CloudSat Spacecraft Status

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CloudSat Spacecraft Status

- Reaction Wheels
  - Effective workarounds have been implemented for the recent reaction-wheel-related anomalies (Wheel 1 failed in June 2017, Wheel 4 relay began displaying intermittent on/off response in Dec 2017).
    - RW #1 is off
    - RW #4 now remains continuously on in DO-Op and maneuvers during the eclipse period at low current load
  - Wheel friction measurements show no indication of abnormal wear.
  - Historical flight data indicates that if wheels exceed 2 B revs without anomaly the wheels are likely to last for more than 5 B revs
    - Wheel 3 will reach 5B revs in ~2022.
- Battery
  - A charge management technique was implemented that reduces stress and maintains sufficient capacity in the battery's weak cell. This technique resulted in increasing the battery capacity from the post-2011 condition.
  - The battery is reliably supporting the addition of RW#4 relay load in umbra, with sufficient voltage margin. Minimum voltages are very stable.

- Redundancy is still available for most spacecraft components.

CloudSat Operations

- Spacecraft pointing on 3 wheels is better than the CloudSat requirements
- CloudSat can safely operate in an orbit consistent with CALIPSO requirements
  - The ability to perform orbit lowering maneuvers without wheels has been demonstrated, providing assurance that the CS disposal orbit can be achieved in the event of an additional reaction-wheel failure.
- CloudSat has demonstrated robust and reliable three wheel formation flying operations.
  - CloudSat's delta-V accuracy on three wheels is consistent with four wheel performance.
  - CloudSat performed two formation-maintenance burns last summer on three wheels.

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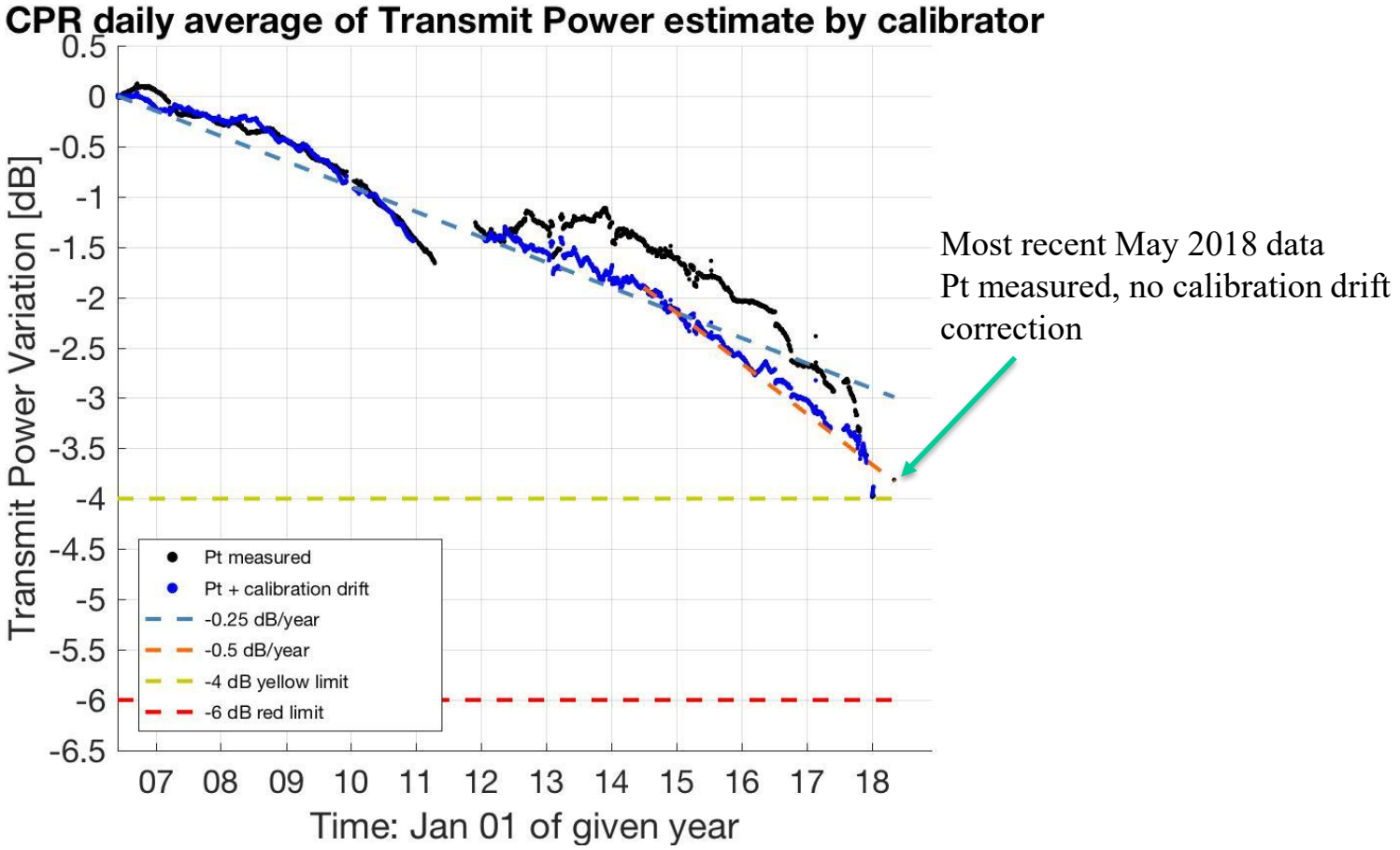
CloudSat CPR transmit power plot (black curve) includes calibration drift.

Calibrated drift correction (blue curve) through early Jan 2018 only.



No future prediction of CPR transmit power trend can be made, but if the −0.5 dB/yr trend continues:

The EIK switchover yellow limit of −26dBZ would be reached in January 2019.

The EIK switchover red limit of −24dBZ would be reached in January 2023.

May 2018 has no data to correct for calibration drift. Only the transmit power measurement is reported.

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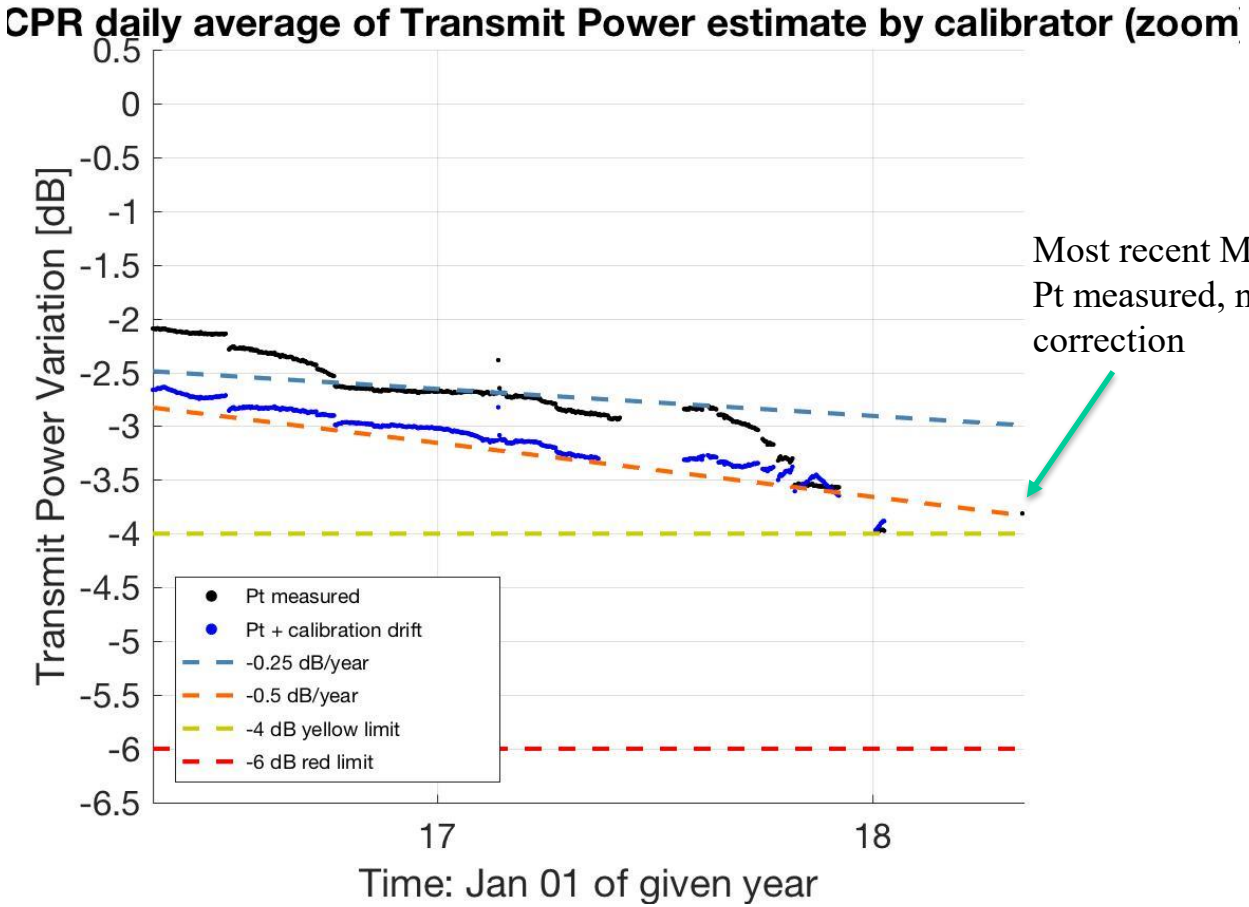
Most recent available transmit power plot zoomed in for the last 2 years.



Most recent May 2018 data
Pt measured, no calibration drift correction