Preparations for NOAA-N

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With contributions from numerous colleagues

Spacecraft

- Present launch date near 15 Sep 2004
- Delta-2 launch vehicle
- No Apogee Kick Motor
- Hydrazine Propulsion System replaced by Gaseous Nitrogen System
- 3 solid state recorders (1 for NOAA17)
- More precise orbit than KLM

INSTRUMENTS

- AVHRR-3 – no change
- HIRS-4 –
  - 10km fov from 19 km for HIRS-3
  - BB has another PRT (5th in the middle to better characterize the temperature gradient, esp since the smaller fov sees the center more than the edges)
  - New temperature sensor near field stop

INSTRUMENTS, cont.

- AMSU-A – no change
- MHS – new instrument,
  - 150-> 157, 183.31+-7=> 190.31
  - Some polarization changes (all v => v v h h v)
  - Much different internal design, much more redundancy than AMSU-B, (processor & interface electronics) PIE A/B (INCLUDING redundant BB PRTs (5@)
- SBUV/2 no change

Contacts

- HIRS/AVHRR-IR - Changyong Cao
- HIRS/AVHRR-VIS Fred Wu, Jerry Sullivan
- AMSU - Tsan Mo
- MHS -
- 1B Processing – Cecil Paris, Emily Harrod,
  - Dave Morel
- Documentation - Kathy Kidwell
- IJPS Manager - Chris Crosiar
- Direct Readout - Darryl Robertson
- Generic – Tom Kleespies

PROCESSING CHANGES

- Will restrict discussion to processing through level 1b

- Reale will discuss level 2/3 (sounding) processing

PROCESSING CHANGES

- AVHRR-3- (Fred Wu, Jerry Sullivan)
  - Visible: ITT provides count to radiance conversions. NOAA does count to albedo.
  - Unfortunately the exact method lost with N. Rao. Wu&Sullivan have extended the method and produced very similar results. This is now well documented. Will be published soon.
  - Infrared: Nonlinear term is now treated with more precision…. Scaling factor change !!!!! From 6 to 7 decimal places
  - No lunar intrusion treatment planned at this time…. Good possibility post-launch

Processing Changes, Cont

- HIRS-4 - Changyong Cao
- NO change due to fov change
- 5 PRT's are now used to average bb temp.
- Potential new algorithm to handle 24 hour average of slope. See paper by Cao and Pubu Ciren. Not clear if this will be in place for launch (resource limited)
- If this new cal algorithm goes in, so will new lunar intrusion algorithm. (Kigawa, JMA method, ephemeris based). Interpolate between clean space looks.
- PRT temperature will go to a 5^{th} order polynomial (ITT recommend, not new idea but just being implemented for N, effect small but is more correct).
- No change to visible processing

Processing Changes, continued

- AMSU-A –
  - LUNAR INTRUSION (Planned) (Kigawa, Mo) - calculate bulk temp of moon compare with space look. Works well offline, to within 1-2 counts out of 60-80 errors, accurate to 0.06K)
  - 1B header and data record modified to document lunar correction

- MHS –
  - LUNAR INTRUSION (planned) Find one or two coldest space look(s)

  - BB temp calculated using PRTs AND 3 precision resistors (calibration channels) to handle nonlinear term.

- SBUV/2 – (Flynn) - No change to processing

1b Format Changes

- Plan is that all 1b header #1 will have identical preamble format (first xx bytes the same content).
- HIRS 1b header will have some words offset.
- The 1b multiple header record option may be implemented on all instruments. These will contain ancillary dataset names and any metadata needed for reprocessing.
- With exception of MHS, all data record changes are supposed to be transparent to the user who does not need to make use of enhanced features such as lunar intrusion. Some formerly spare bytes are now being used.
  - ALSO same changes to KLM 1b format changes may be made TBD before NOAA-N launch.

1b FORMATS

Where to get…---- Cecil Paris

- ftp://metroweb.nesdis.noaa.gov/pub/noaa-n
  - A directory for each instrument contains:
    - 1b format
    - 1b format difference from KLM
    - Sample NOAA-N 1b **simulated from NOAA-16**

Documentation Changes

- NOAA-KLM User's Guide will be amended to reflect NOAA-N specifics.
- A separate NOAA-N supplement page will have links to pertinent sections of above.
- Kathy Kidwell is still editor

DIRECT READOUT

- Different formats documented in user's guide

- Darrell.Robertson@noaa.gov

Processing Environment

- Switch from Amdahl mainframe to

  IBM-AIX-RS/6000

  – Native Text from EBCDIC to ASCII
  – Native MVS Real to IEEE floats

- Result is 1b scaled integers being fed by higher base precision floating point

NOAA-17 On-orbit Verification (To be Repeated for NOAA-N)

- Background and intro
- Participants
- Some interesting results

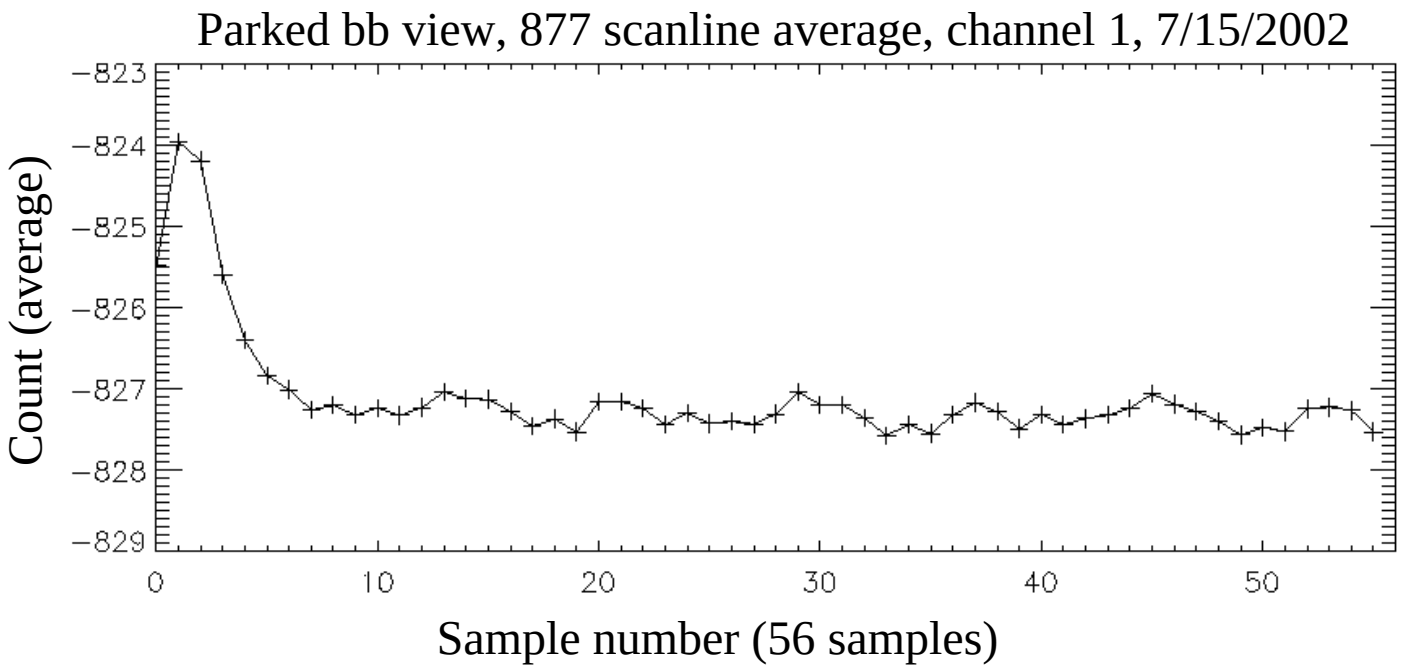
N-17 On-Orbit Testing by ORA, NOAA/NESDIS

- NASA OV focus on engineering and meeting spec
- NOAA OV intent is to characterize *scientific* performance and test compliance with user's *scientific* requirements
- Supplements NASA's OV in area of payload radiometry and geolocation
  - **For AVHRR, AMSUs, HIRS, and SBUV/2 only**
- Test planning and data analysis coordinated with NASA
- NOAA test procedures documented separately in OV plan
  - When interesting issues surfaced, we followed the trail wherever it led.

Participants

Mike Weinreb Jerry Sullivan C. Cao Tom Kleespies Tsan Mo Larry Flynn

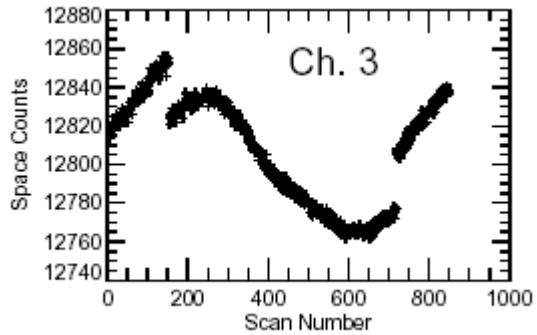
Example of unresolved anomaly. Second Sample Bias - C. Cao

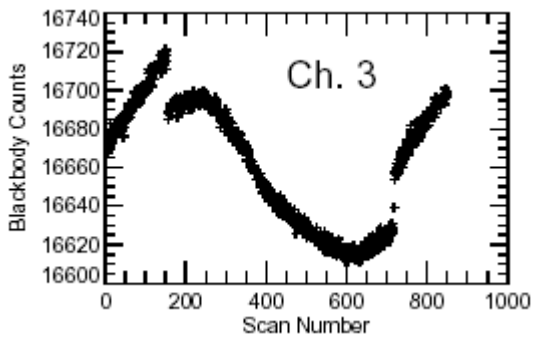


- 3 counts higher for channel 1 (~3K),
- ~1 count for most other longwave channels
- Regardless of space, bb, or earth view
- Cause is unknown

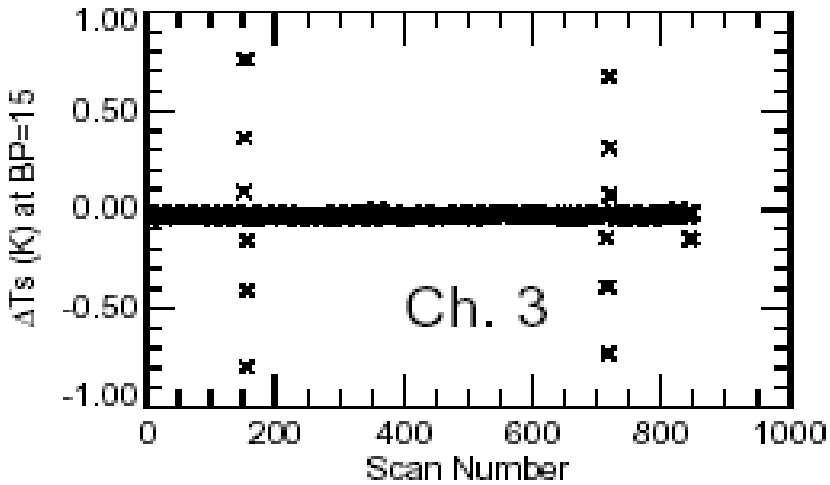
NOAA-17 Ch. 3 Anomaly – T. Mo

NSS.AMAX.NM.D02196.S0306.E0459.B0028991.GC





Predicted) T_s across gap: ±0.8K

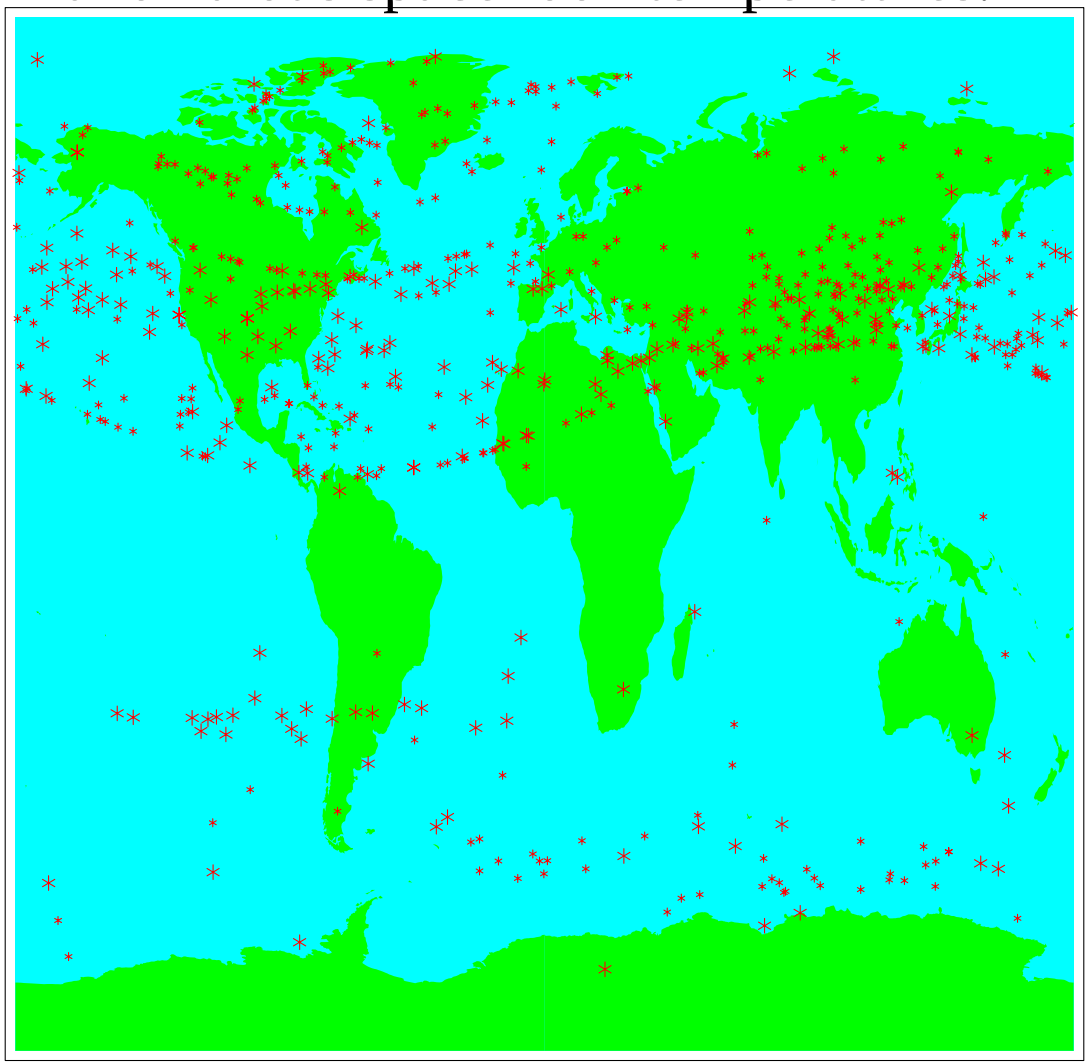


) T_s=uncorrected - corrected

- **Corrective algorithm implemented (problem disappeared in Aug 2002)**

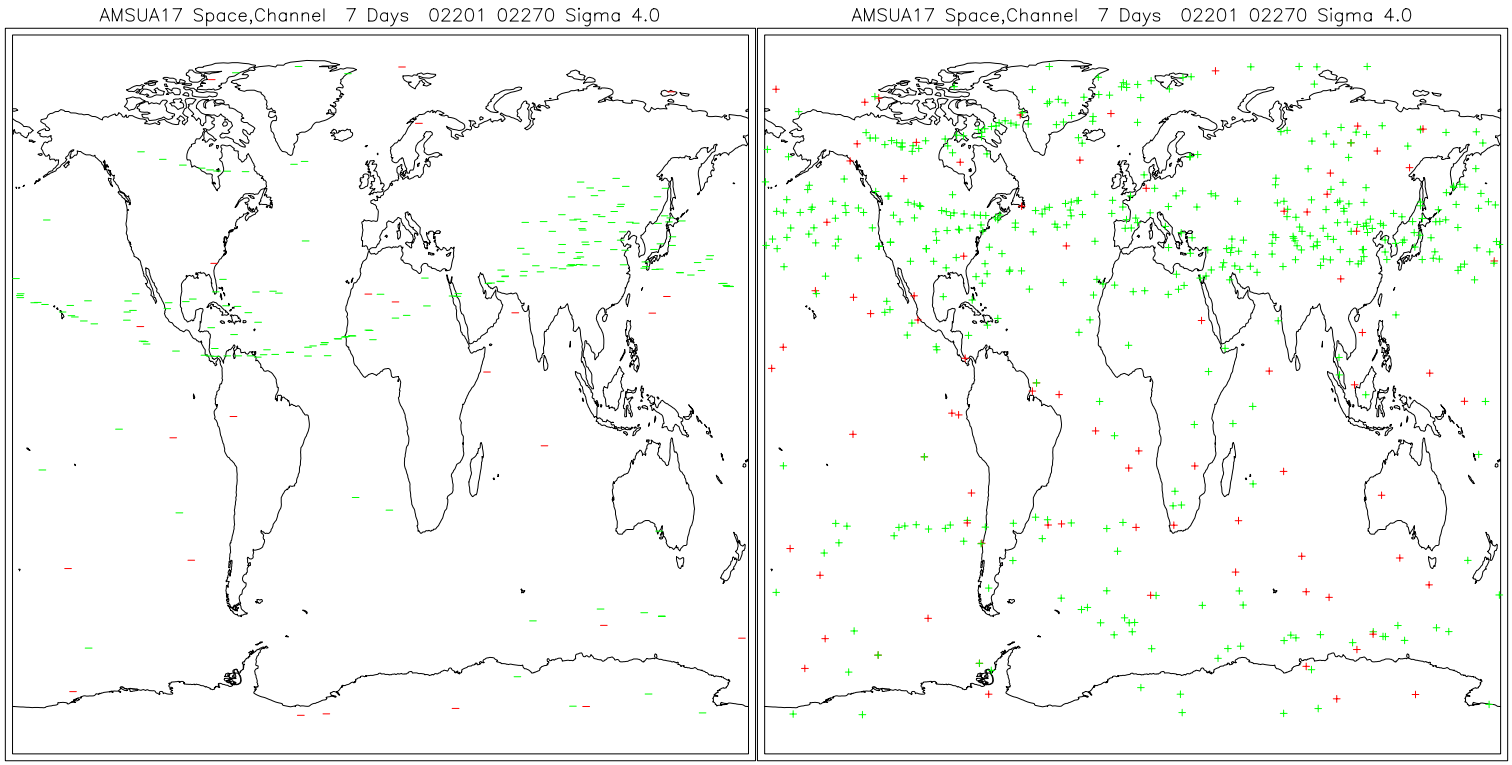
NOAA-17 AMSU-A channel 5

anomalous space look temperatures.



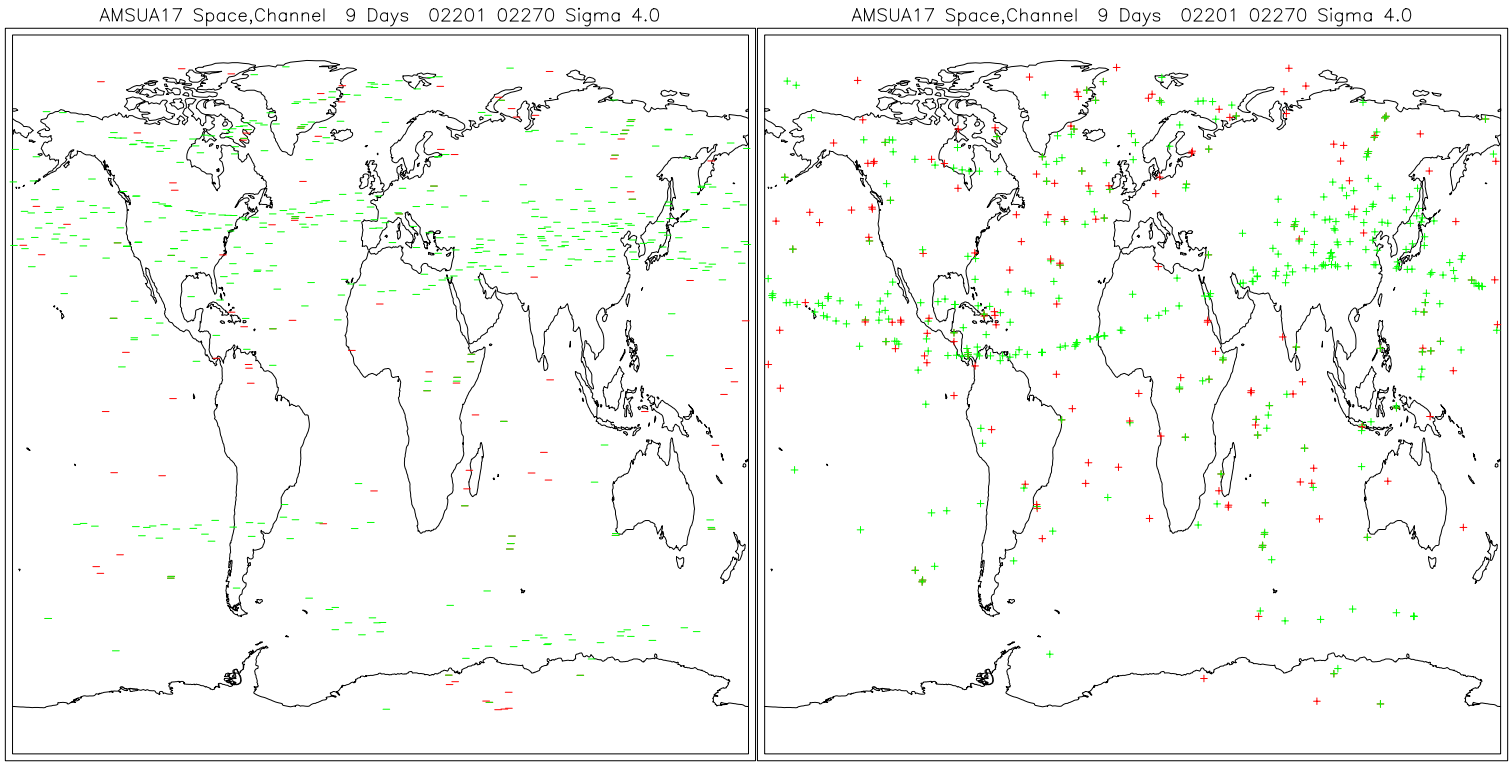
AMSUA-17 Space Antenna Temperatures > 4σ of orbital mean Ch 7

Left, negative departure, right positive departure



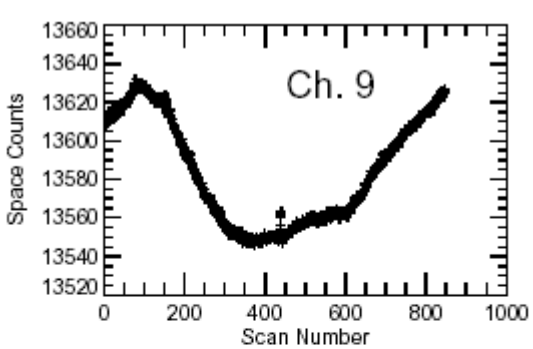
AMSUA-17 Space Antenna Temperatures > 4σ of orbital mean Ch 9

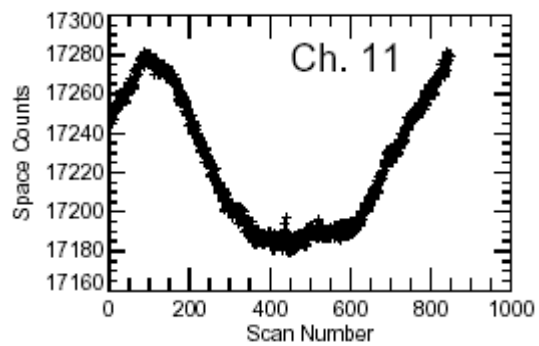
Left, negative departure, right positive departure

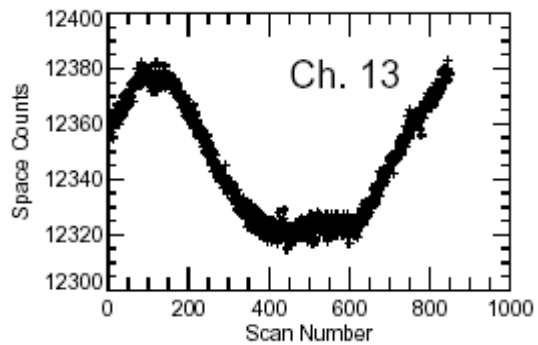


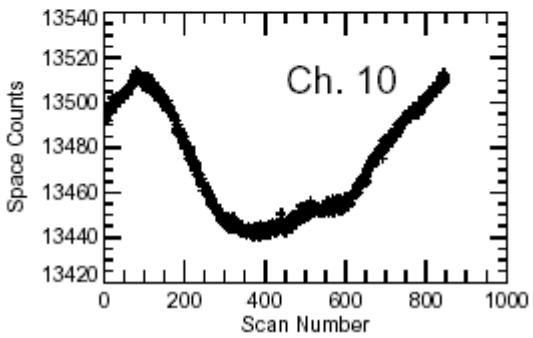
NOAA-17 Ch. 9-14 Anomaly

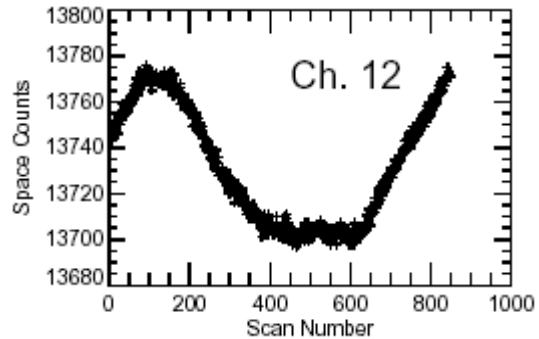
NSS.AMAX.NM.D02196.S0306.E0459.B0028991.GC

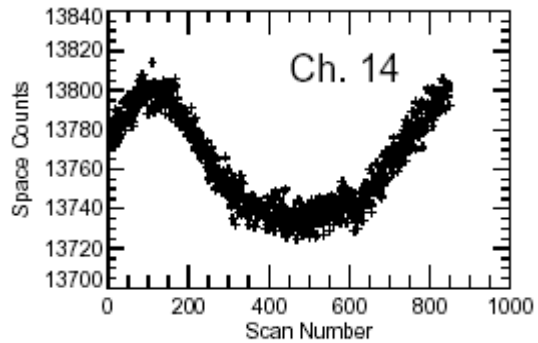












POES Equator Times