

Advanced Microwave Precipitation Radiometer (AMPR)

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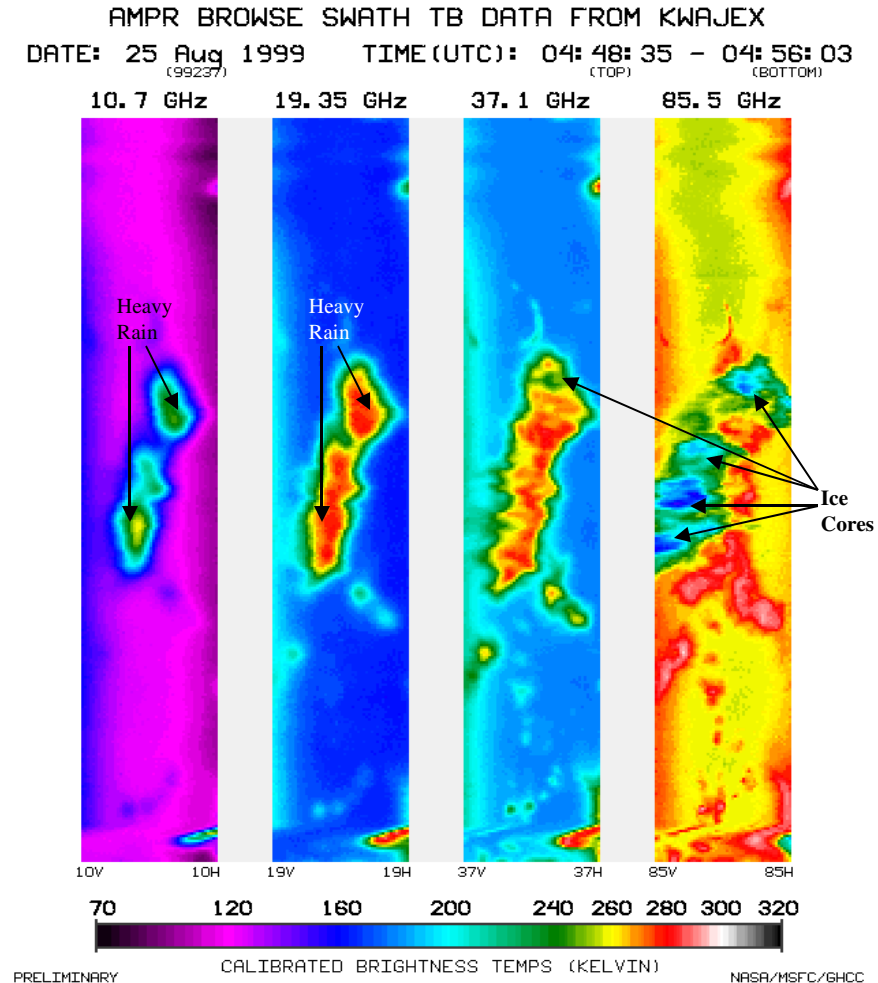
AMPR Description

- **Passively senses at 10.7, 19.35, 37.1, and 85.5 GHz**
- **Flies on ER-2 or DC-8 aircraft**
- **Scans ± 45 degrees about nadir**
 - **50 samples (pixels) per scan**
 - **Rotating polarization**
- **Swath width 40 km at 20 km ER-2 altitude**
- **Surface resolutions**
 - **2.8 km at 10 and 19 GHz**
 - **1.5 km at 37 GHz**
 - **0.64 km at 85 GHz**
- **Hot and cold load calibration loads**
 - **Hot load ~45 Celsius**
 - **Cold load ~ ambient air temperature**
- **Scan rate is 3 seconds**
 - **50 milliseconds per pixel**
 - **0.5 seconds to reposition mirror**



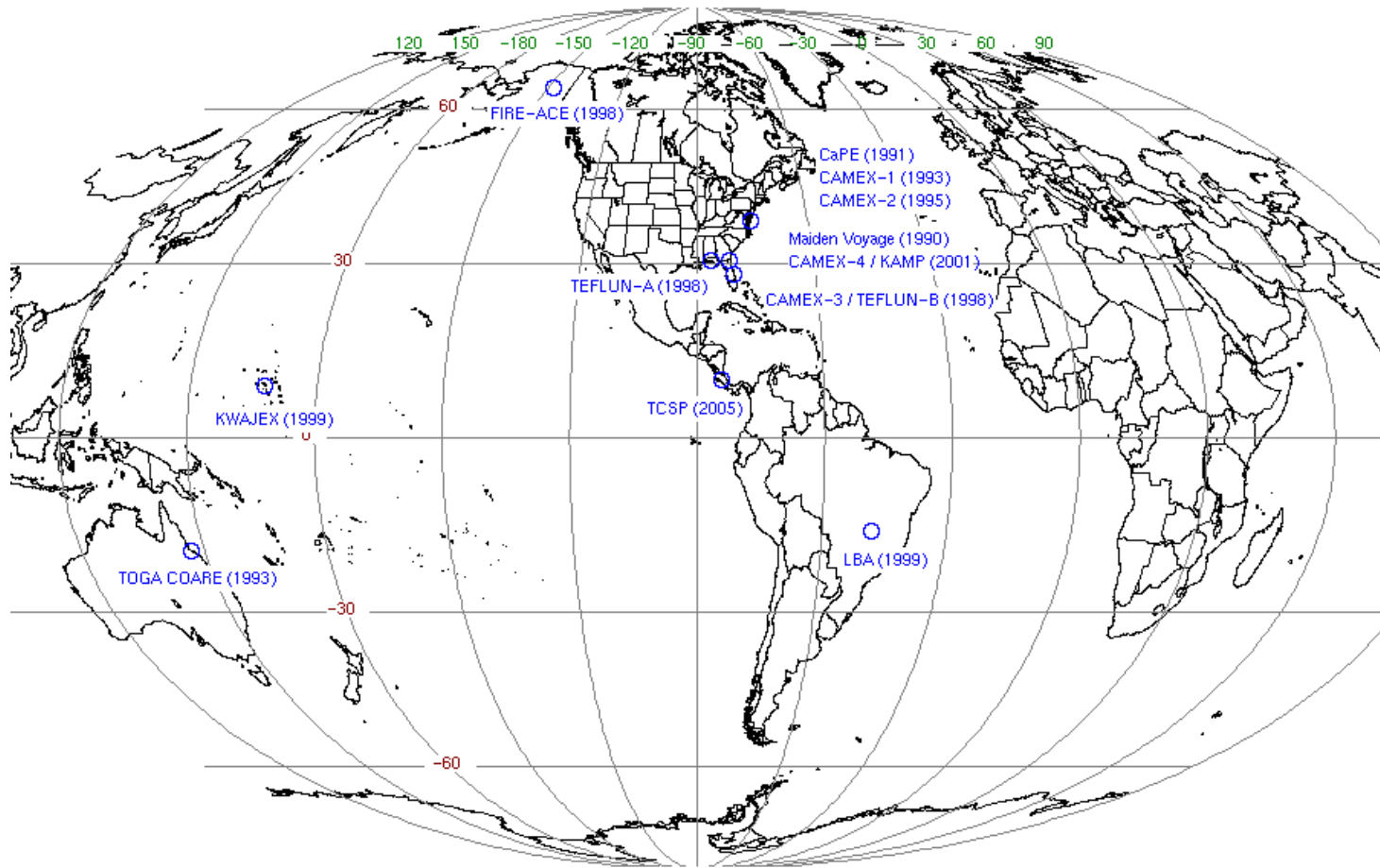
AMPR Accomplishments

- Deployed in 12 NASA field experiments
- Used to sample land and oceanic rainfall, hurricanes, and sea-ice conditions
- Archived data at Global Hydrology Resource Center
- Referenced in 32 peer-reviewed AMS journal articles



Robbie Hood (MSFC/GHCC)

Locations of 12 AMPR deployments



AMPR DEPLOYMENT SITES 1990 - 2005

The Advanced Microwave Precipitation Radiometer (AMPR)
Image from CAMEX-4

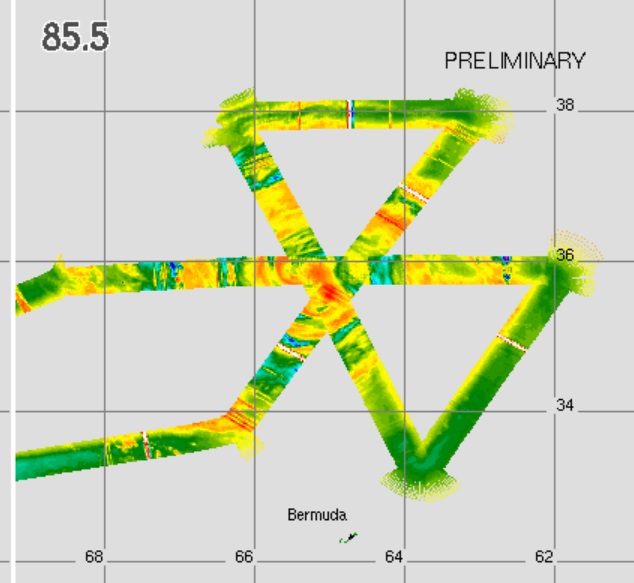
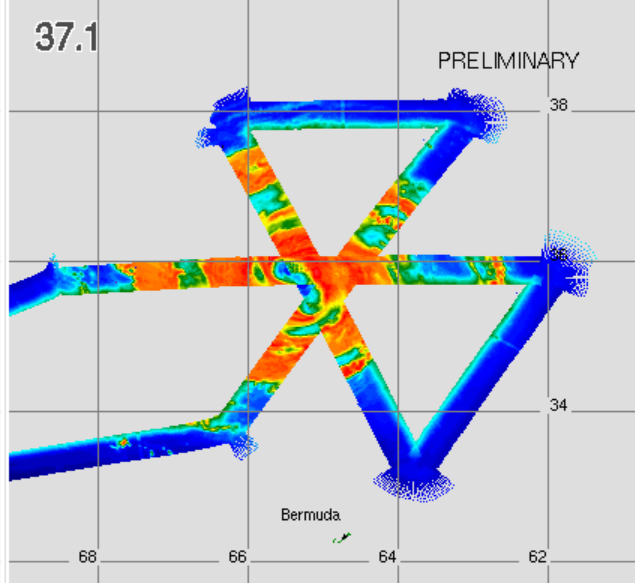
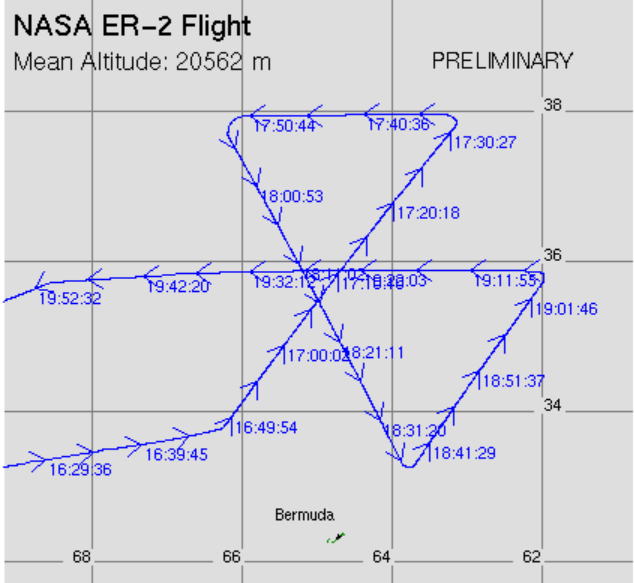
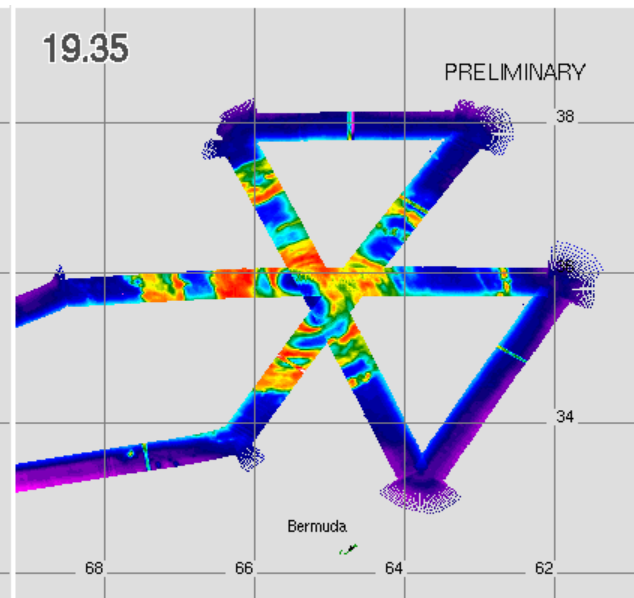
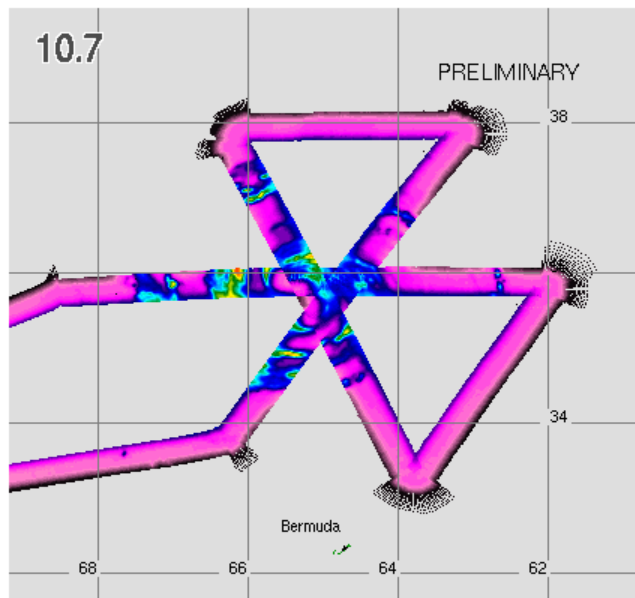
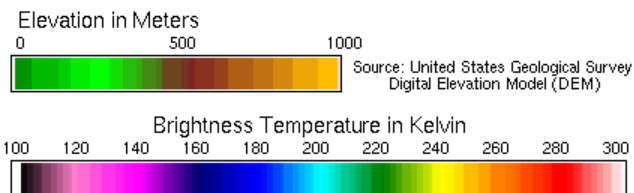
PRELIMINARY

10 Sep 2001 (253) 16:07:47-20:14:09 UTC

Frequencies in GHz
 Cross-Track Scan (L-to-R in direction of motion)
 $V[\cos^2(\theta+45^\circ)] + H[\sin^2(\theta+45^\circ)] = 1$

Grid Center: 35.50°N x 65.00°W
 Grid Resolution: 2.22 km
 NASA/NSSTC/GHCC
 Some data may have been interpolated

HURRICANE ERIN

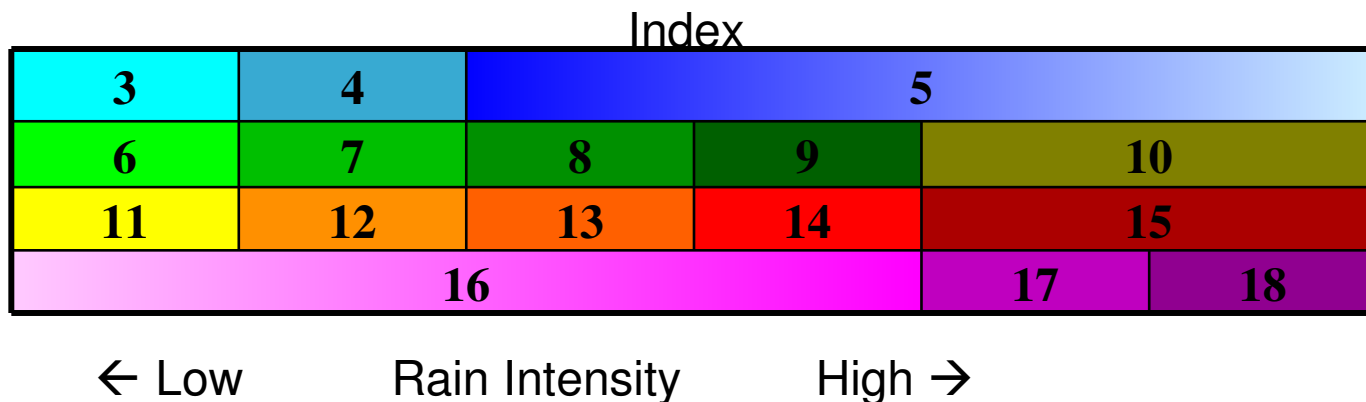
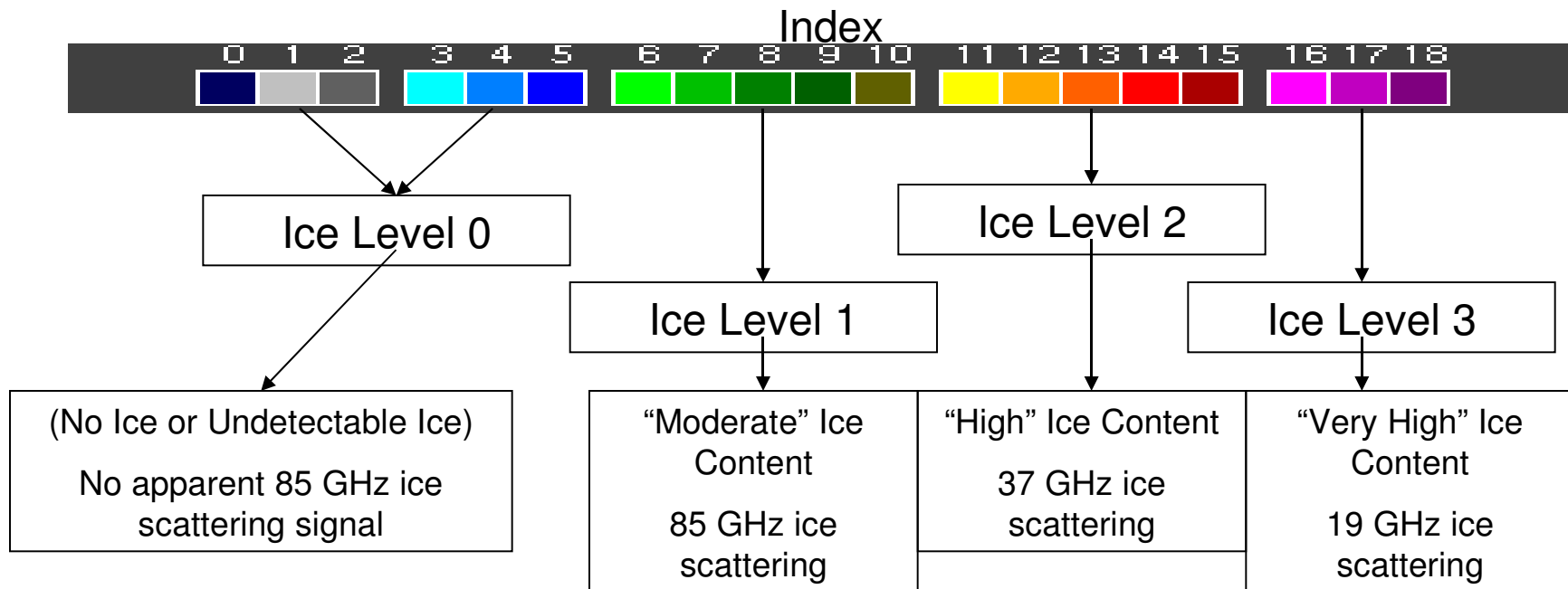


AMPR Precipitation Index (API)

- Developed with AMPR TBs and EDOP reflectivity data from CAMEX-3 and CAMEX-4
- Qualitative measure of precipitation-sized rain and ice content
- 6 rain levels and 4 ice levels, 18 total indices
- LIP data used to correlate electric fields to API

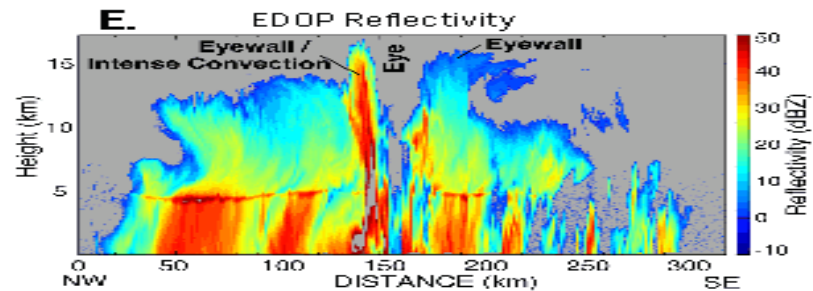
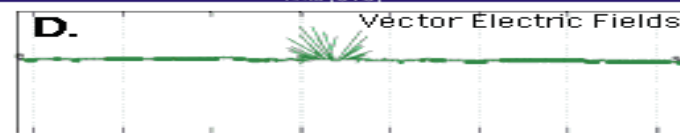
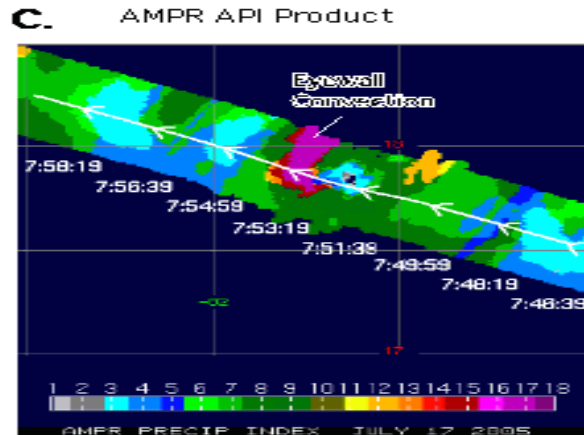
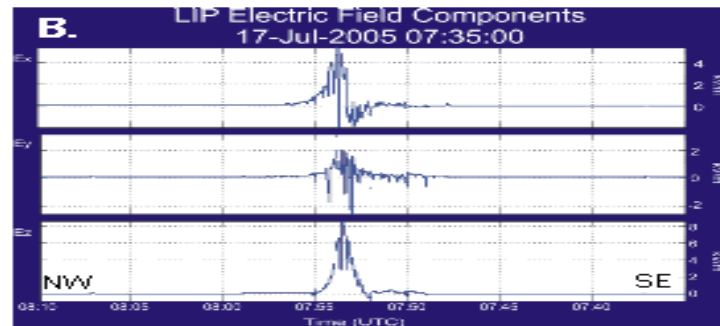
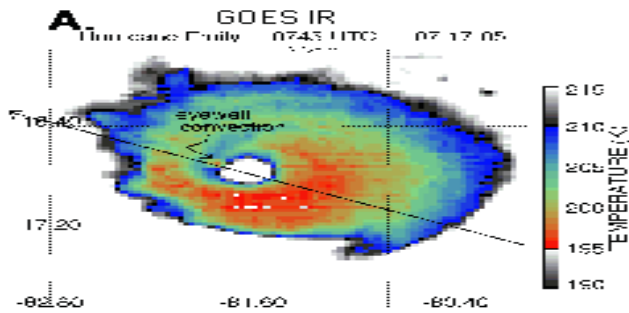
AMPR Precipitation Index (API)

Diagrams of the API and basic physical properties.

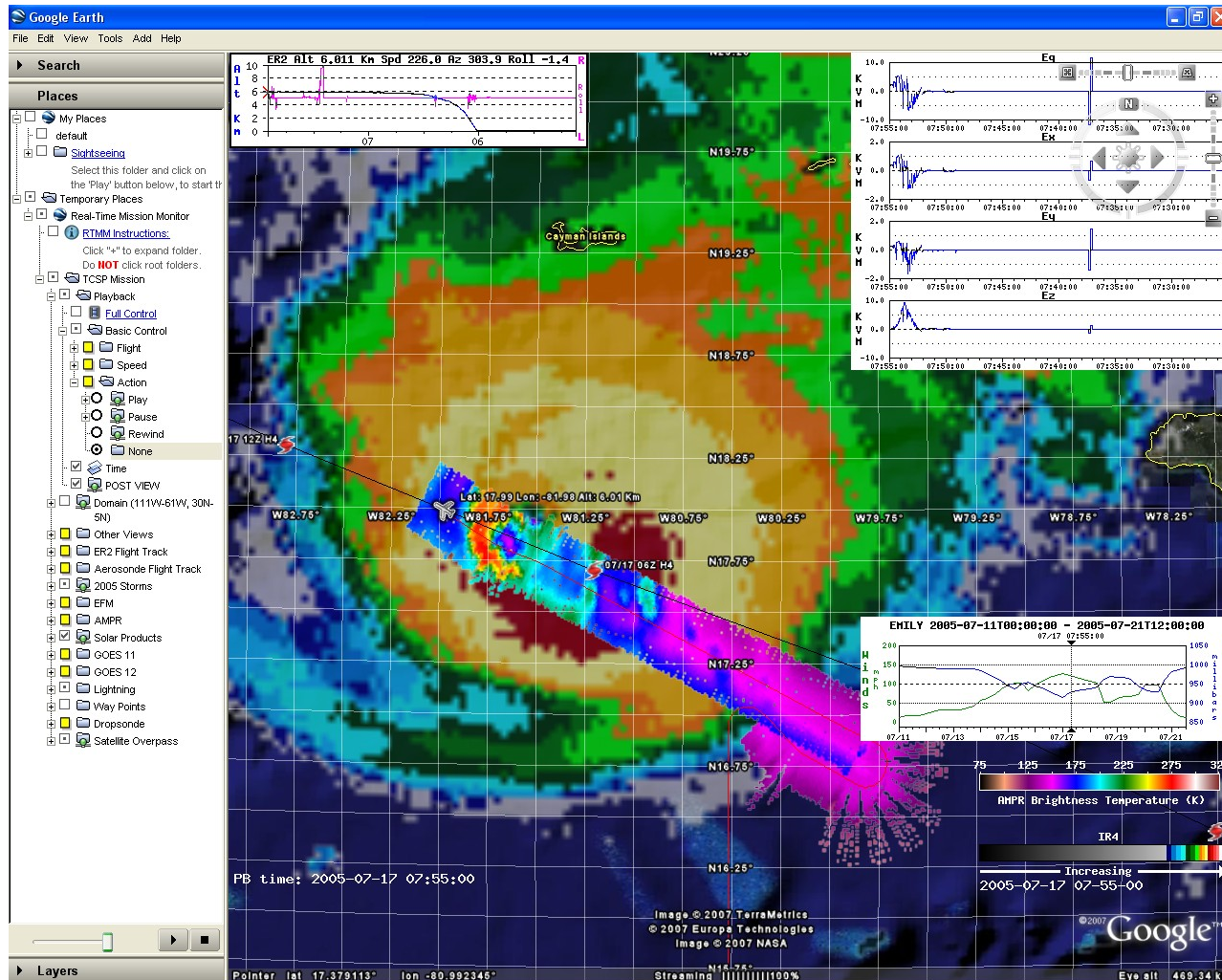


Example of API

An example of API with LIP electric fields and EDOP reflectivities for the first of two ER-2 overpasses of Hurricane Emily on 17 Jul 2005 during TCSP experiment (*accepted by BAMS*).



Real Time Mission Monitor (RTMM) Playback of AMPR Observations during Tropical Cloud System and Processes Experiment (2005)

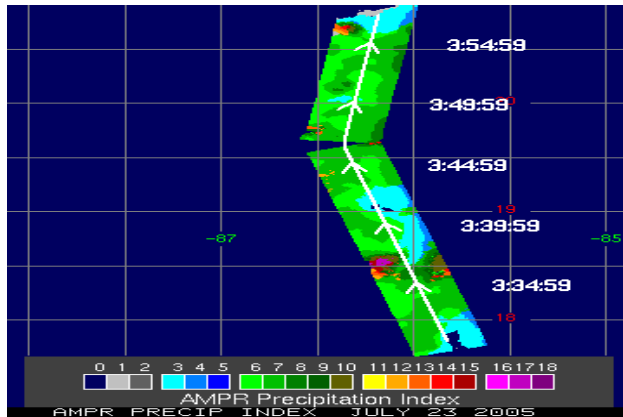


AMPR Products

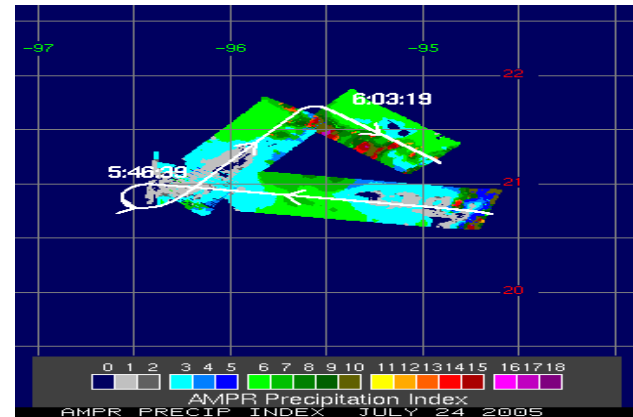
- **Quick-looks of 4 frequencies of calibrated brightness temperatures in raster format**
- **Real-time display of calibrated temperatures in RTMM (possible)**
- **Archived brightness temperature and API data**
- **Archived browse images of calibrated brightness temperatures and API in both raster and geo-located formats**

API samples from TSCP Flights

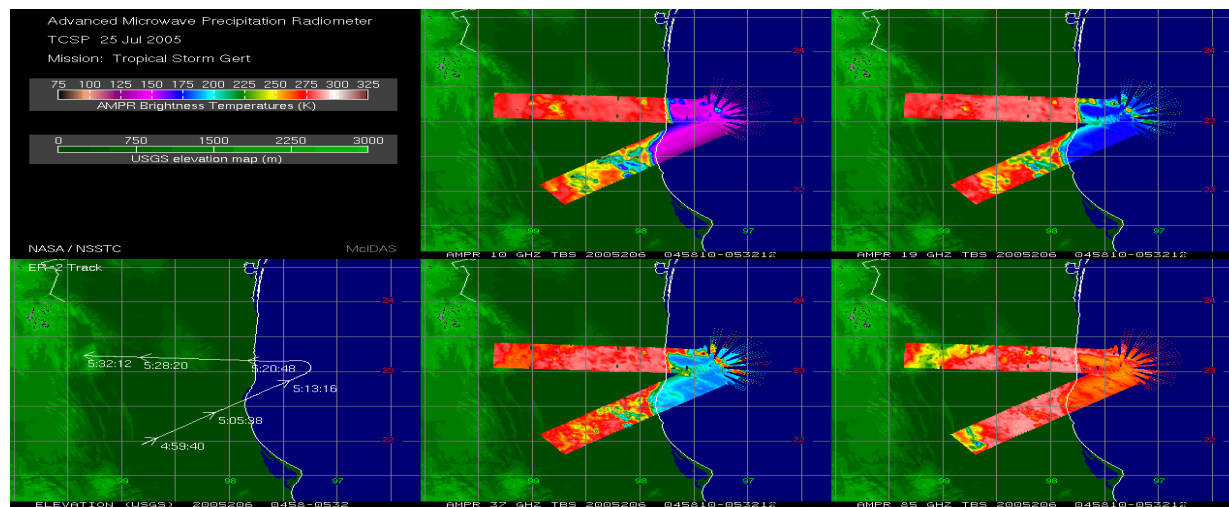
TD 7 (Gert), 23 July



TS Gert, 24 July

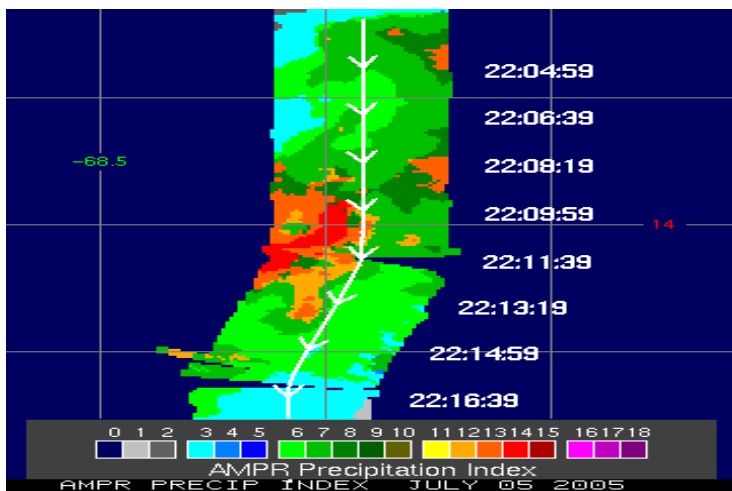


AMPR TB's of Post-Landfall TS Gert, 25 July

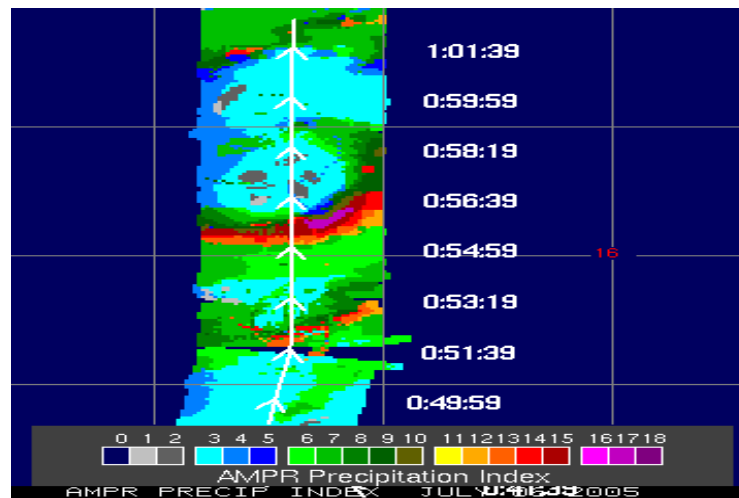


API samples from TSCP Flights

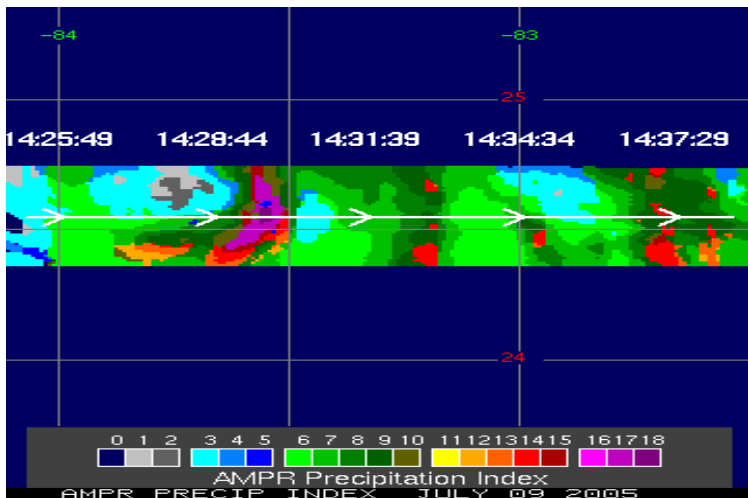
TD 4 (Dennis), 05 July



TS Dennis, 06 July



Hurricane Dennis, 06 July



Hurricane Emily, 17 July

