

Relation of Hurricane Inner Core Precipitation and Wind Structure to Tropical Cyclone Intensification and Landfalling

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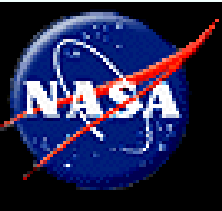
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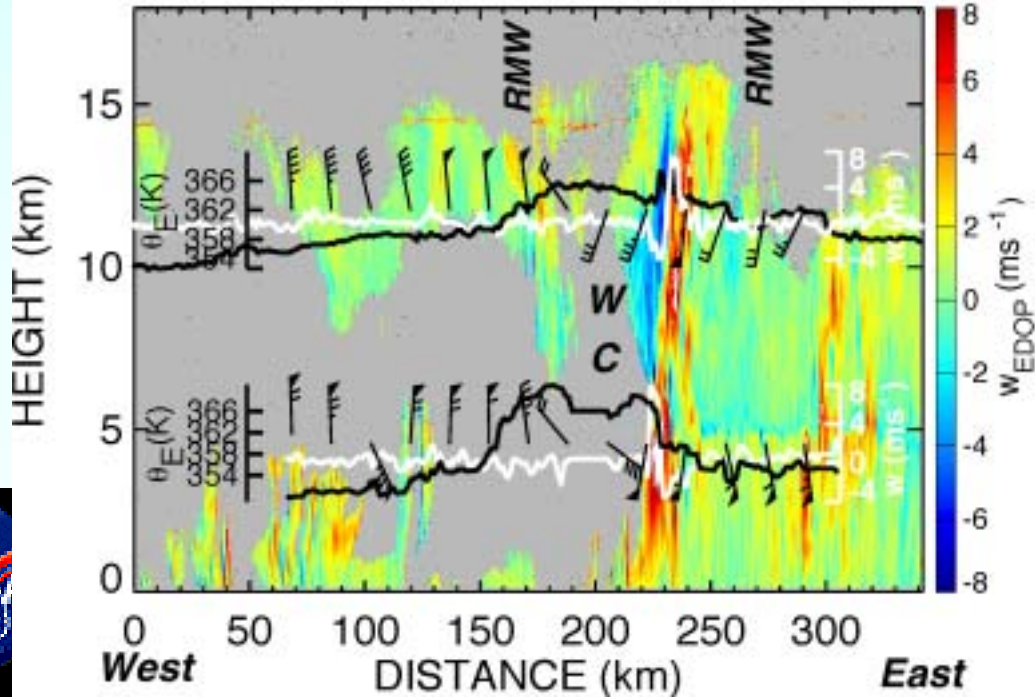
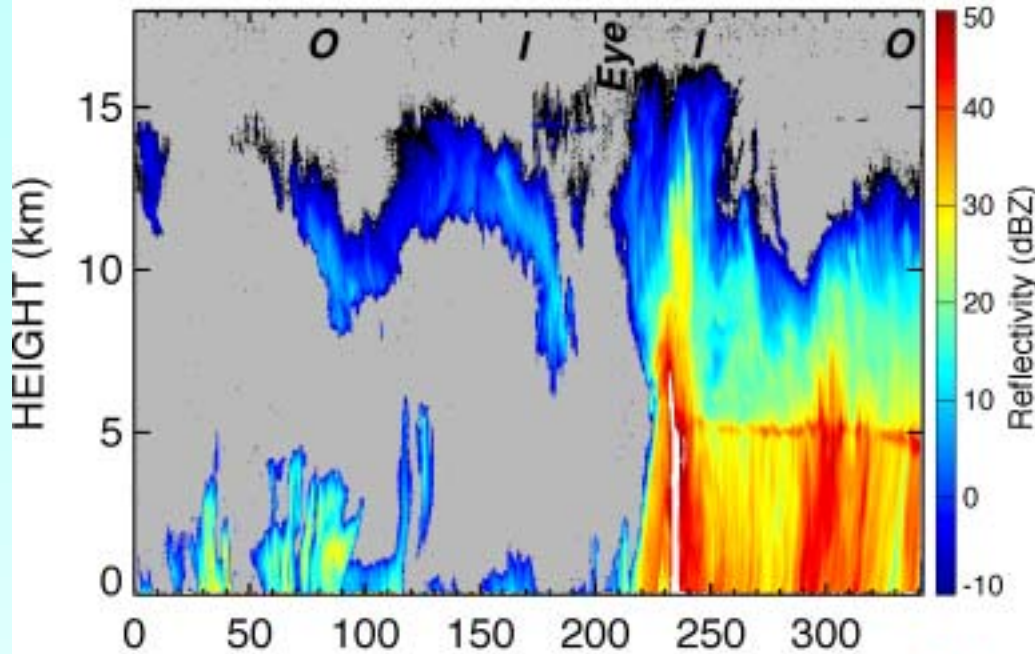


Science Objectives

- Role of inner core convective bursts on hurricane intensification.
 - Relations of vertical motions and microphysical structure.
 - Improved understanding of the rain estimation in coastal and inland regions.
- *Emphasis on EDOP participation, processing, and case studies*



980823 1950-2017 UTC



Hurricane Bonnie 9/23/98

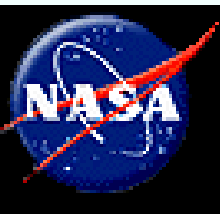
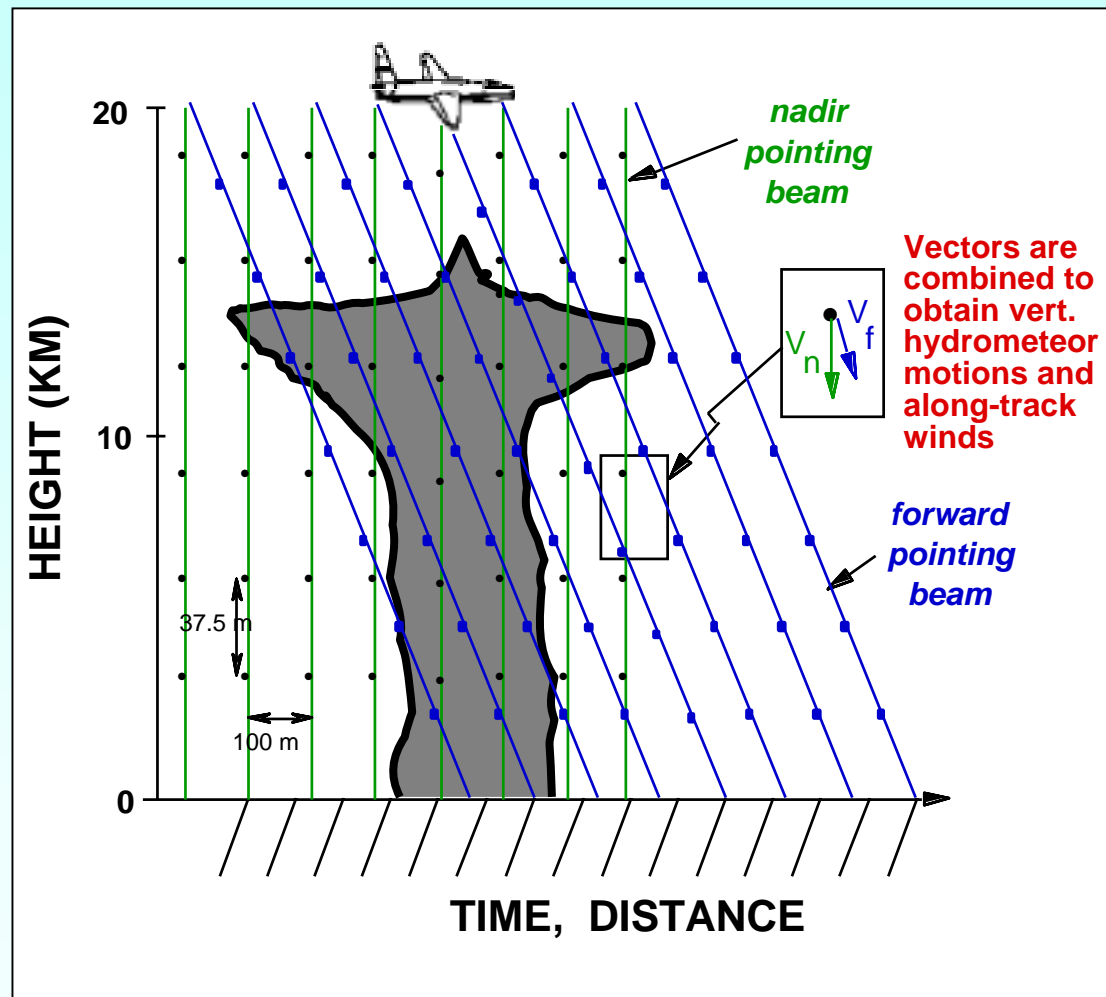
Convective Burst During Storm Intensification

Heymsfield et al., 2001
Mon. Wea. Rev.



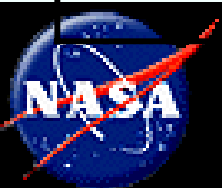
ER-2 Doppler Radar (EDOP)

- Precipitation X-band (9.6 GHz) Doppler radar located in nose of NASA ER-2 high-altitude aircraft emulates satellite view
- Dual-fixed antennas for nadir and forward views along aircraft track
- Forward and nadir beam measure intensity and air motions in precipitation region
- Forward beam provides dual polarization capability for micro-physical characterization of precipitation (liquid, snow, hail)



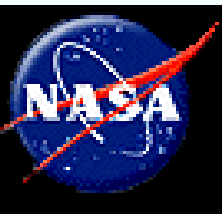
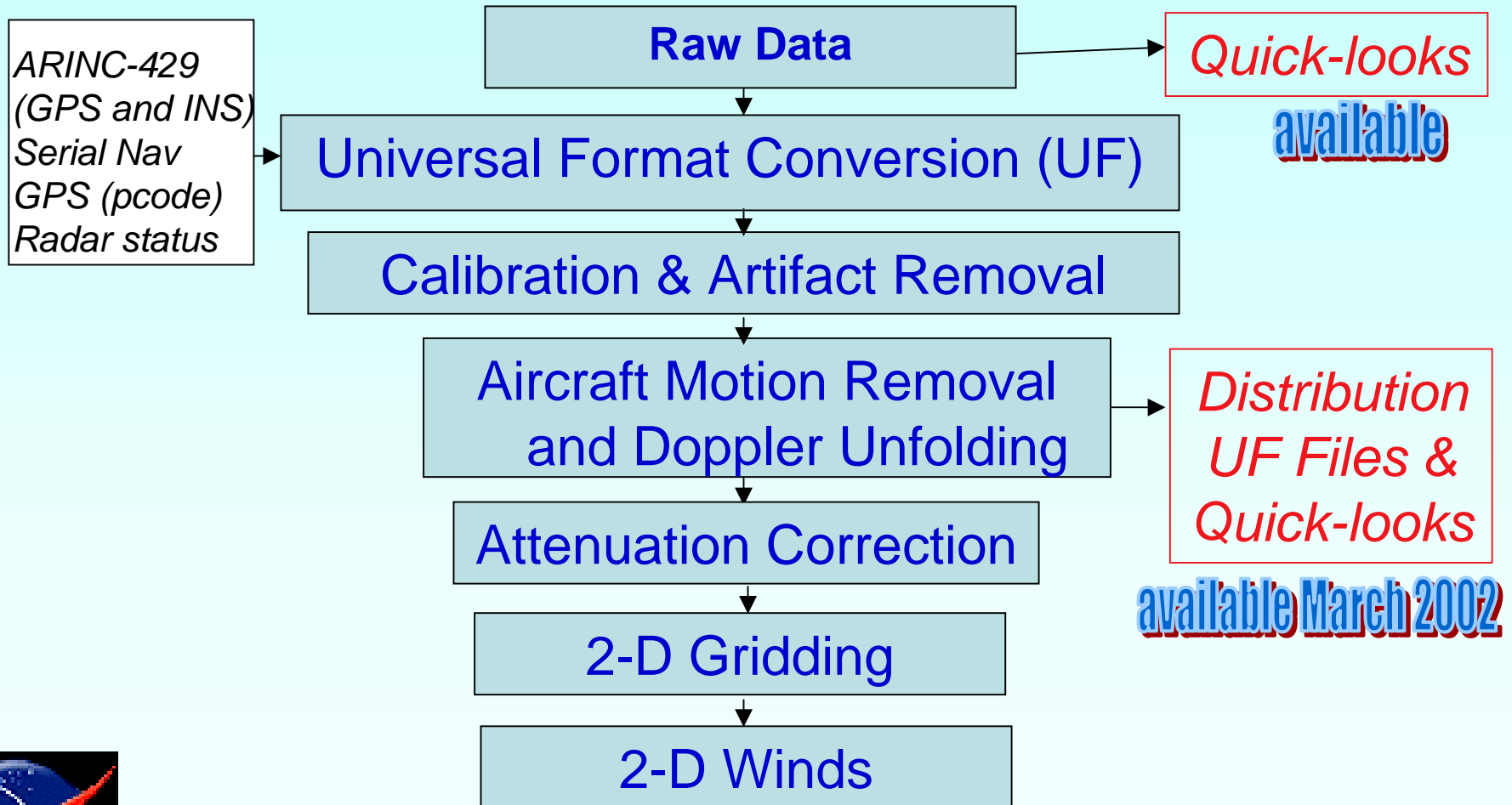
EDOP DATA SUMMARY

Sortie	Date	Time (UTC)	Description	Notes
01-131	010818	None	Check Flight	Transmitter not turned on entire flight
01-132	010820	2026-0036	Chantal	Transmitter turned on after first leg
01-133	010826	1740-1919	Andros	
01-134	010903	1537-1823	KAMP	
01-135	010907	1629-2002	KAMP	
01-136	010909	1630-1914	KAMP	
01-137	010910	1502-2107	Erin	
01-138	010916	None	Gabrielle	Transmitter not turned on entire flight
01-139	010919	1642-2042	KAMP	
01-140	010922	1715-2118	Humberto	
01-141	010923	1808-0107	Humberto	Lots of cirrus undetected
01-142	010924	1903-0032	Humberto	Lots of cirrus undetected



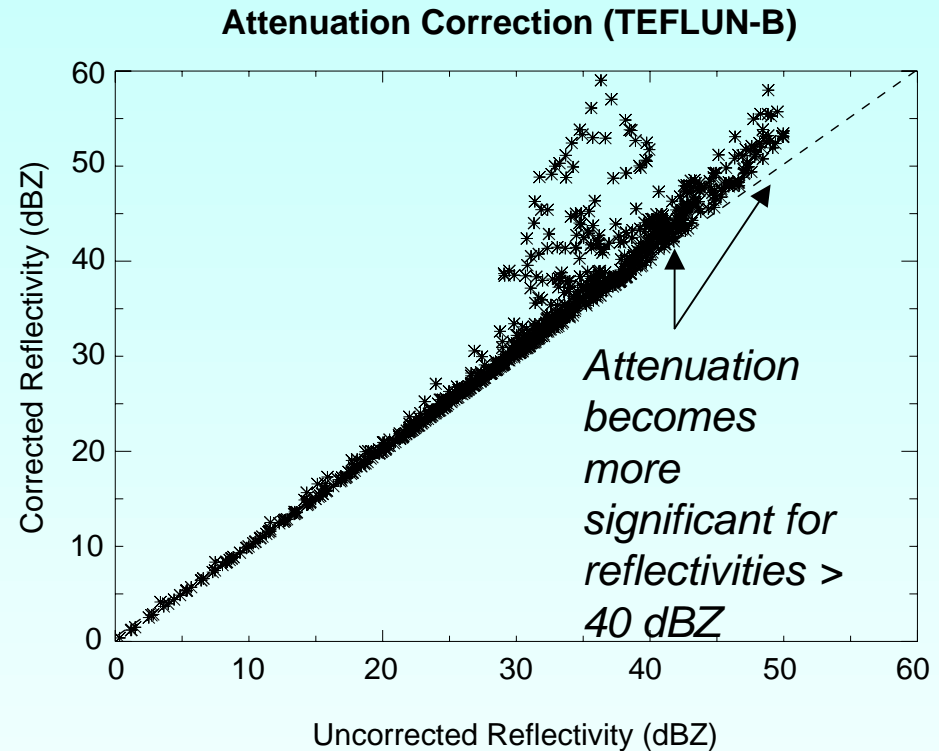
(quicklooks available <http://rsd.gsfc.nasa.gov/edop/index.html>)

EDOP Post-processing

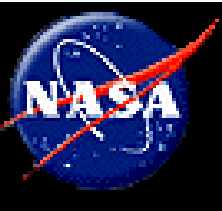


Reflectivity Calibration, Attenuation

- External (lab) calibration before and after experiment - about 1 dB differences from previous campaigns due to higher transmit power.
- Calibration stability monitored during flight using internal calibration.
- Examination of ocean return (σ^0) and comparison with surface radars (ongoing).

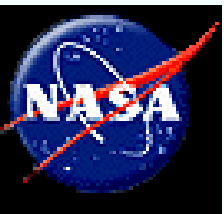


(Attenuation correction not performed on distribution data sets)

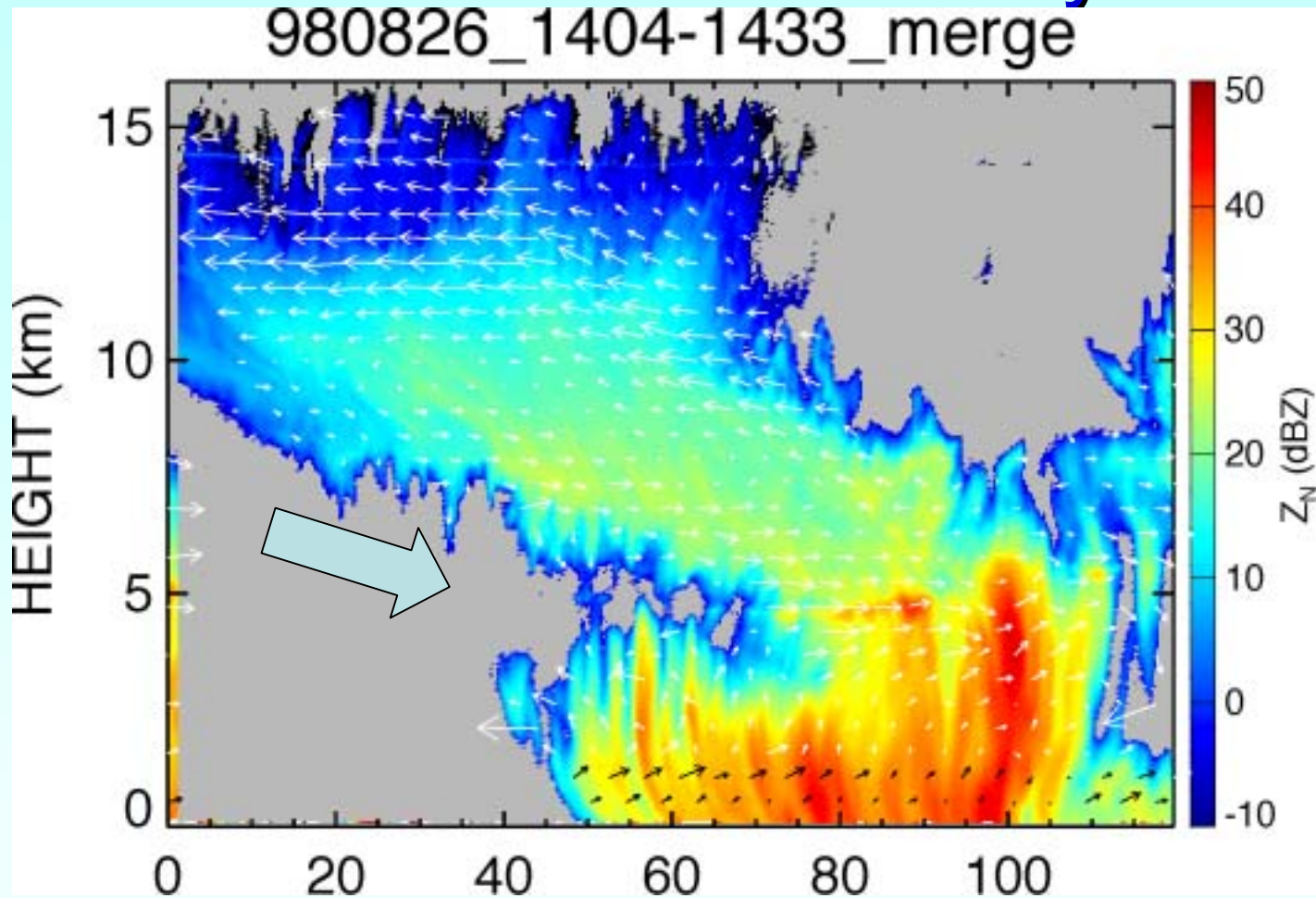


CASE STUDIES

- Hurricane Bonnie landfalling (8/26/98)
 - *HRD collaboration, paper in progress*
- TS Chantal (8/20/01) (sheared storm)
 - *Tropical Conf. Paper, HRD & other collaboration*
- Hurricane Humberto (9/22/01)
 - Convective burst
- KAMP: Strong convection cases (9/07/01, etc.)



Hurricane Bonnie West Eyewall

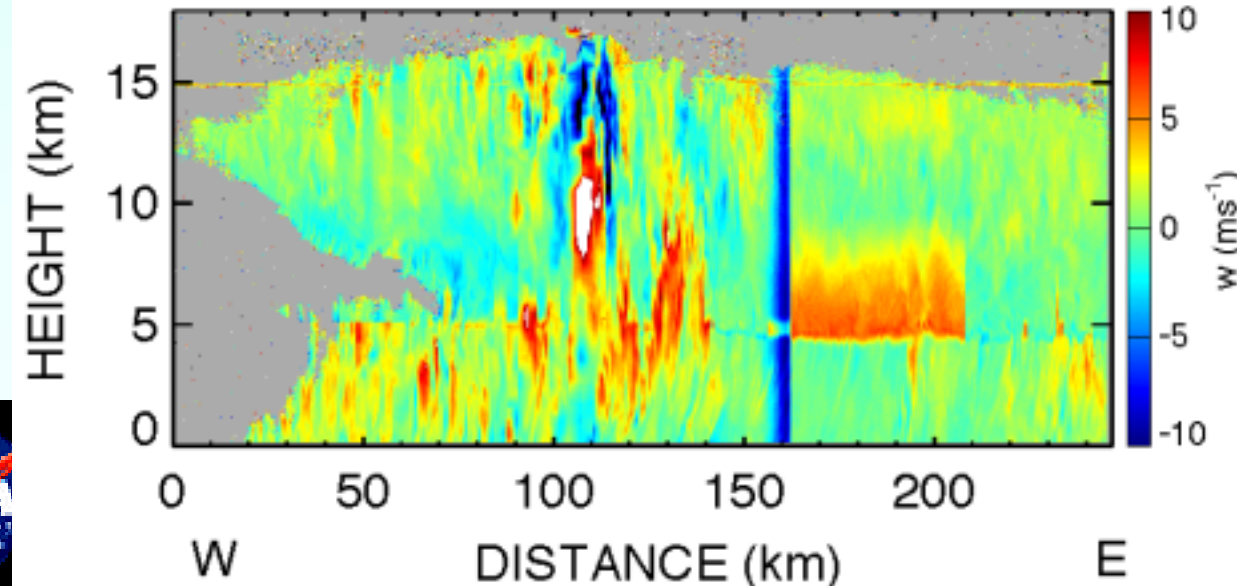
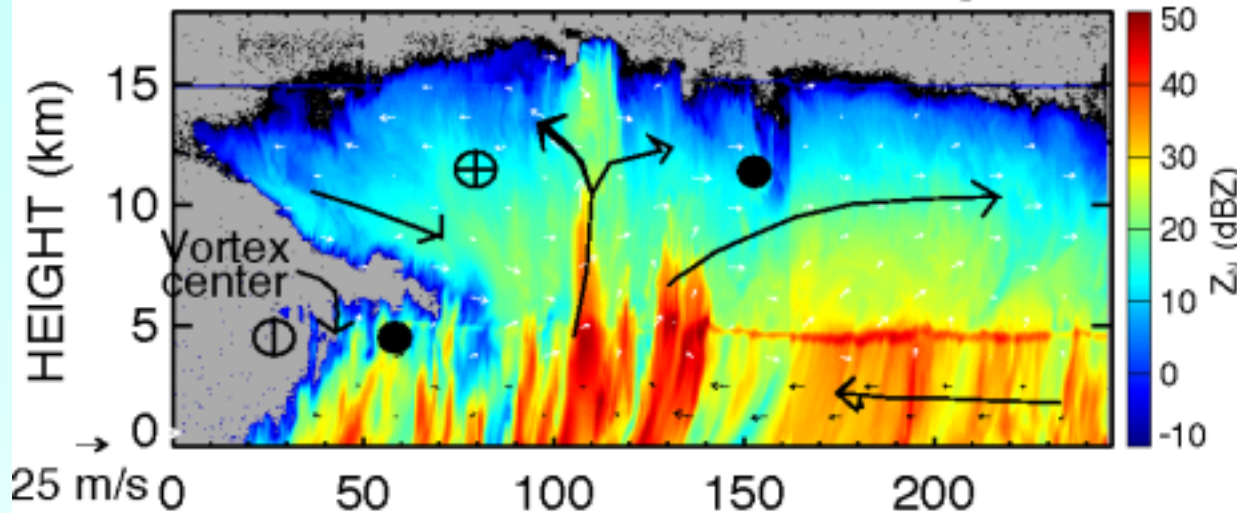


Role of dry intrusion on west half of storm on weakening storm and on precipitation structure.



TS Chantal 20 Aug 2001

010820_2101-2125_merge

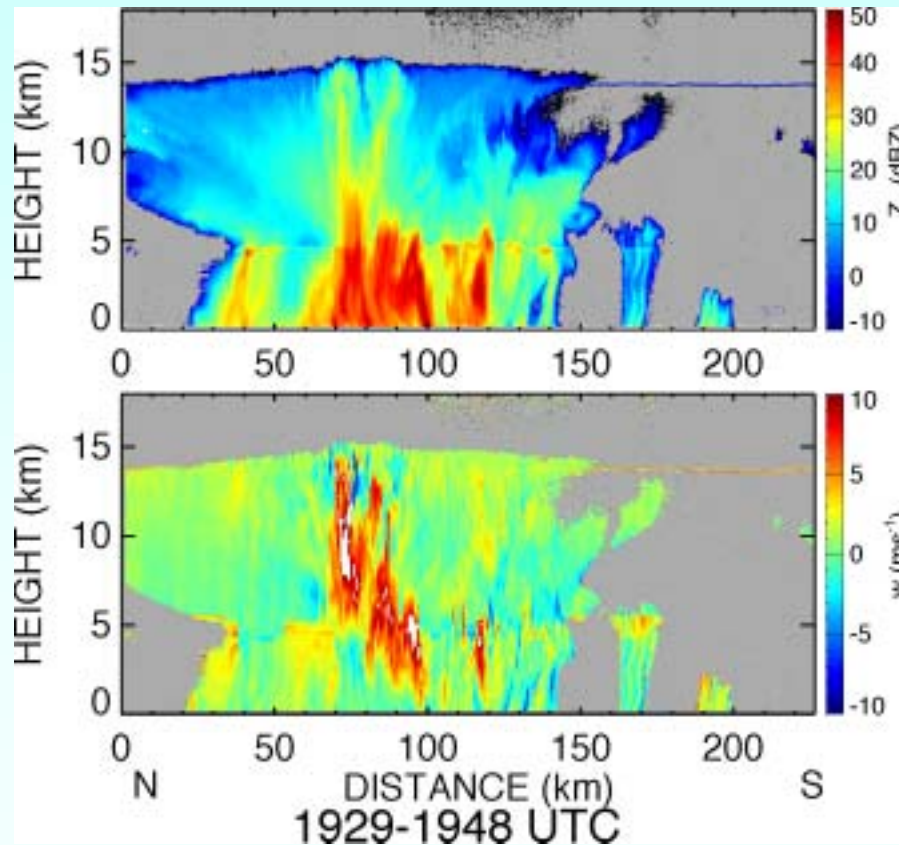


- Why didn't storm develop?
- Why was convection so intense and persistent?

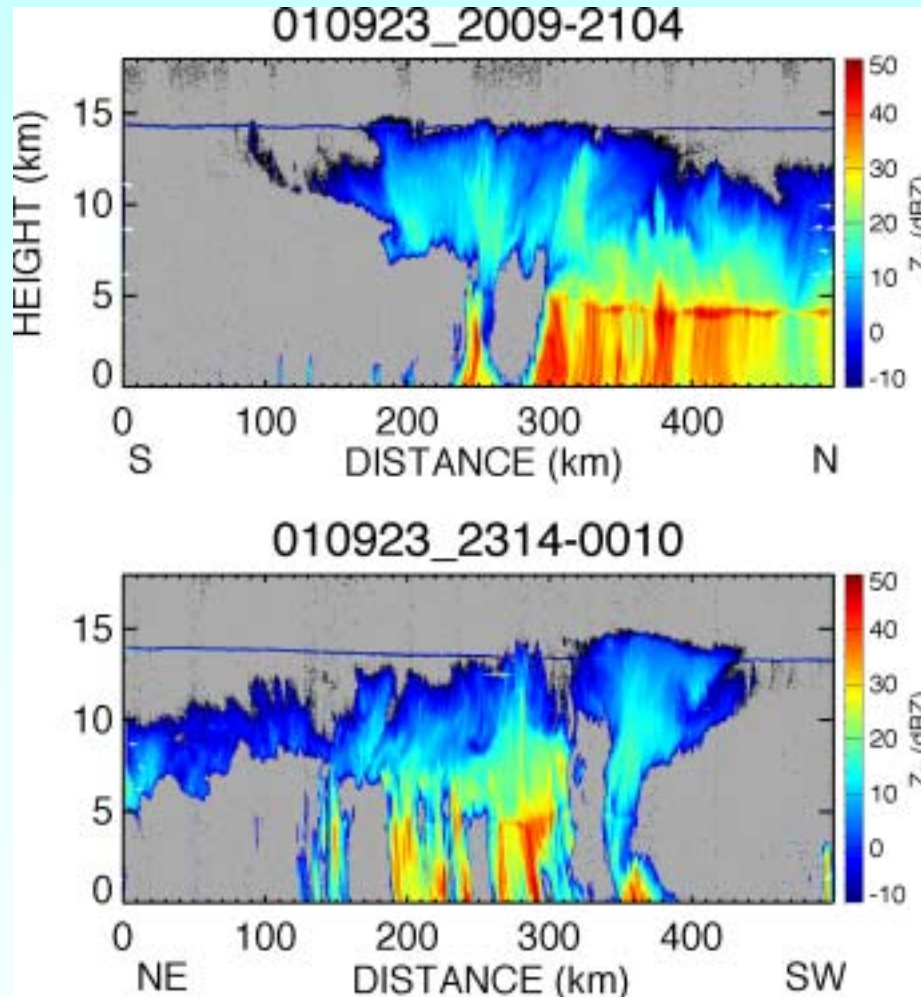


Hurricane Humberto

22 Sept 2001 Convective Burst



Humberto 23 Sept 2001



Future Work

- Archive EDOP UF data files soon.
- Bonnie landfalling case completion.
- Chantal case study (8/20/01)
- Properties of secondary circulation and inner core convection with EDOP from other cases (2001: Humberto, Erin; 1998: Georges)
- TRMM-related studies (KAMP)
- Collaboration on case studies

