 kts



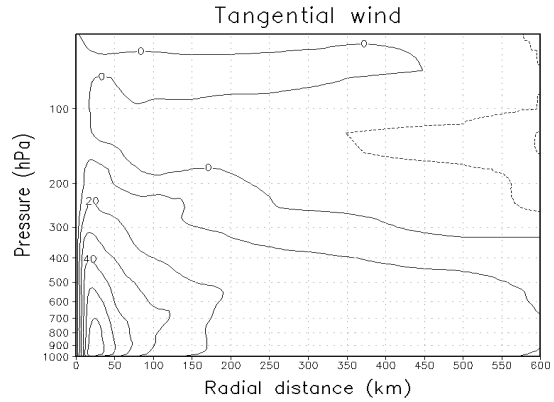
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082912, 18 h FCST
Tangential wind (contour), Min=-20.2423 kts, Max=82.8355 kts



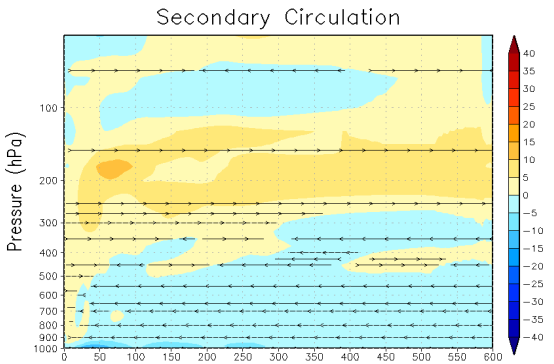
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082918, 09 h FCST
Tangential wind (contour), Min=-19.5117 kts, Max=67.1675 kts



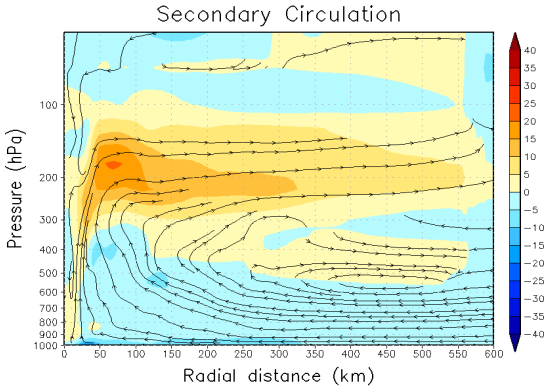
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082918, 15 h FCST
Tangential wind (contour), Min=-20.468 kts, Max=67.2153 kts



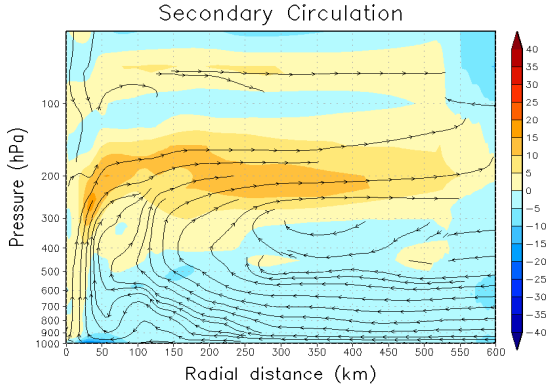
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082918, 15 h FCST
Tangential wind (contour), Min=-20.468 kts, Max=67.2153 kts



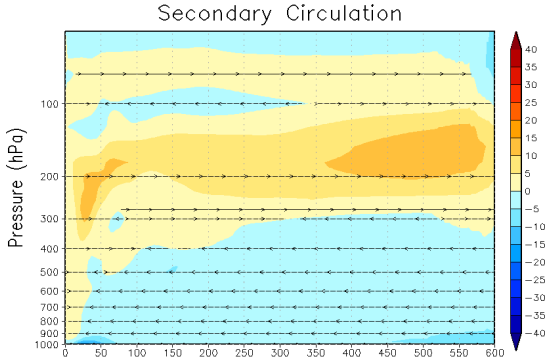
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082912, 00 h FCST
Radial wind (shaded), Min=−16.644 kts, Max=12.7902 kts
Radial−vertical flow (streamline), Pressure velocity peak=0 Pa/s



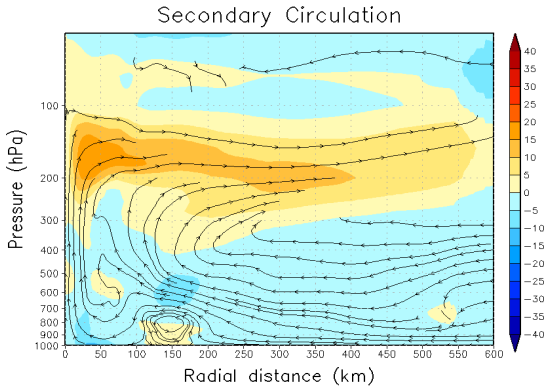
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082912, 03 h FCST
Radial wind (shaded), Min=−20.9516 kts, Max=20.6063 kts
Radial−vertical flow (streamline), Pressure velocity peak=−9.07527 Pa/s



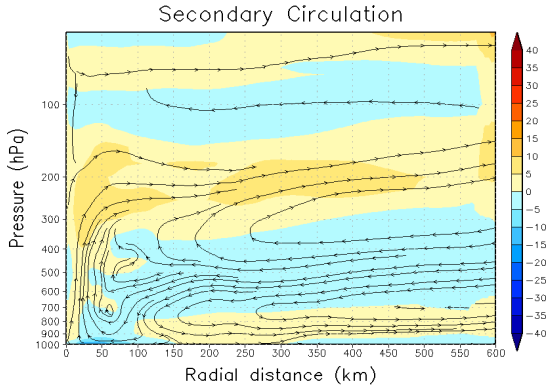
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082912, 06 h FCST
Radial wind (shaded), Min=−22.1693 kts, Max=16.2496 kts
Radial−vertical flow (streamline), Pressure velocity peak=−7.59305 Pa/s



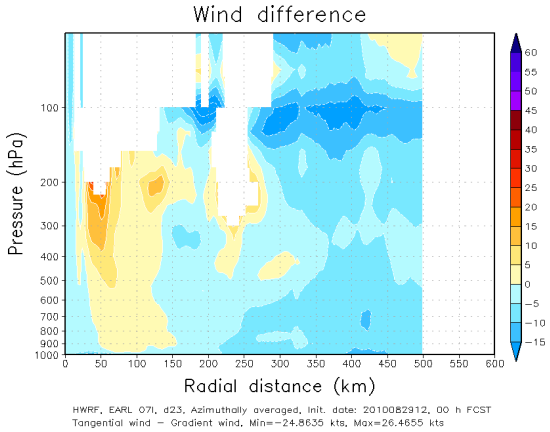
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082918, 00 h FCST
Radial wind (shaded), Min=−18.6676 kts, Max=13.3167 kts
Radial−vertical flow (streamline), Pressure velocity peak=0 Pa/s



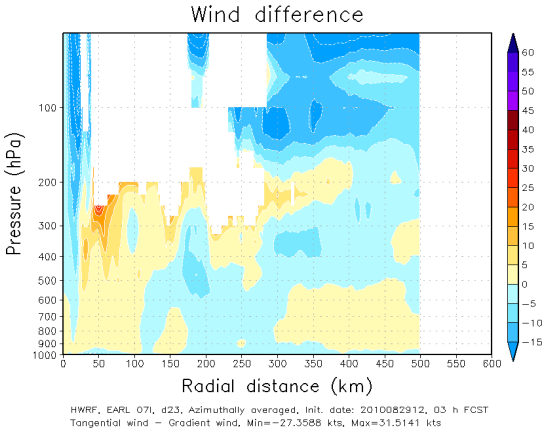
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082918, 03 h FCST
Radial wind (shaded), Min=−11.9719 kts, Max=20.0544 kts
Radial−vertical flow (streamline), Pressure velocity peak=−11.4025 Pa/s



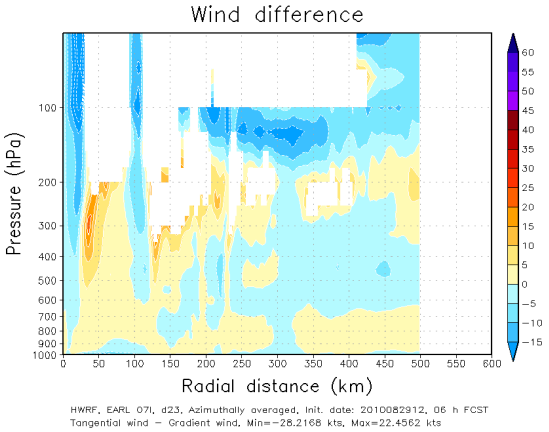
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082918, 06 h FCST
Radial wind (shaded), Min=−17.6282 kts, Max=10.7648 kts
Radial−vertical flow (streamline), Pressure velocity peak=−8.11927 Pa/s



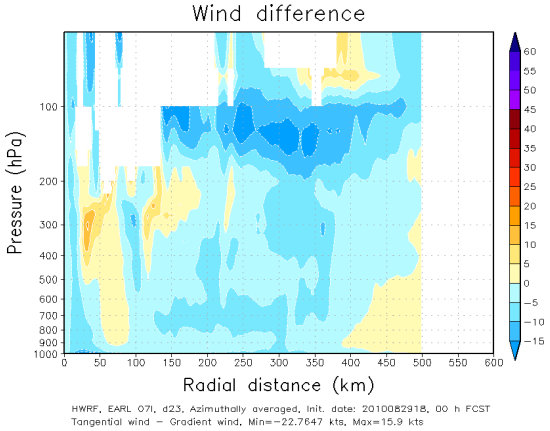
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082912, 00 h FCST
Tangential wind − Gradient wind. Min=−24.8635 kts, Max=26.4655 kts



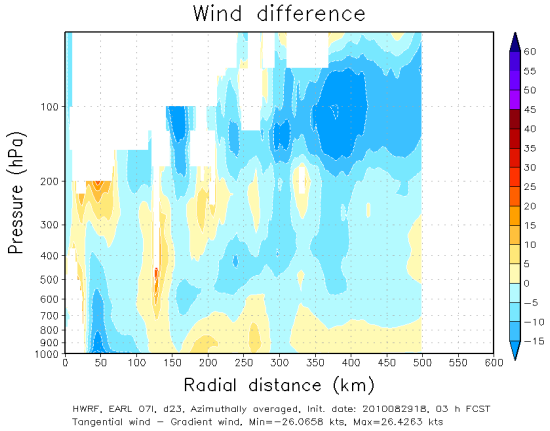
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082912, 03 h FCST
Tangential wind − Gradient wind. Min=−27.3588 kts, Max=31.5141 kts



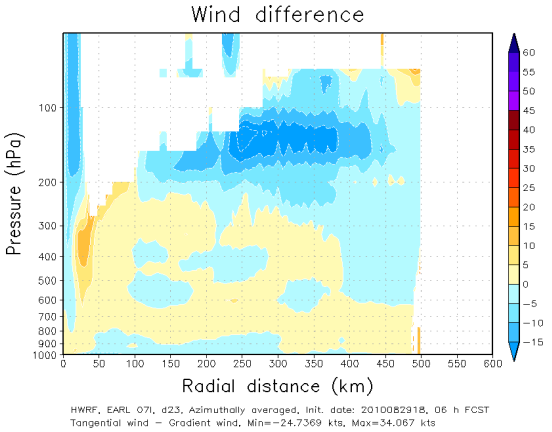
HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082912, 06 h FCST
Tangential wind − Gradient wind. Min=−28.2168 kts, Max=22.4562 kts



HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082918, 00 h FCST
Tangential wind − Gradient wind. Min=−22.7647 kts, Max=15.9 kts



HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082918, 03 h FCST
Tangential wind − Gradient wind. Min=−26.0658 kts, Max=26.4263 kts



HWRF, EARL 07l, d23, Azimuthally averaged, Init. date: 2010082918, 06 h FCST
Tangential wind − Gradient wind. Min=−24.7369 kts, Max=34.067 kts