A Fundamental Climate Data Record of SSM/I, SSMIS and Future Microwave Imagers

Quality Control Procedures

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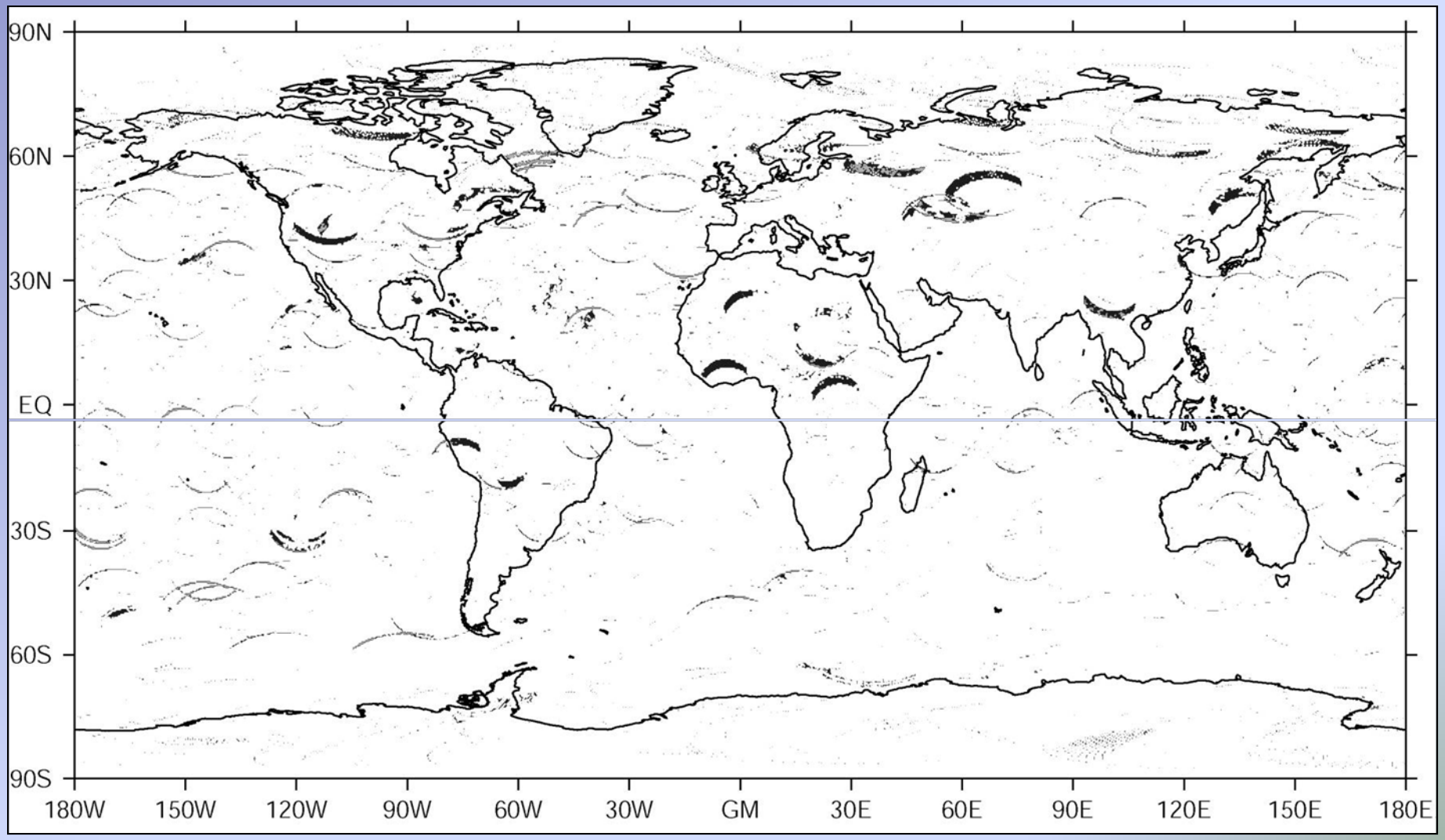
Objectives

1. Eliminate bad data (i.e. mislocated scans)
   - Eliminate duplicate/invalid scans
   - Set erroneous data to missing (e.g. TB = 400K)
2. Provide users information on potential data issues
3. Minimize the amount of data eliminated by QC routines
4. Monitor sensor health
   - Identify sensor issues that may affect CDRs (e.g. F15 RADCAL).
   - Help to identify and target calibration issues affecting specific sensors/channels.

Pixels Removed by Vila et al. 2010 QQ

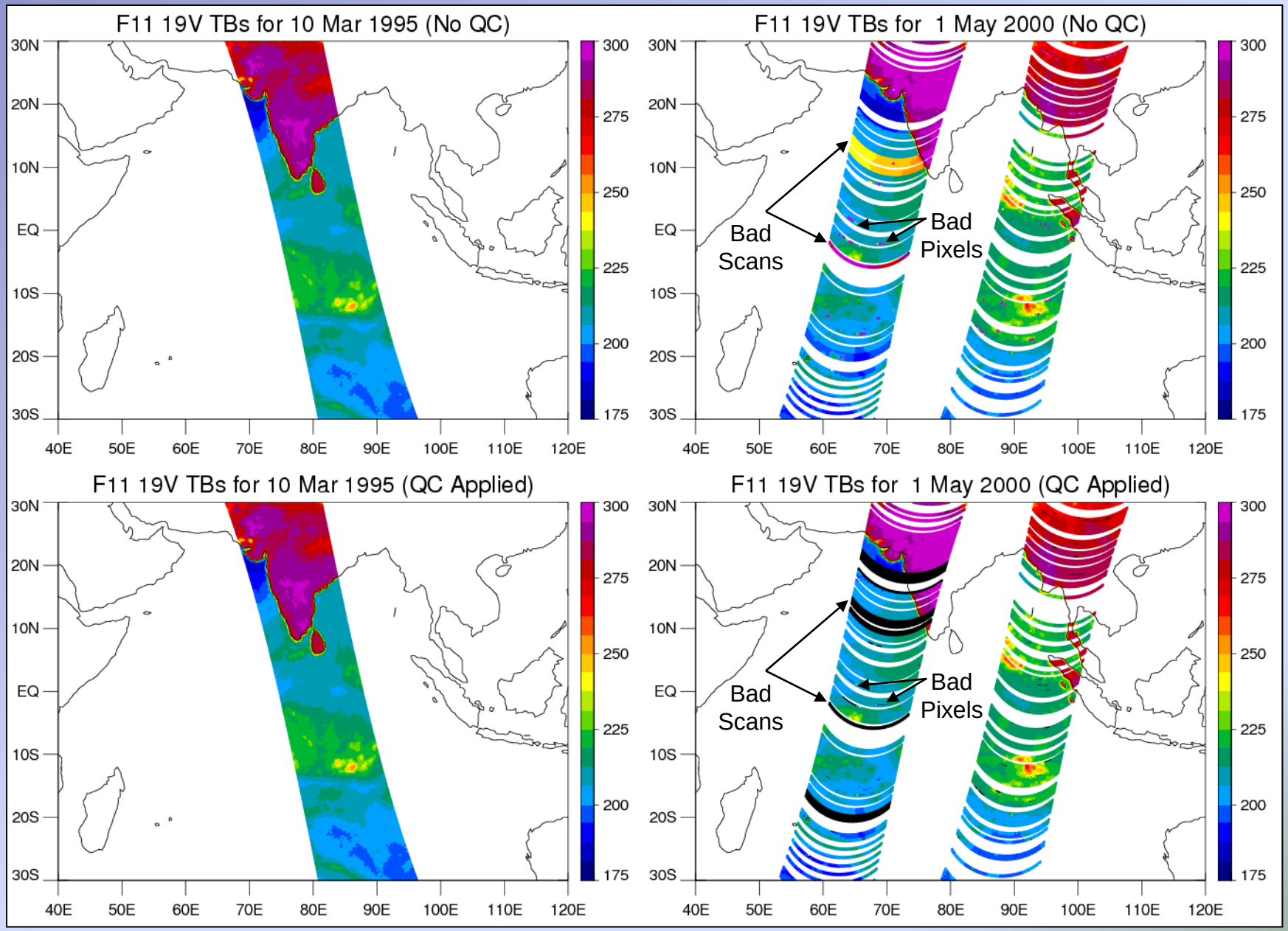
(F13, August 2005)



Current QC Checks

- Pixel Tests
  - Check that distance between pixels is within expected range
  - Check for nonphysical TAs (< 50K or > 325K)
  - Check for nonphysical lat/lon values
- Scan Tests
  - Test that lat/lon differences between adjacent scans is within expected range
  - Test that difference from one scan to next does not significantly exceed climatology

Identifying and Eliminating Bad Pixels/Scans

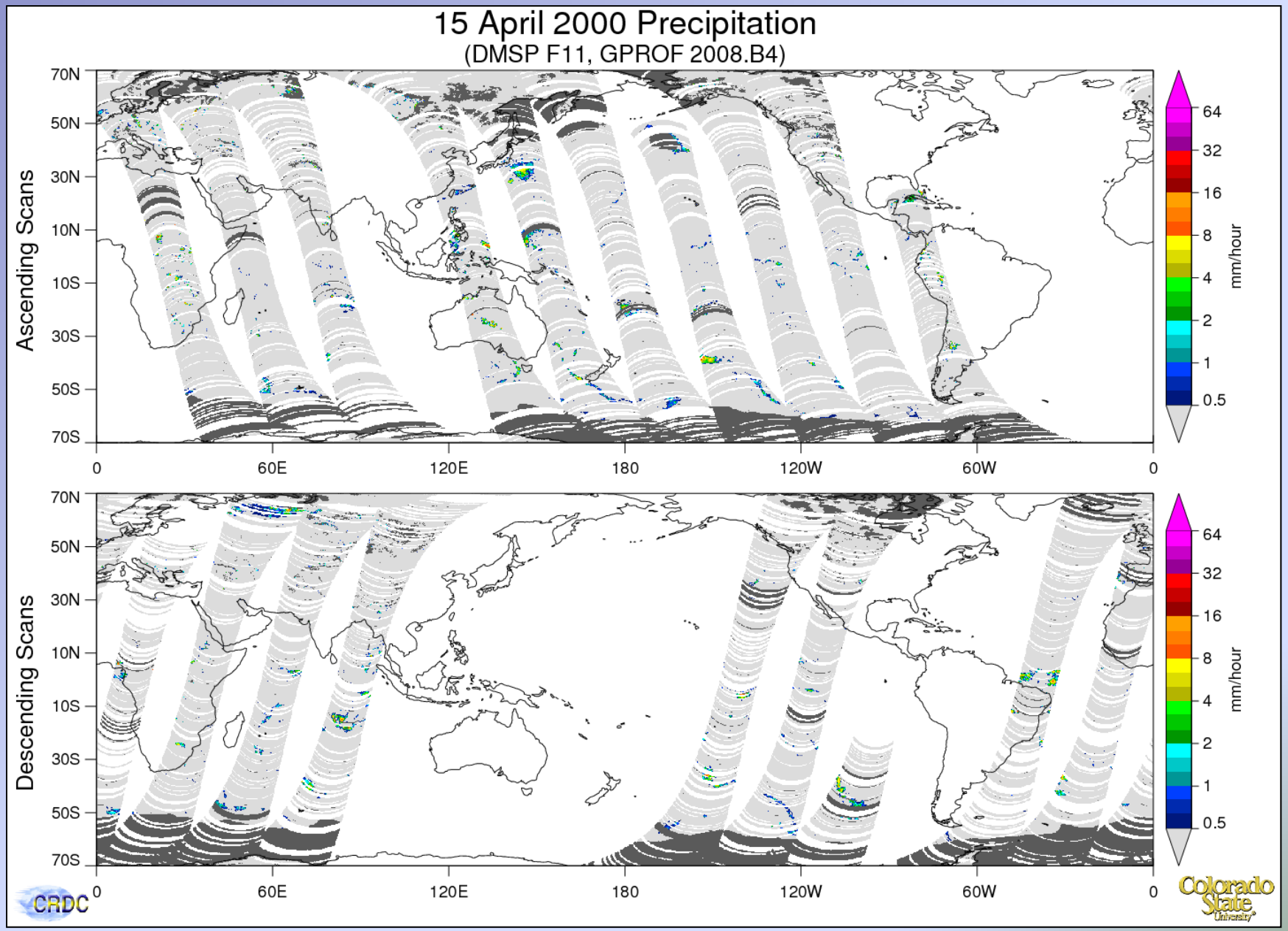


Data Quality Flag

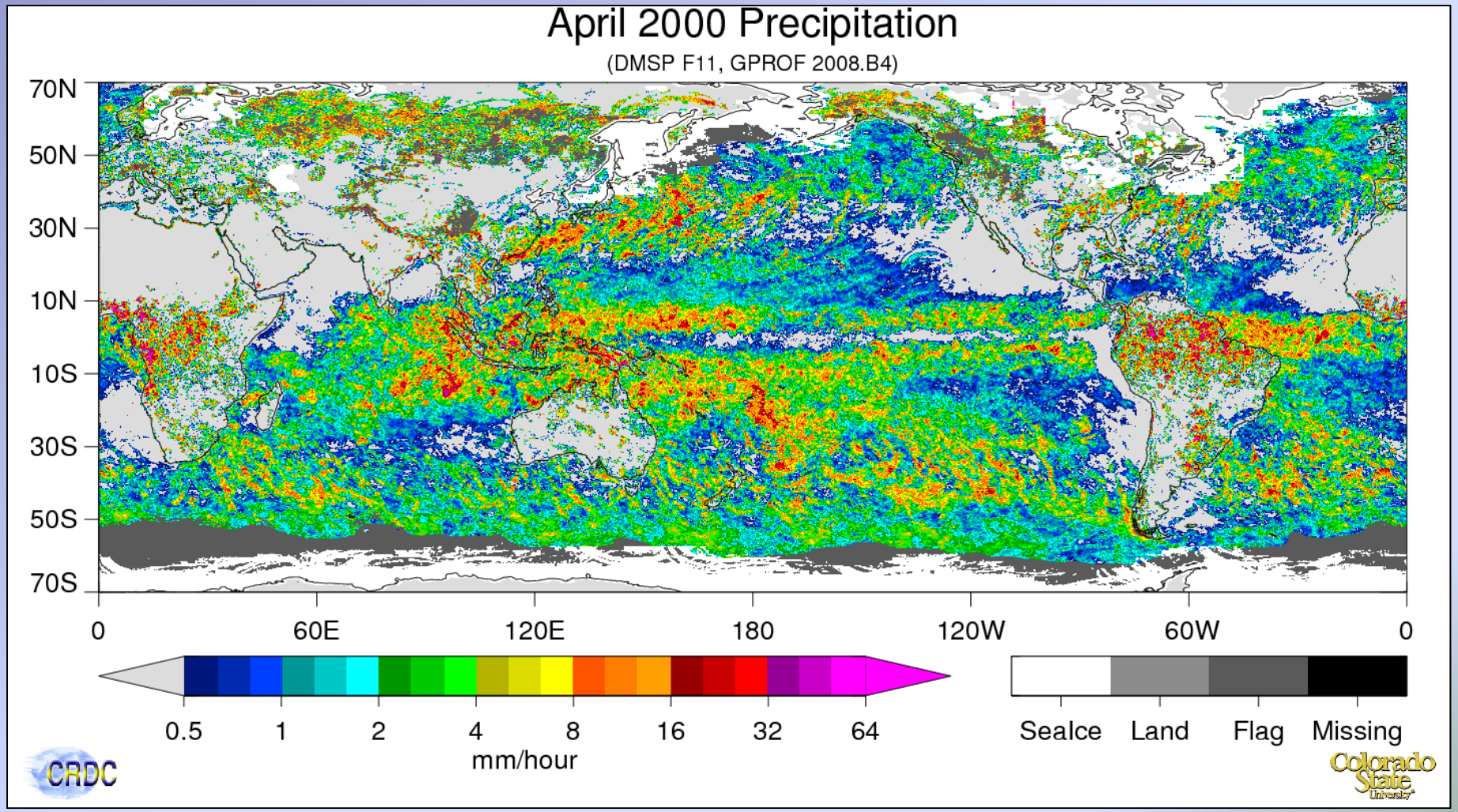
Single byte value for each pixel (0-255)

1. Good Data (QualityFlag = 0)
2. Minor Issue (0 < QualityFlag < 100)
   - Application dependent (user must decide)
   - Example: Sun glint possible
3. Major Issue (QualityFlag >= 100)
   - Affected channel(s) set to missing
   - Example: 85V channel bad on F08

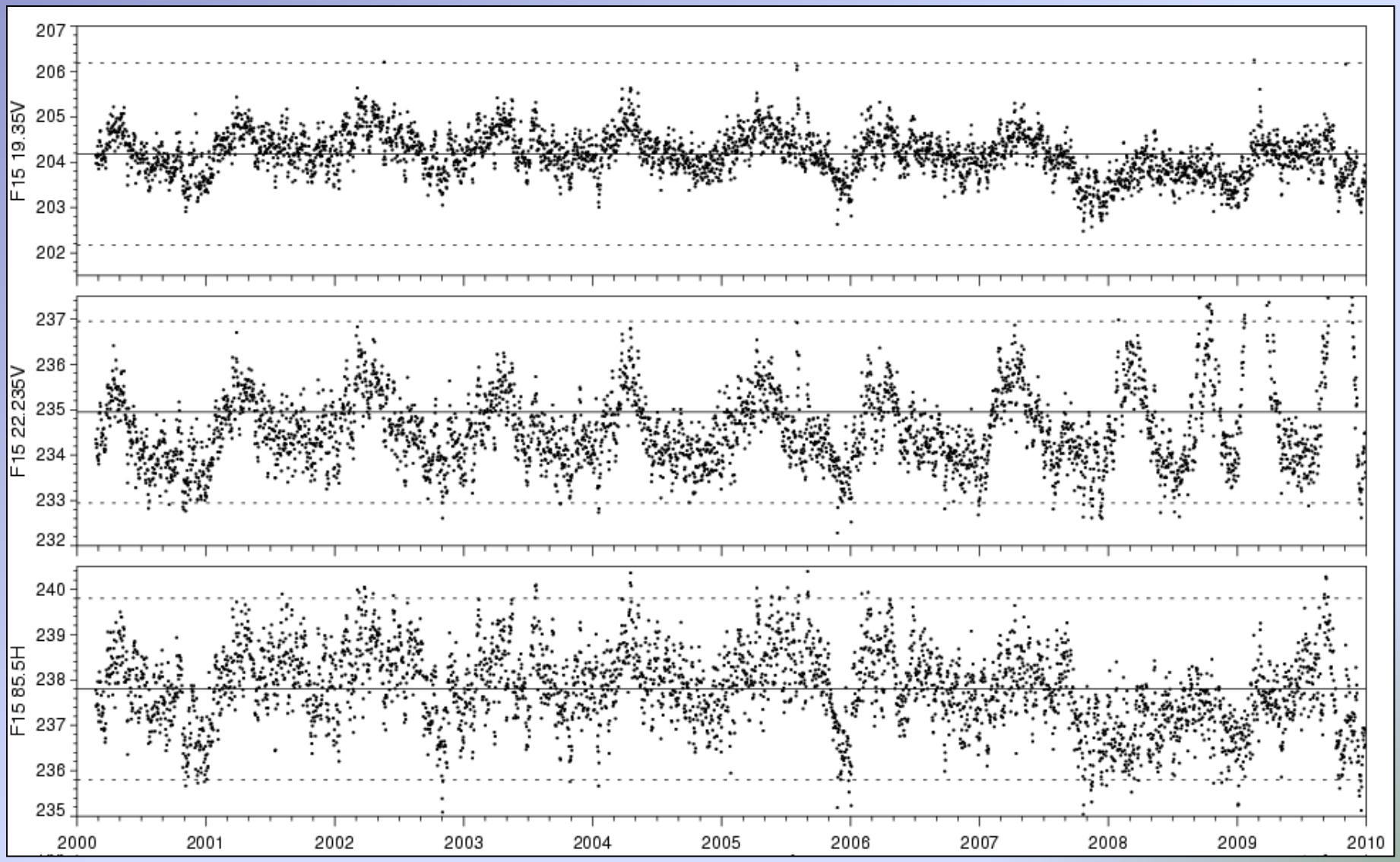
F11 SSM/I Precip (15 April 2000)



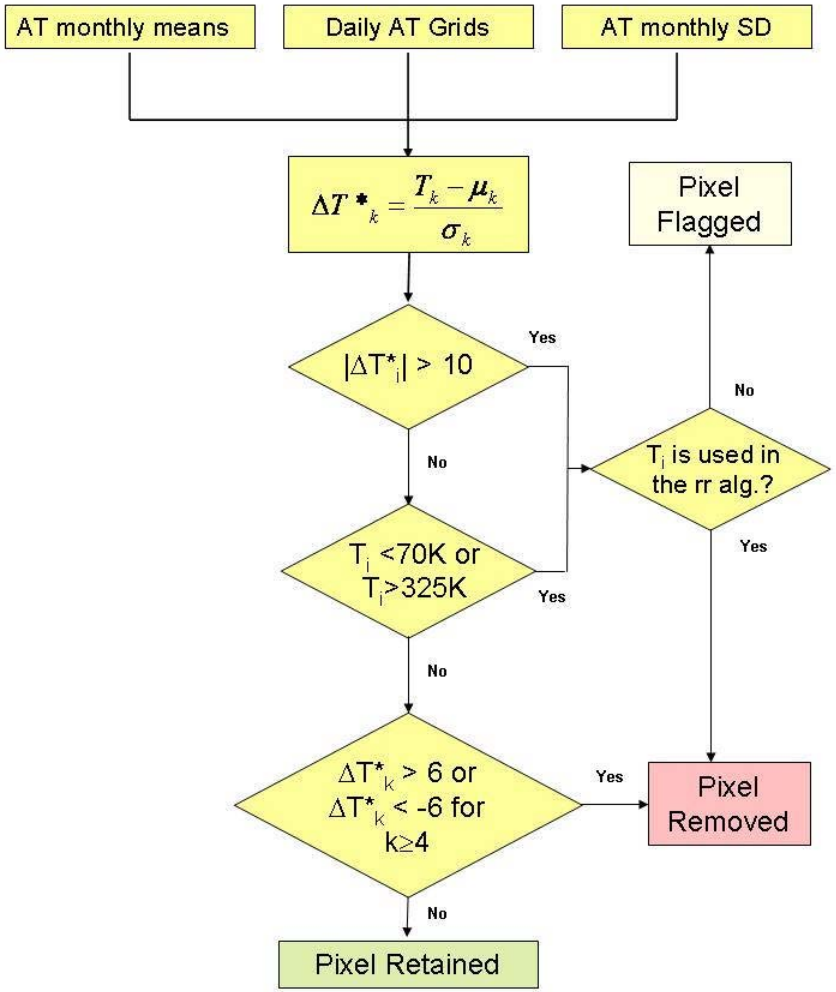
F11 SSM/I Precip (April 2000)



Monitoring F15 TBs

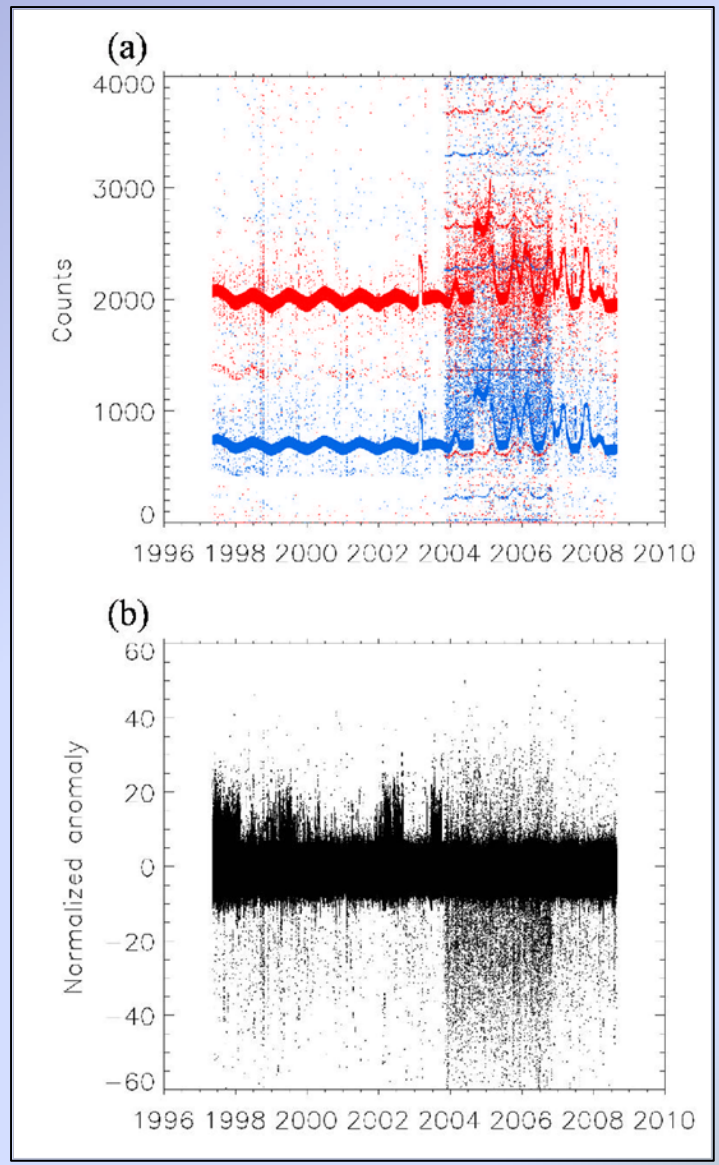


Vila et al. 2010



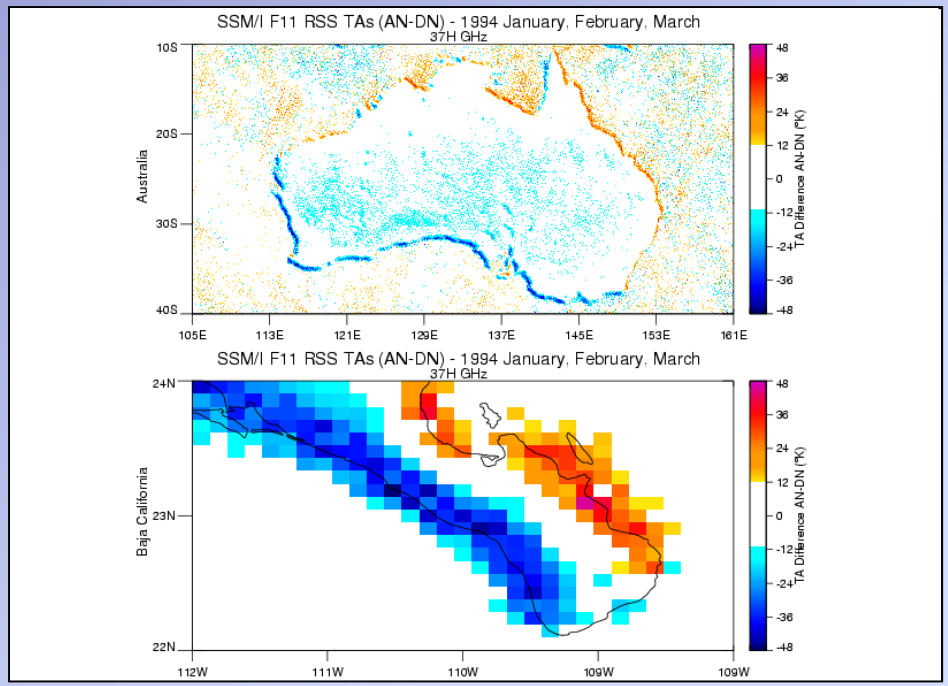
Uses a comparison with climatological values to identify bad pixels/scans.

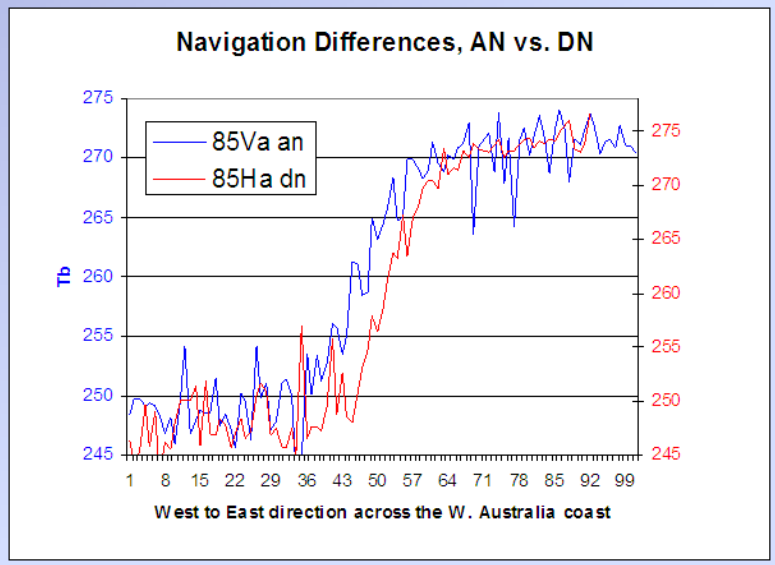
Semunegus et al. 2010

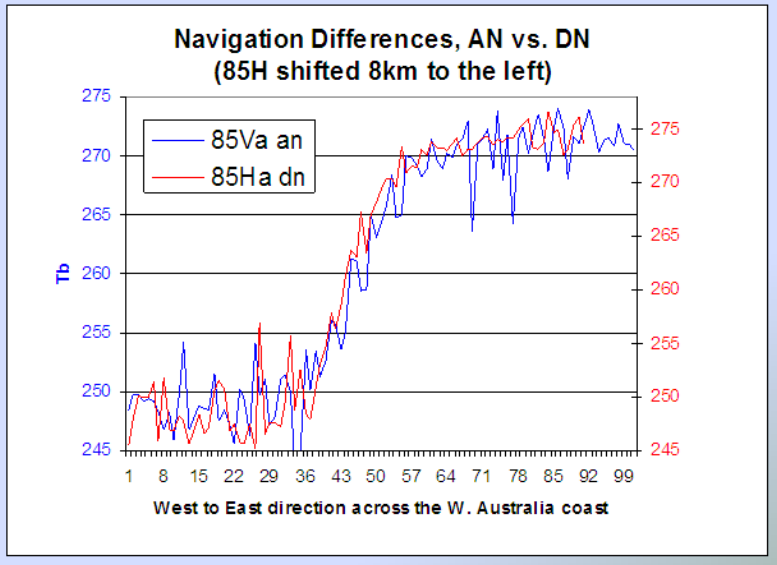


Plots of a) cold (blue) and warm (red) load counts and b) normalized anomalies of TAs versus climatology for 37H channel on F14 showing issues starting in late 2003.

SSM/I Geolocation Errors







Future Work

- Revisit current procedures
- Review and incorporate QC ideas from other groups
- Investigate time-dependent errors in geolocation
- Use analysis of geolocation errors to develop/improve lat/lon QC checks
- Investigate the impact of broadcast interference