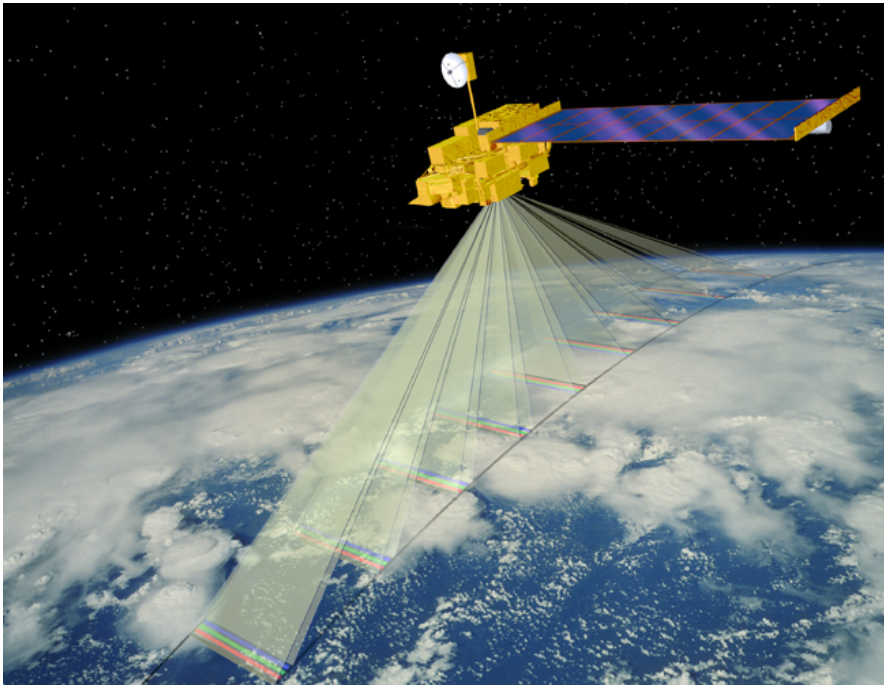


MISR Sciences

- Aerosol and air quality
- Clouds, climate, and weather
- Surfaces
- Advanced concepts for future remote sensing



PI: Dr. David Diner

9 view angles at Earth surface:
Nadir, $\pm 26^\circ$, $\pm 46^\circ$, $\pm 60^\circ$, $\pm 70^\circ$

4 bands: 446, 558, 672, 866 nm

Daylight global coverage: 400-km swath

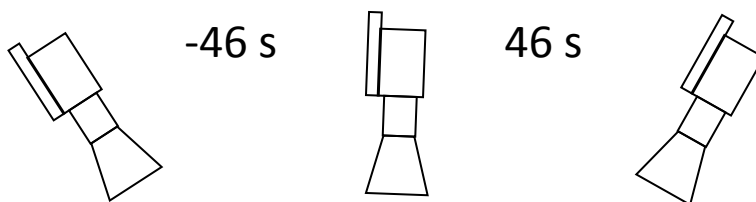
275 m - 1.1 km resolution

7 minutes for scenes at all 9 angles

Data since 2000, lifetime projection >2017



MISR Flight Direction



-26° +26°

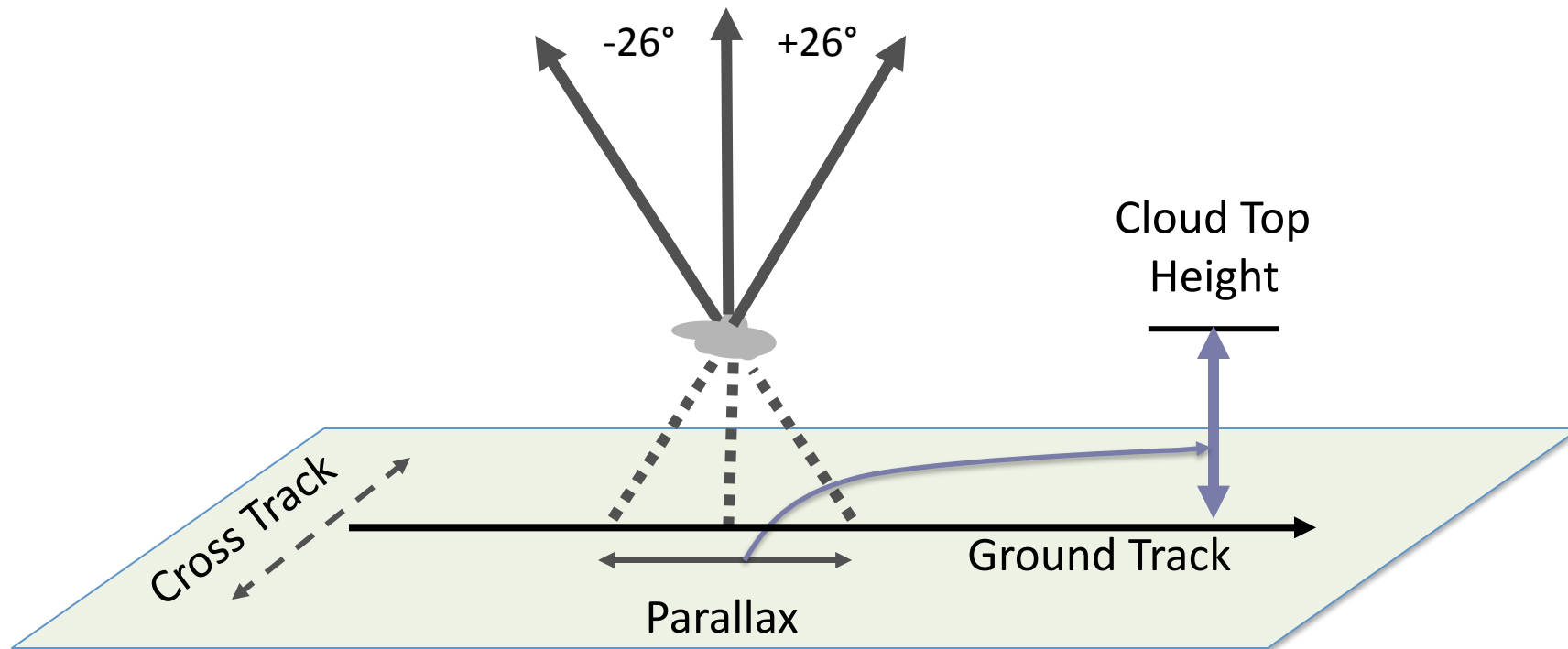
Stereo Technique

Cloud Top
Height

Cross Track

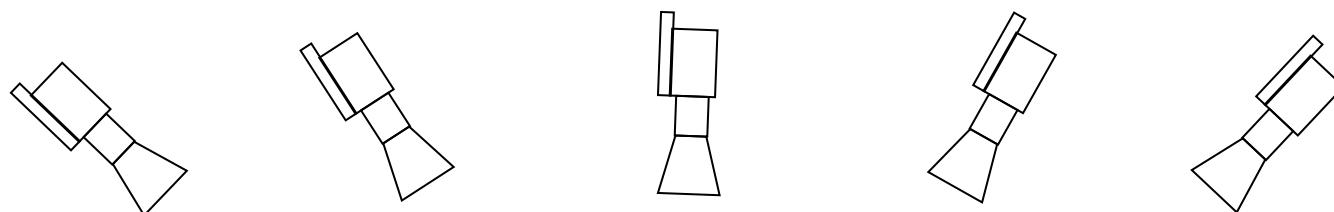
Ground Track

Parallax

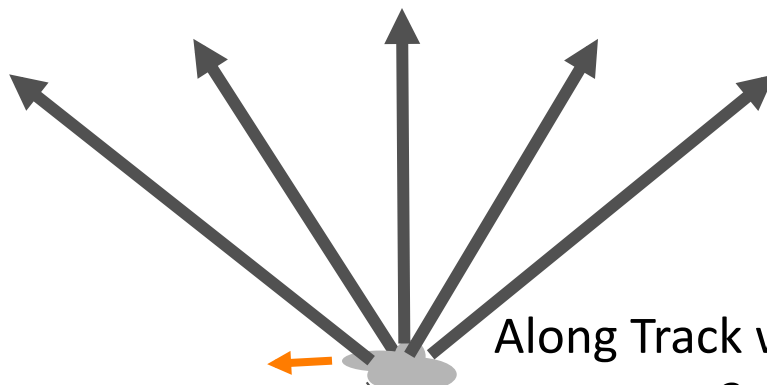




MISR Flight Direction



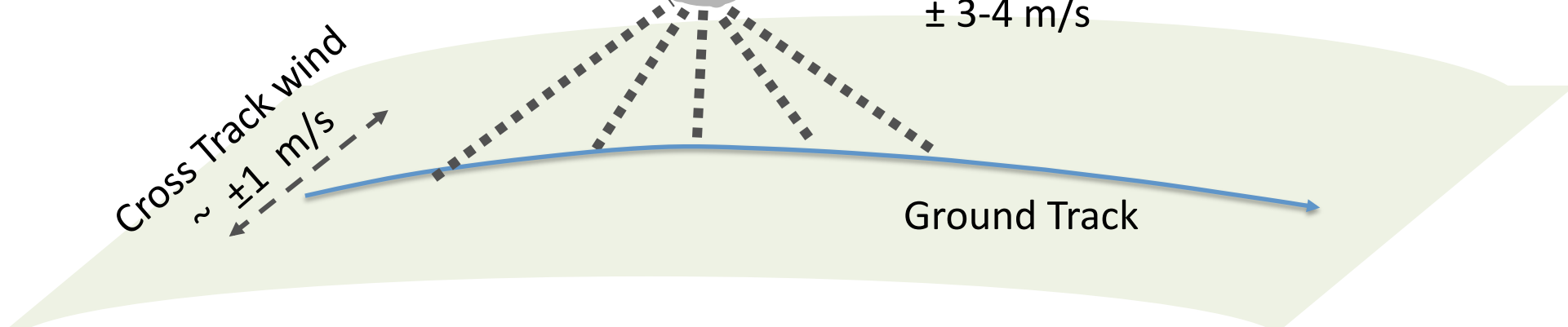
Stereo Technique

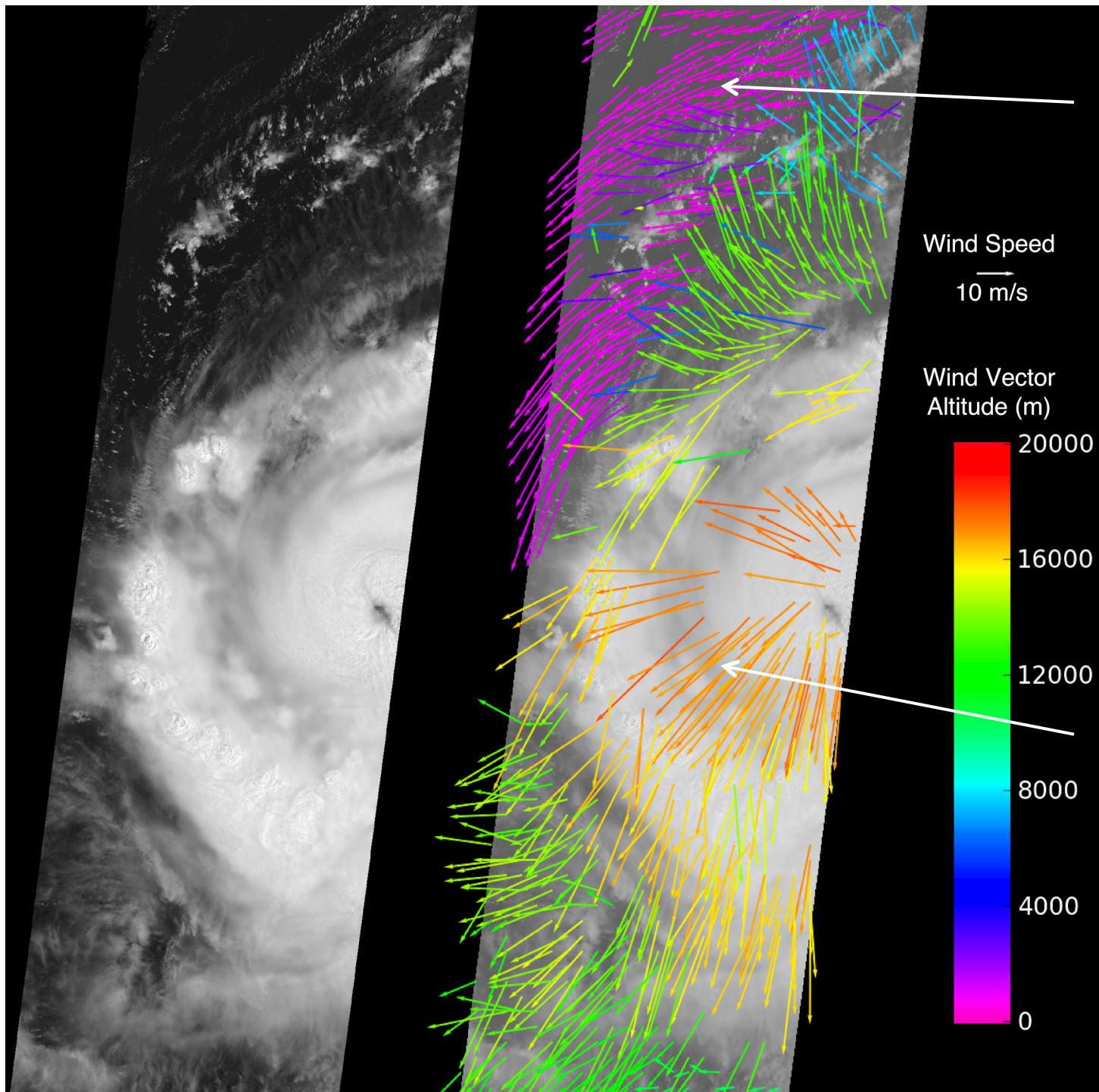


Along Track wind precision
 $\pm 3-4$ m/s

Cross Track wind
 $\sim \pm 1$ m/s

Ground Track





Boundary
layer wind
field

Hurricane Earl
8/30/2010

(orbit 37285)

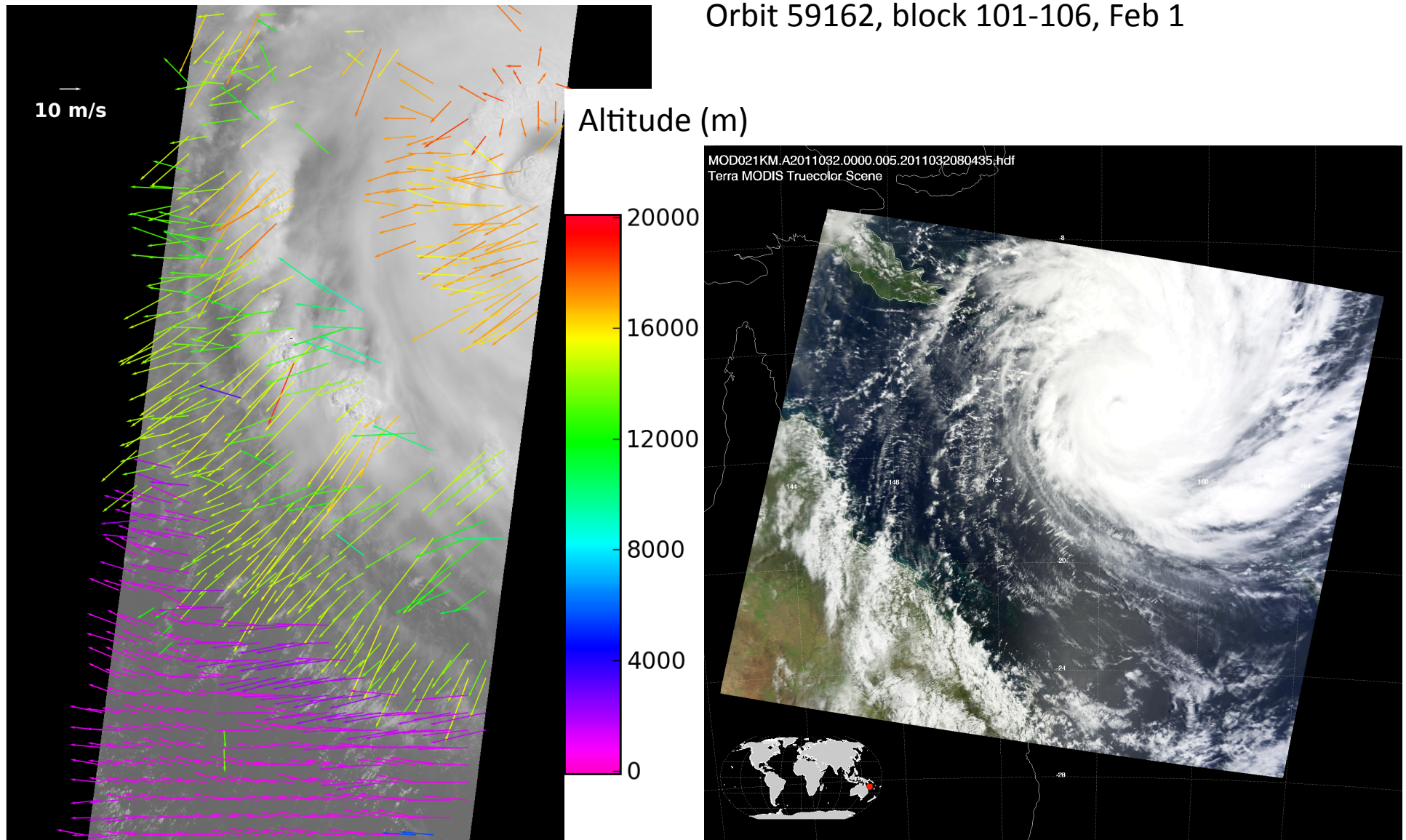
High-level
outflow

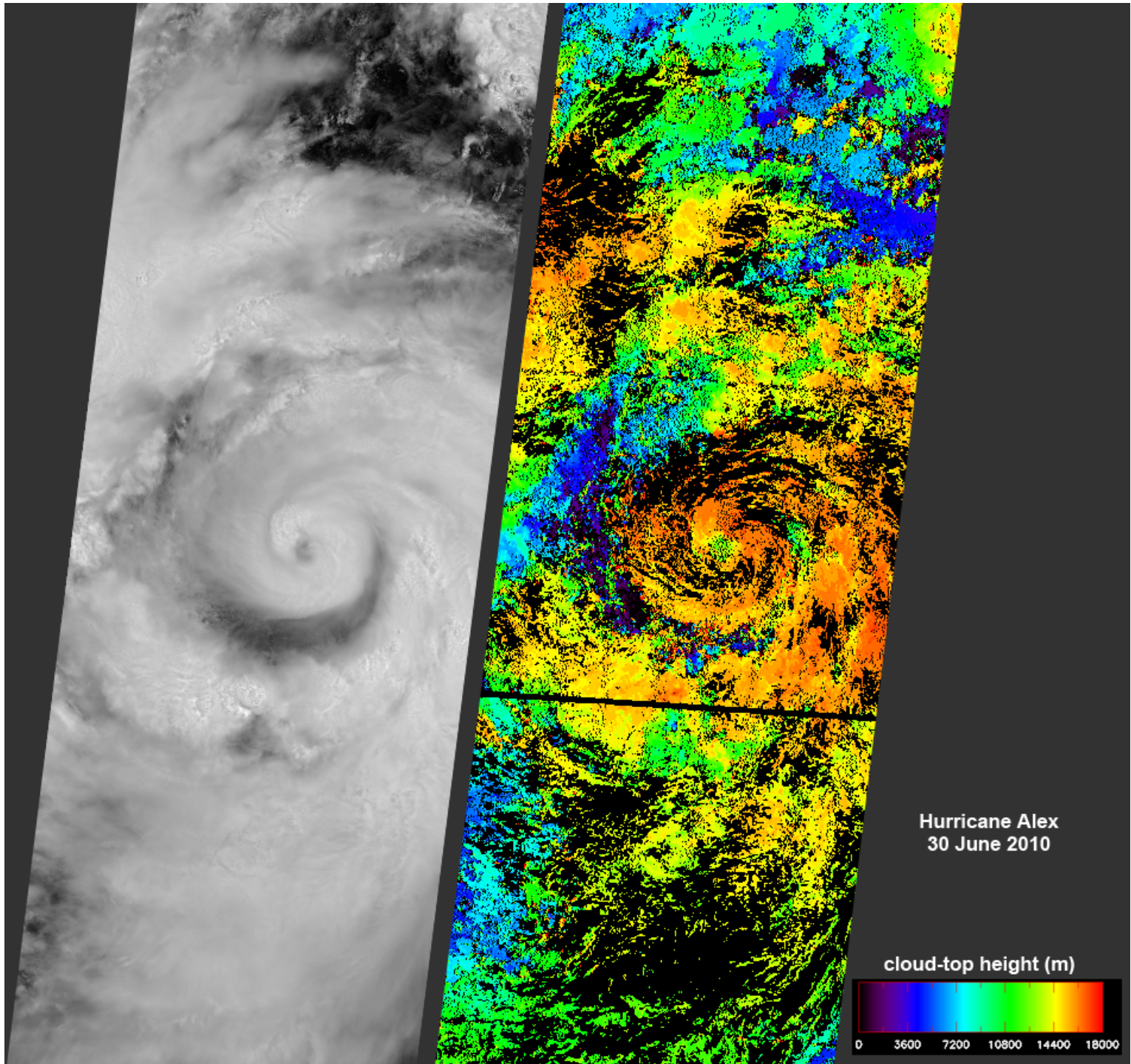
Courtesy of
Kevin Mueller

Courtesy of
Kevin Mueller

TC Yasi

Orbit 59162, block 101-106, Feb 1





Hurricane Alberto Observed by MISR

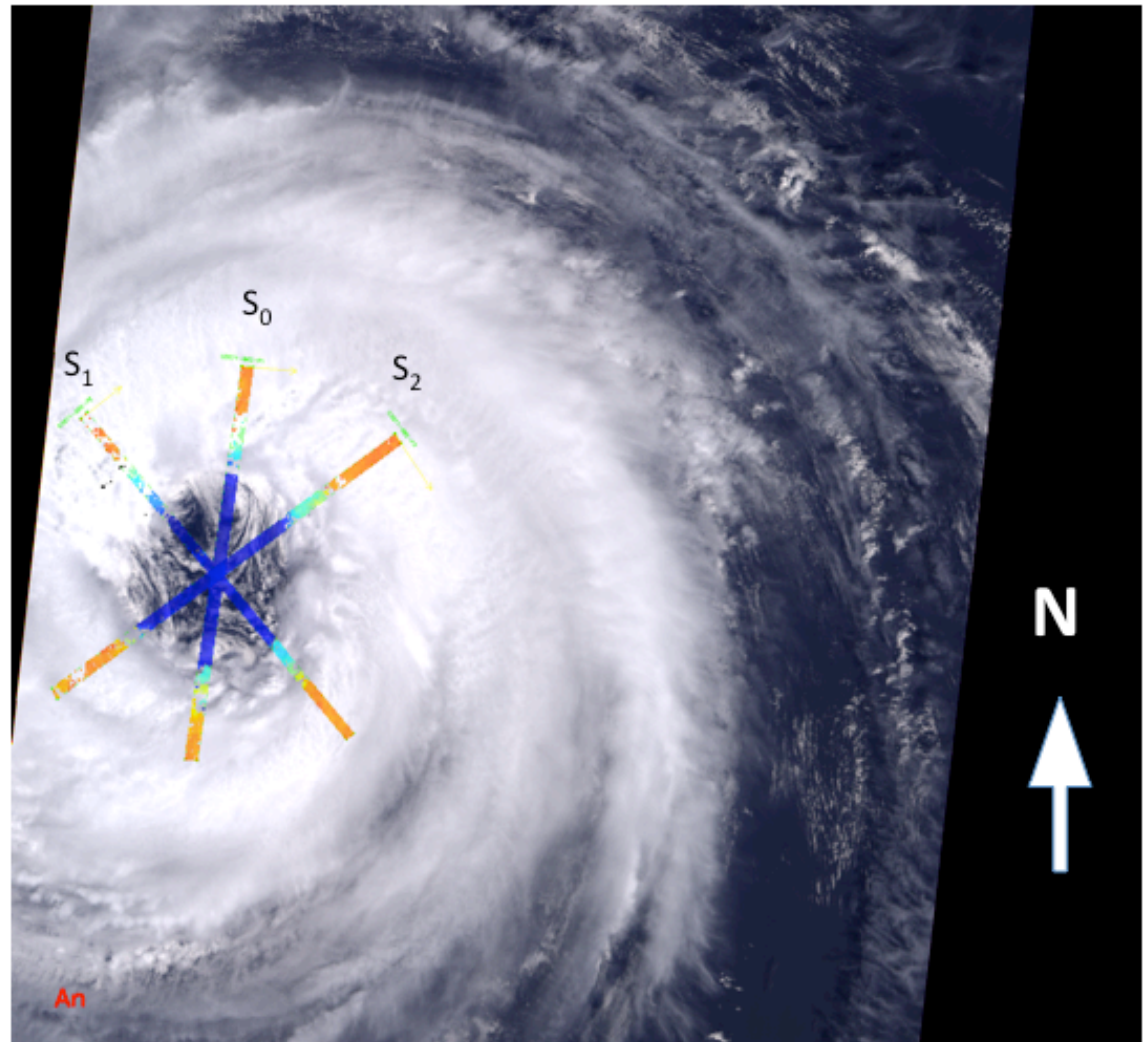
The MISR Interactive eXplorer (MINX)

- (1) Simultaneous retrieving cloud-track wind and cloud top height;
- (2) Using nadir-26°, 26°-46°, 46°-60° in both fore and aft views;
- (3) Pattern matching in a domain of 5×5, 7×7, 9×9 pixels (MISR red images: 275m pixel size and ~400 km swath);
- (4) Requiring *a priori* wind direction;
- (5) Producing results if two of six pairs of pattern matching are consistent.

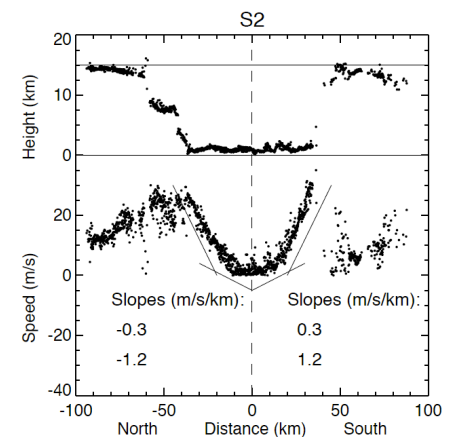
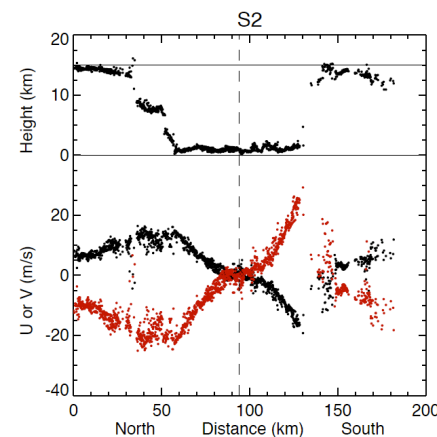
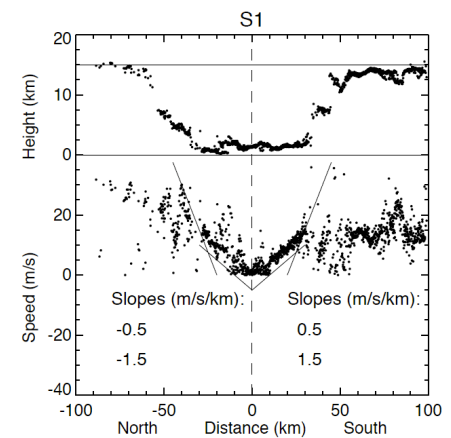
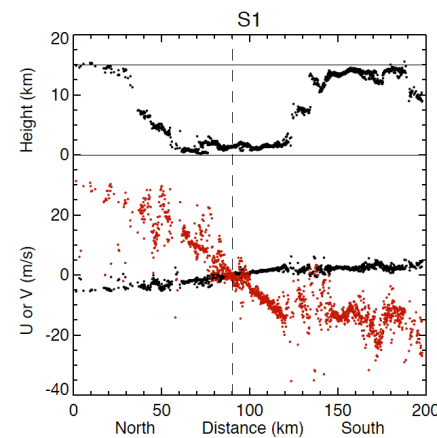
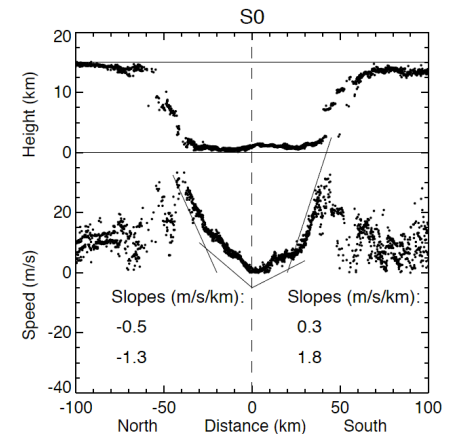
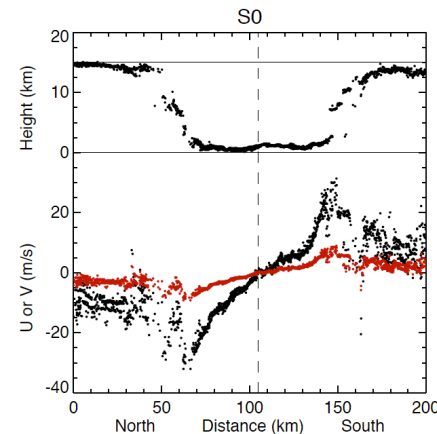
Alberto on 19 Aug. 2000

- (1) Moving very slowly (< 2m/s);
- (2) Winds inside the eyewall dominated by the tangential component;
- (3) Three slices digitized (S0, S1, S2) with a mesovortex under S0;

19 August 2000



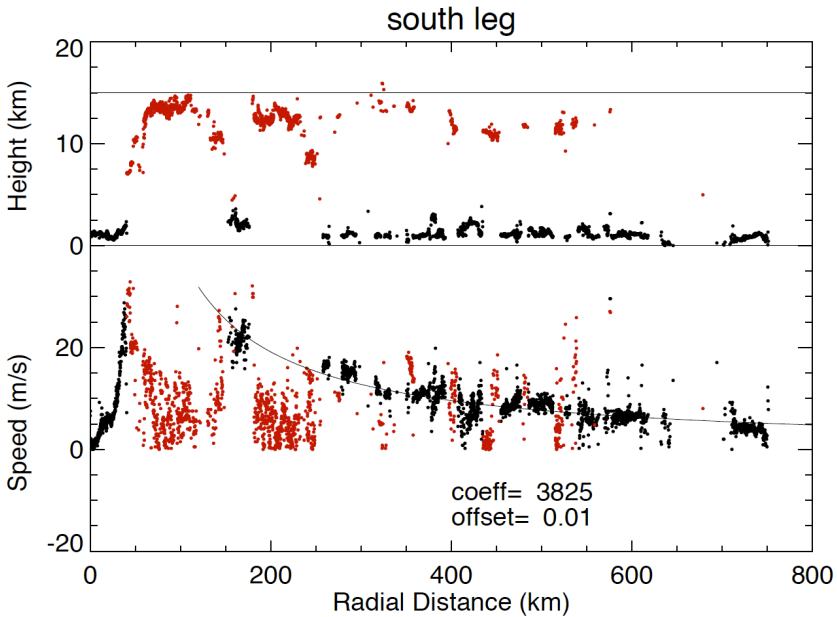
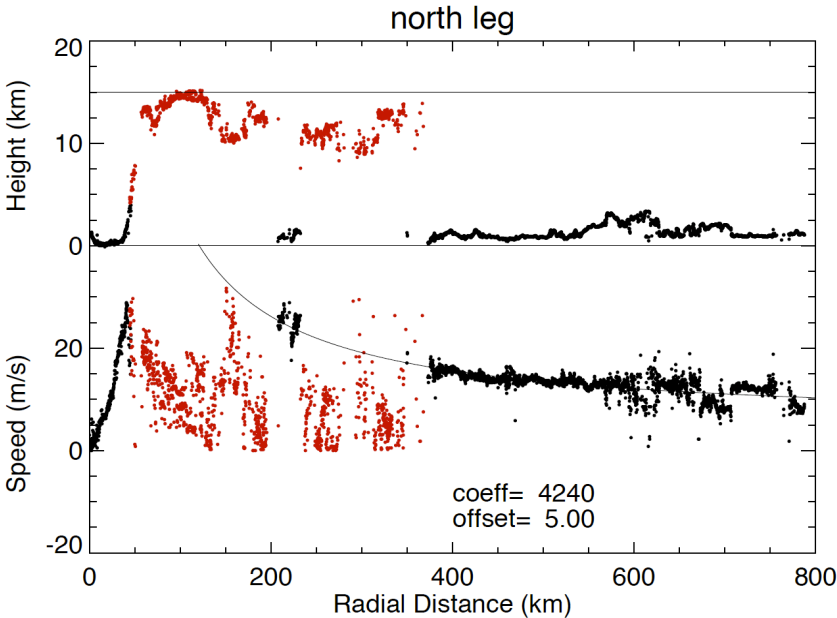
- (1) Most of the low clouds inside the eyewall with an altitude < 2 km,, including the mesovortex in the south end;
- (2) Generally slow or near-zero rotation near the center of the eye;
- (3) Two distinct rotational velocities in the southern S0 section (where the mesovortex is developed), showing the rotation near the eyewall is $\sim 6\times$ faster than one in the center;
- (4) Lower cloud top deck in the south of the cyclone than in the north (although further investigations needed to verify the wind direction for these high clouds).



$$M \approx 4000 \text{ m/s} \cdot \text{km}$$

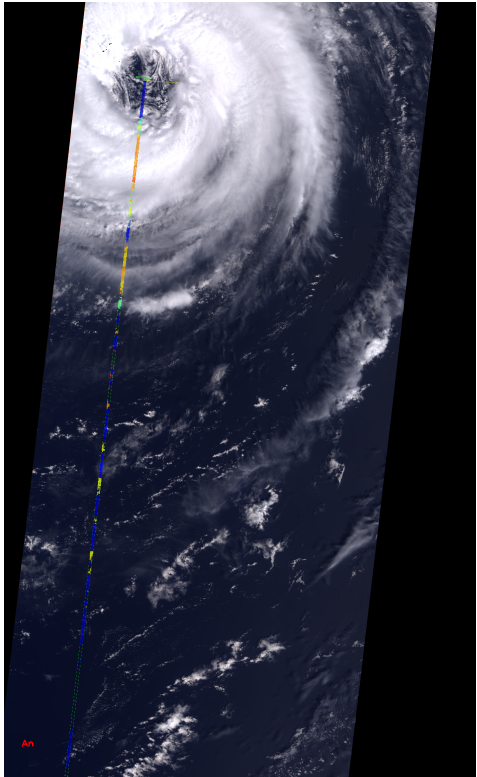
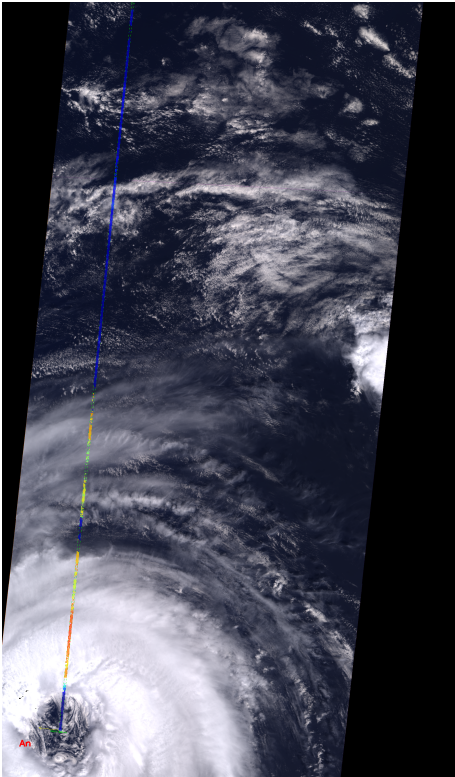
$$v_{north} = \frac{4240}{r} + 5.0 \quad \text{m/s}$$

$$v_{south} = \frac{3825}{r} + 0.0 \quad \text{m/s}$$



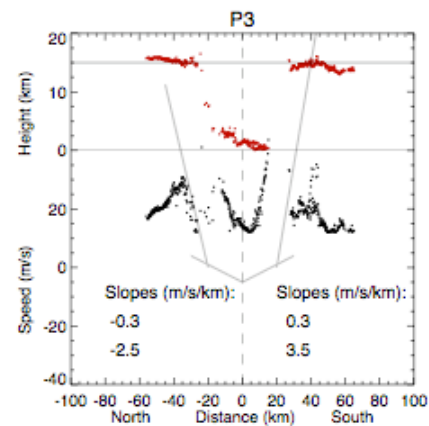
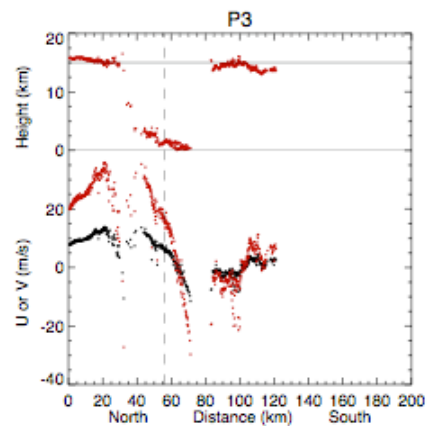
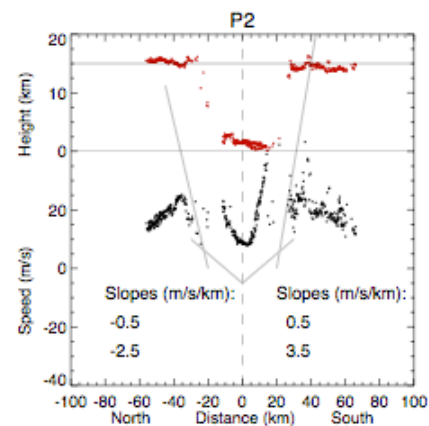
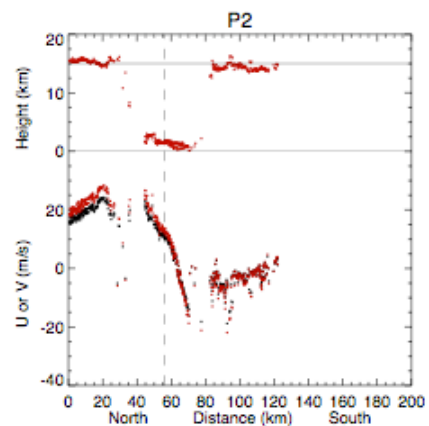
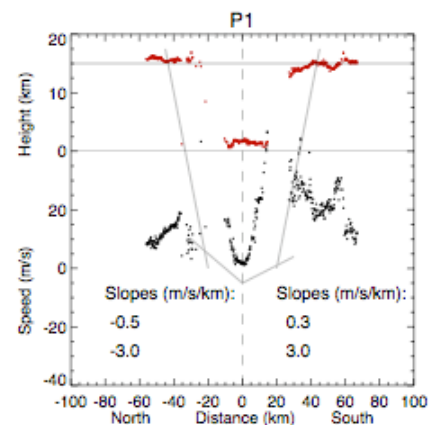
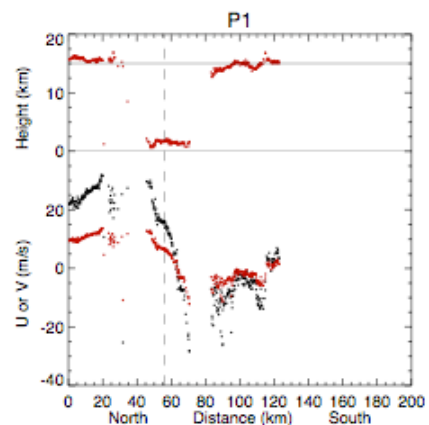
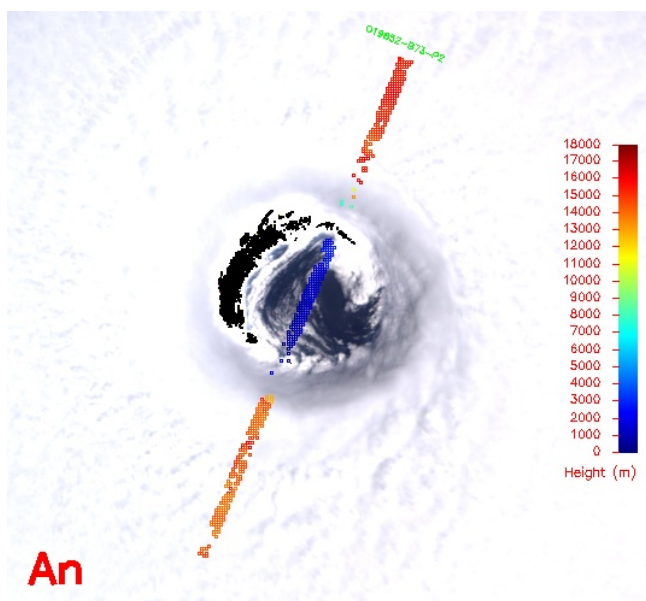
North leg

South leg

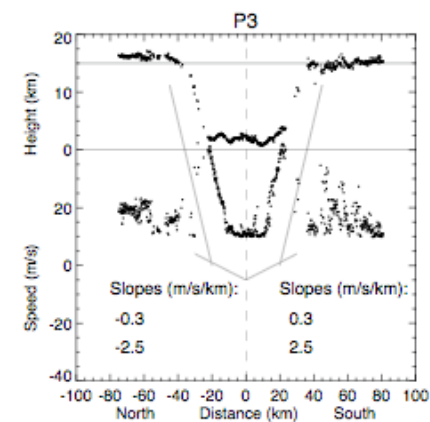
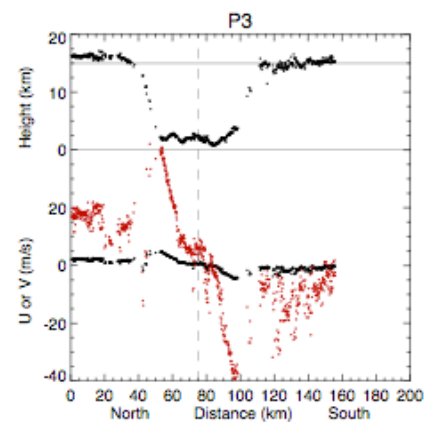
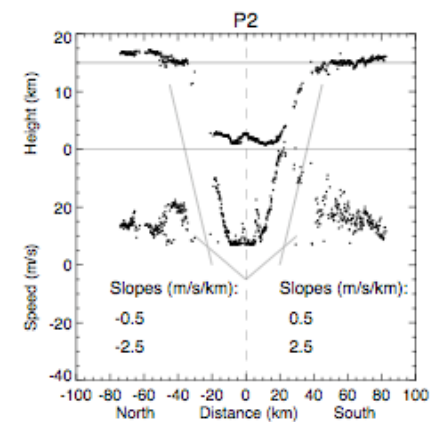
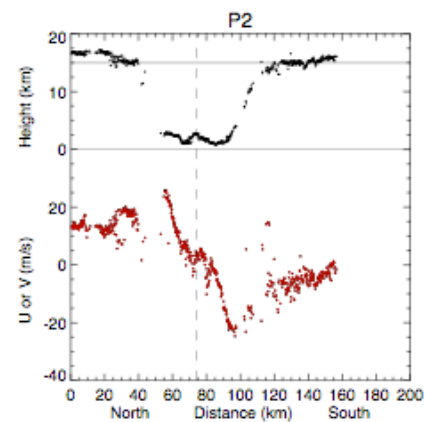
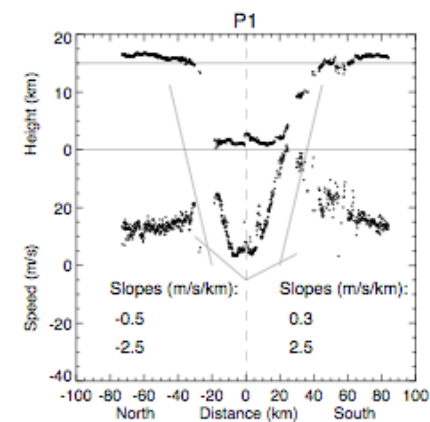
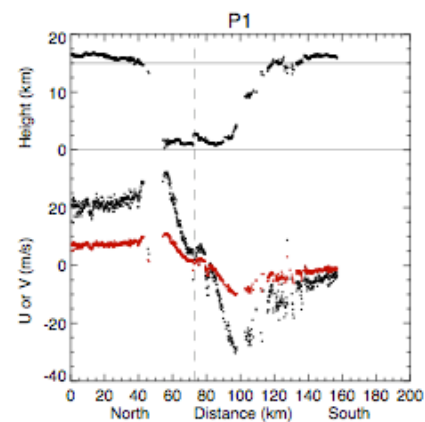
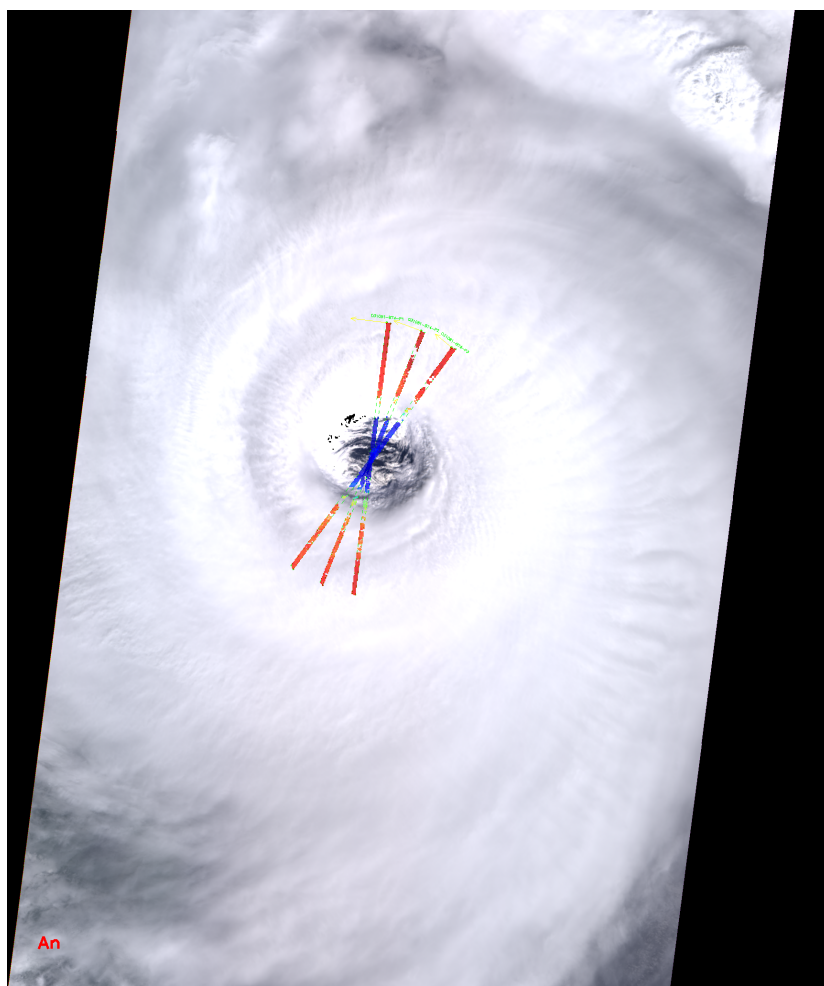


Inner-Core Rotation and Cyclone Intensity

Isabel (2003)



Wilma (2005)



TC Intensity vs. Inner-Core Rotation

