

Radar Observations of Convection in NAMMA

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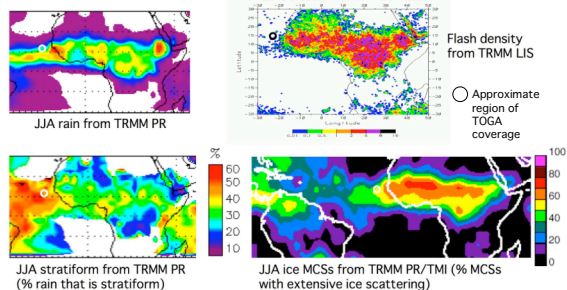
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Goals for TOGA Radar Observations in NAMMA

- Collect radar data and assist in guidance of DC-8 during field phase
- Analyze precipitation and circulation structures within maritime MCSs in the vicinity of the Cape Verde islands and describe the progression of their structure and behavior as they transition from the African continent to a more maritime environment
- Document kinematic, microphysical, and precipitation features, internal to these MCSs, that are relevant to tropical cyclogenesis

TRMM Background Climatology

1998-2004 JJATRMM-based MCS climatology over Africa and tropical Atlantic

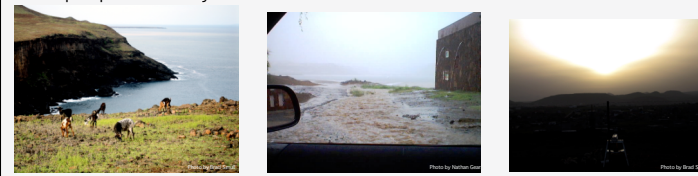


• The Cape Verde Islands are in a transition region between intense land-based convection over Africa and weaker maritime convection over the open ocean

NASA TOGA Radar Deployment



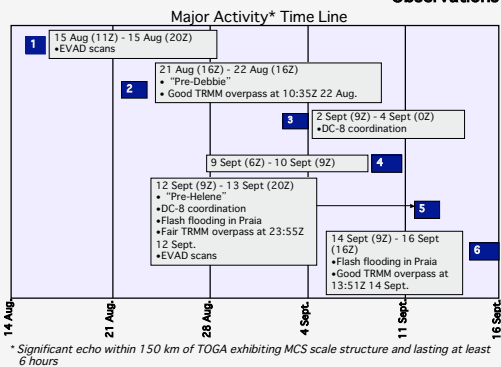
- TOGA location ~100m above coastline outside Praia on south coast of Sao Tiago
- The site provided an unobstructed view east-southwest where most precipitation activity was observed



View NE of TOGA with local wildlife in foreground | Flash flooding around Praia during 3 September event | View NW of TOGA on a dust day

- TOGA: C-band (wavelength 5.3 cm)
- Deployment: 15 August - 16 September, 2006 in Praia, Republic of Cape Verde
- Data Collected: Unfiltered reflectivity (ZT), filtered reflectivity (DZ), radial velocity (VR), and spectral width (SW)
- Scan strategy:
 - > 1-tilt (0.8°) surveillance scan covering 360° azimuth (~300 km maximum range)
 - > And one of the following...
 - > 18-tilt (0.8°-29°) scan covering 360° azimuth (~150 km maximum range) - used most often
 - > 20-tilt (0.8°-53°) scan covering 360° azimuth (~150 km maximum range) - used occasionally
 - > 21-tilt (0.8°-54°) scan covering 360° azimuth (~150 km maximum range) - used rarely
- Scans repeat on a 10-minute cycle
- Radar operated nearly continuously during deployment
 - > ~ 9,000 scans collected

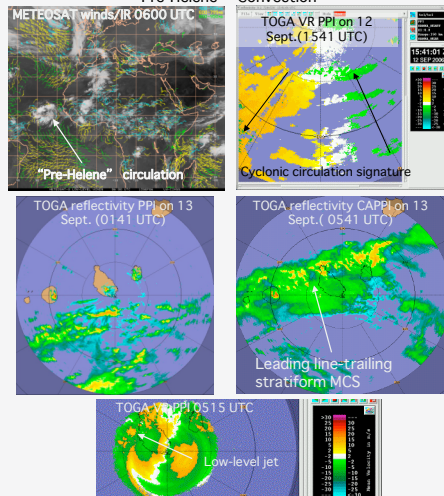
Observations of Convection



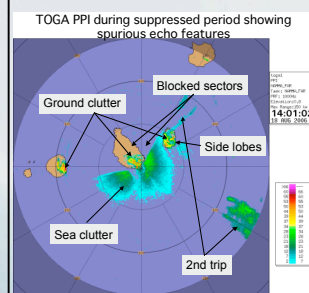
Observed Features of Interest in Major Events:

- Classic leading line convection - trailing stratiform MCSs
- Leading stratiform - trailing convection MCSs
- Narrow convective bands (> 100 km in length) with no accompanying stratiform
- Orographic forced convection over islands
- Broad scale cyclonic circulation and embedded vortices

12-13 September "Pre-Helene" Convection



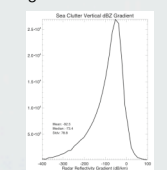
TOGA Radar QC Issues



- The radar data contains multiple artifacts that must be removed before it can be used for research analyses

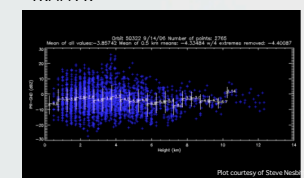
QC algorithm approach

- Ground clutter and side lobes removed using a clutter template for each sweep
- Multiple trip echo removed using a VR mask
- Sea clutter removed using vertical reflectivity gradient threshold



- Apply calibration bias offset
- Apply GATE attenuation correction
- Version 1 data set to be released summer 2007

- Calibration bias determined from comparisons between TOGA and TRMM PR
- Based on 4 overpass intercomparisons (22 August, 3 September, 12 September, and 14 September), TOGA is 4.0 dB (± 2.2 dB) high relative to TRMM PR



Example TRMM PR - TOGA comparison on 14 September

Acknowledgements

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