

Vertical wind shear impacts on TC structure deduced from HWRF ICs and airborne Doppler radar

Investigators: Reasor, Rogers,
Gopalakrishnan, Lorsolo, Gamache, Marks

Special Thanks: Kaplan, Quirino

Doppler Database	MEAN 2km VBAR (ms^{-1})	MEAN 2km RMW (km)	MEAN DP SHR (ms^{-1})
ALL (n=154→69)	54	31	6
VBAR>55 (34)	(63)	32	5
VBAR<55 (35)	(45)	30	7
RMW>32 (33)	58	(39)	6
RMW<32 (36)	51	(24)	6
DP SHR>6 (32)	54	31	(9)
DP SHR<6 (37)	55	31	(4)

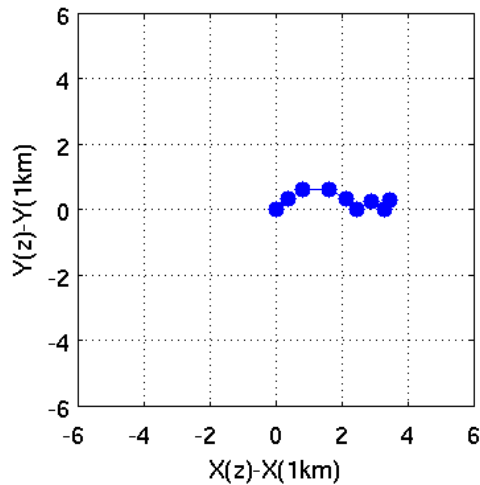
HWRF HRH ICs	MEAN 2km VBAR (ms^{-1})	MEAN 2km RMW (km)	MEAN DP SHR (ms^{-1})
ALL (n=57→51)	40	65	8
VBAR>34 (24)	(58)	59	9
VBAR<34 (27)	(24)	71	7
RMW>63 (25)	32	(82)	8
RMW<63 (25)	48	(49)	8
DP SHR>7 (27)	40	64	(10)
DP SHR<7 (24)	40	66	(5)

Method

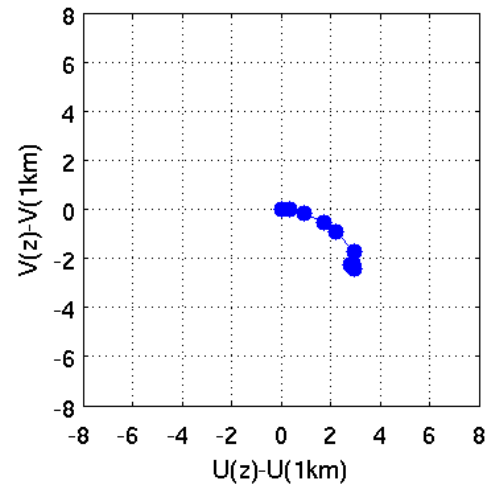
- Simplex-derived centers computed consistently between radar and model datasets
- Local hodograph
 - HWRF: 1.5° average from local center
 - Radar: Generally within 60 km of local center
- Vorticity centroid computed ~within 1.5° of surface center in model
- For each member of composite:
 - Fields rotated such that large-scale deep-layer shear vector points due east
 - Horizontal distance scaled by $z=2$ km RMW

Radar Composite: All Cases

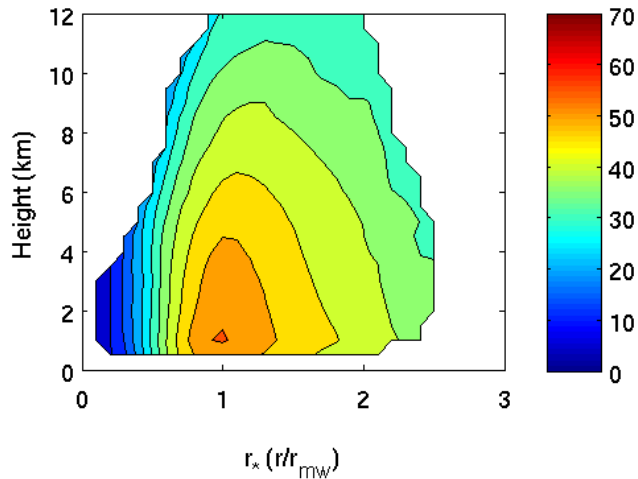
Simplex Center Tilt
Composite



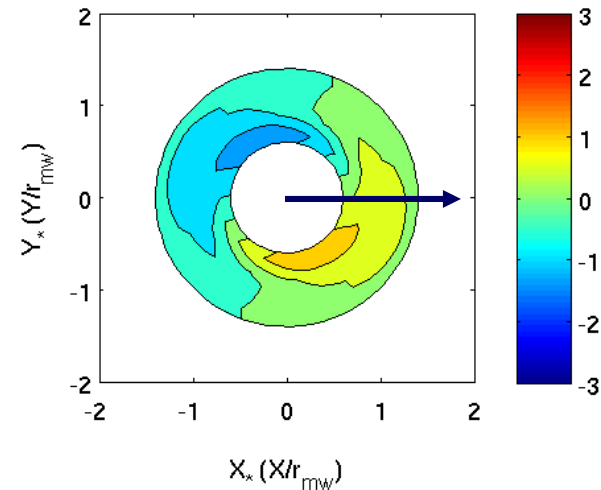
Local Hodograph
Composite



Azi-mean Vt
Composite

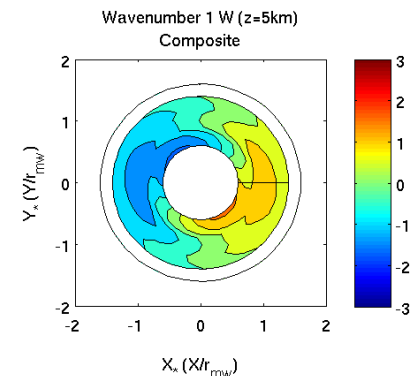
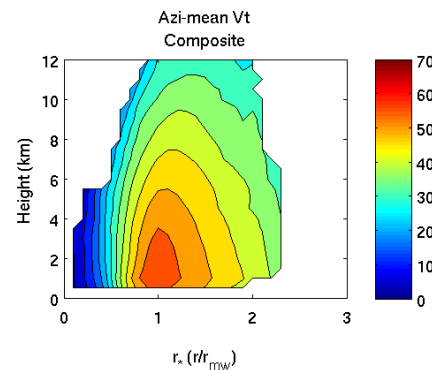
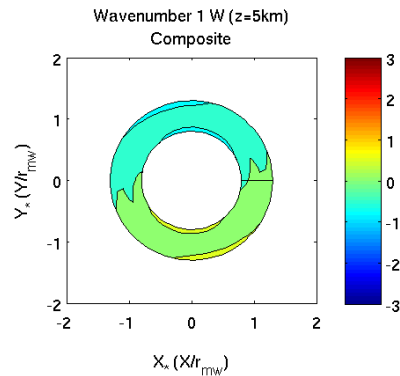
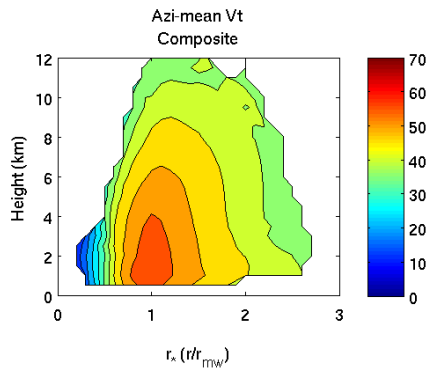
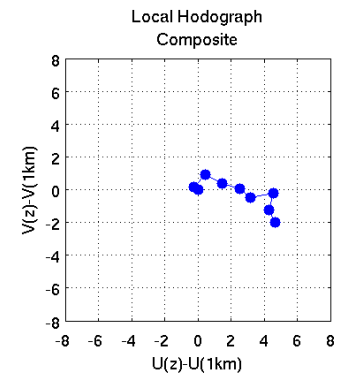
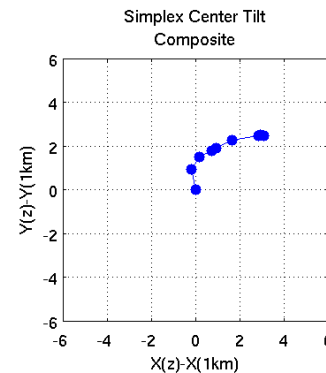
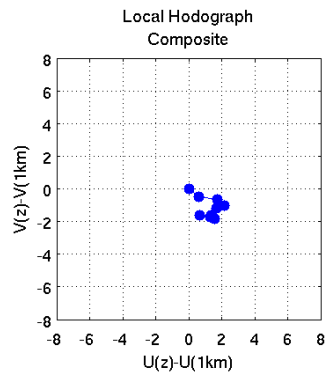
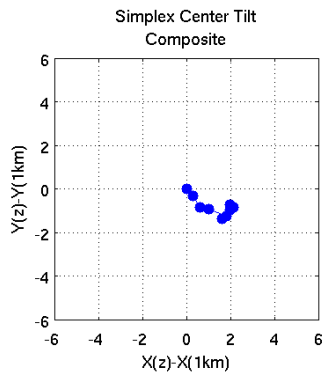


Wavenumber 1 W (z=5km)
Composite



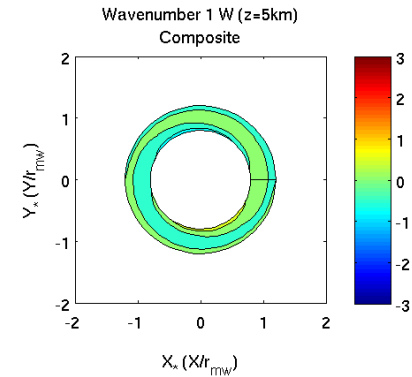
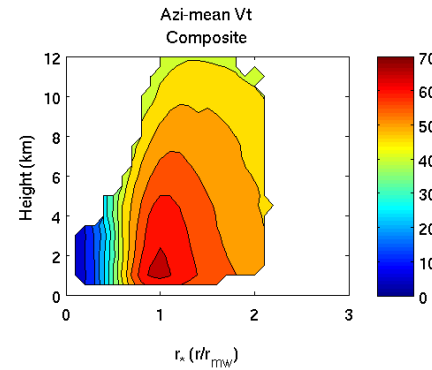
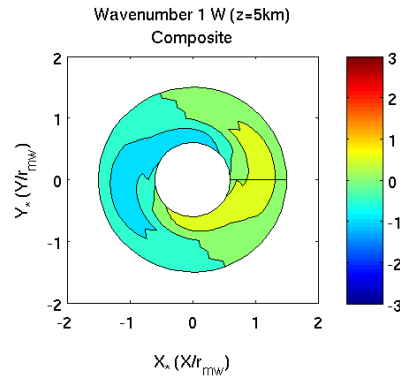
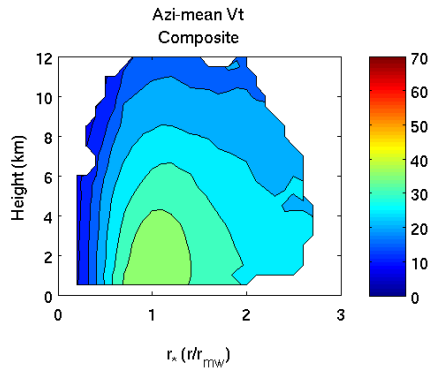
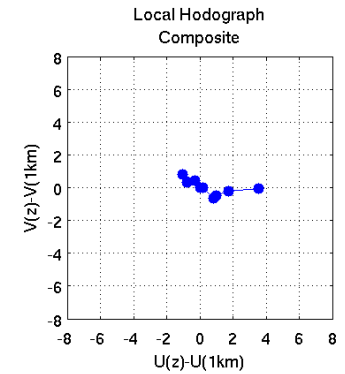
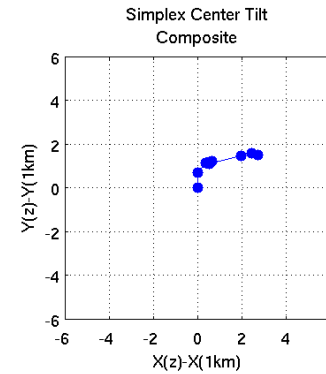
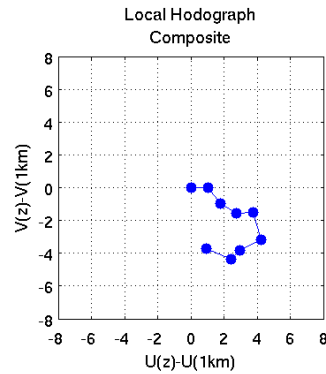
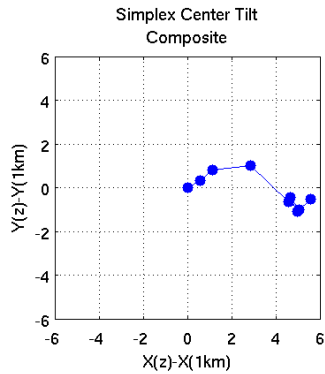
Radar Composite: (n=20-25)

DP SHR <4 vs >8 ms⁻¹



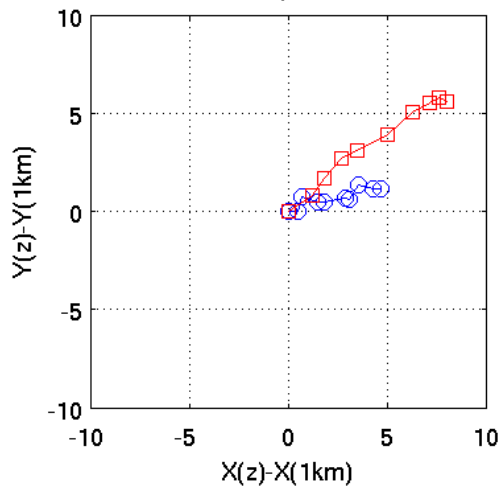
Radar Composite: (n=20-25)

VBAR <50 vs >62 ms⁻¹

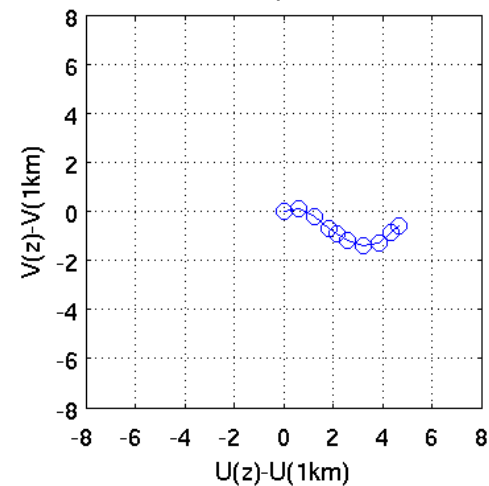


HWRF Composite: All Cases

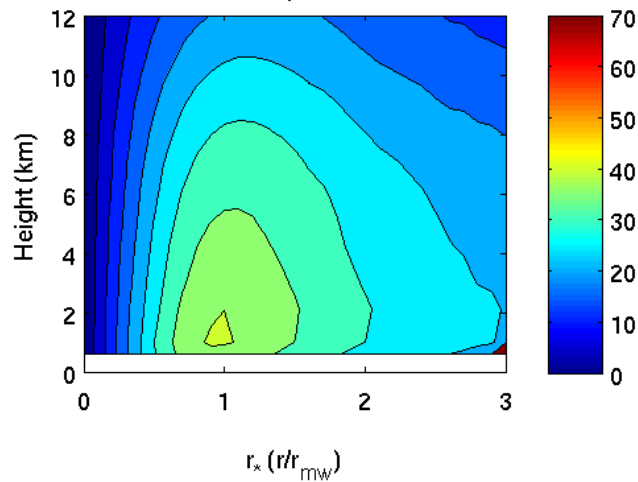
Simplex/Centroid Center Tilt
Composite



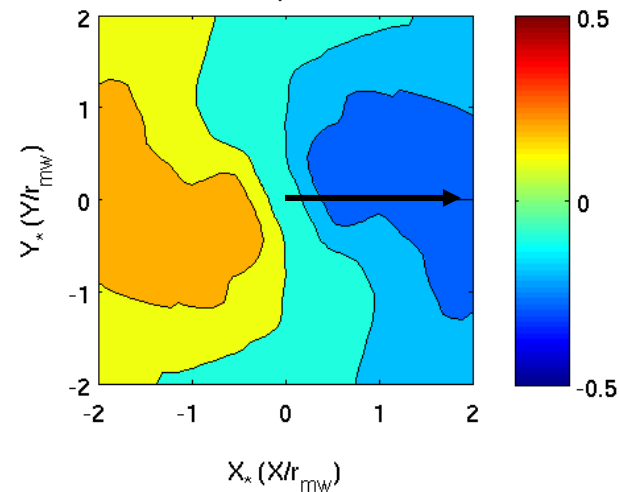
Local Hodograph
Composite



Azi-mean Vt
Composite

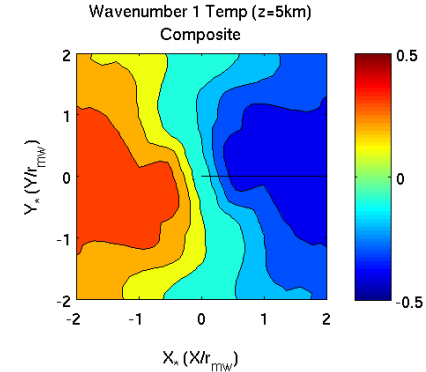
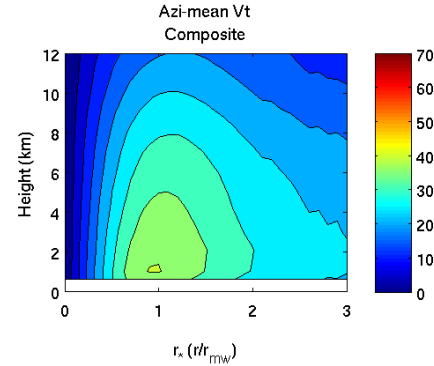
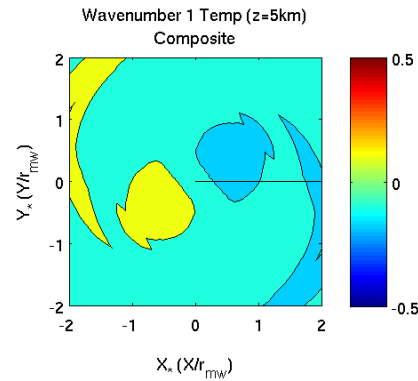
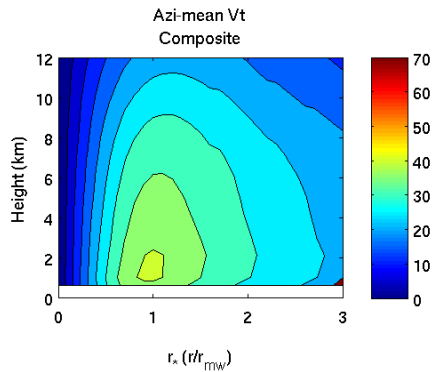
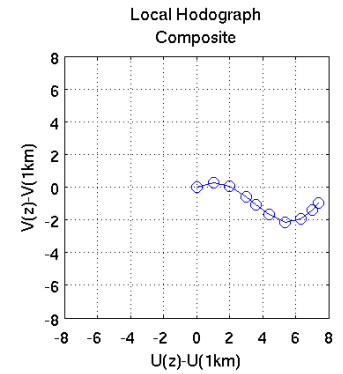
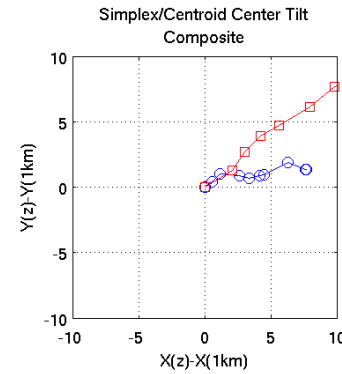
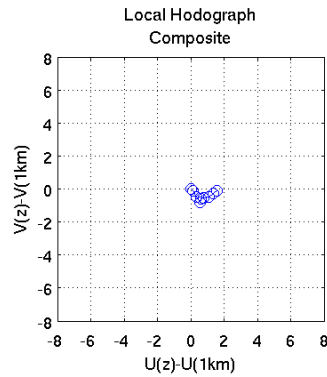
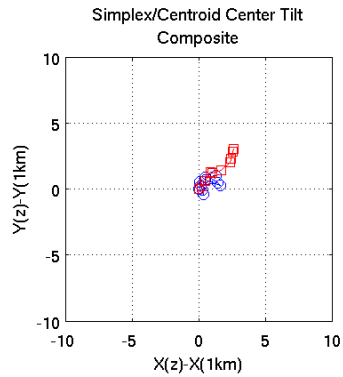


Wavenumber 1 Temp (z=5km)
Composite



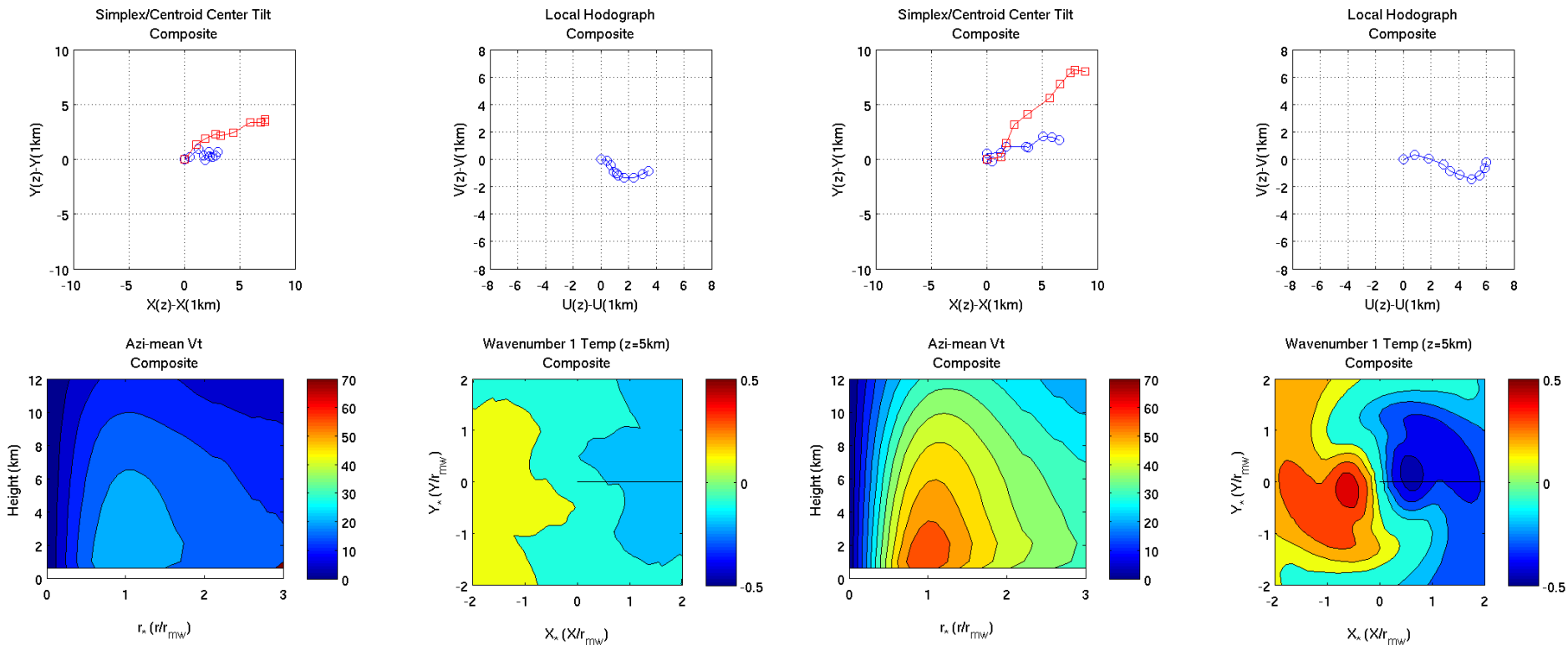
HWRF Composite:

DP SHR <7 vs >7 ms^{-1}



HWRF Composite:

VBAR <34 vs >34 ms⁻¹



Smaller RMW and higher DP SHR!

Need more cases....