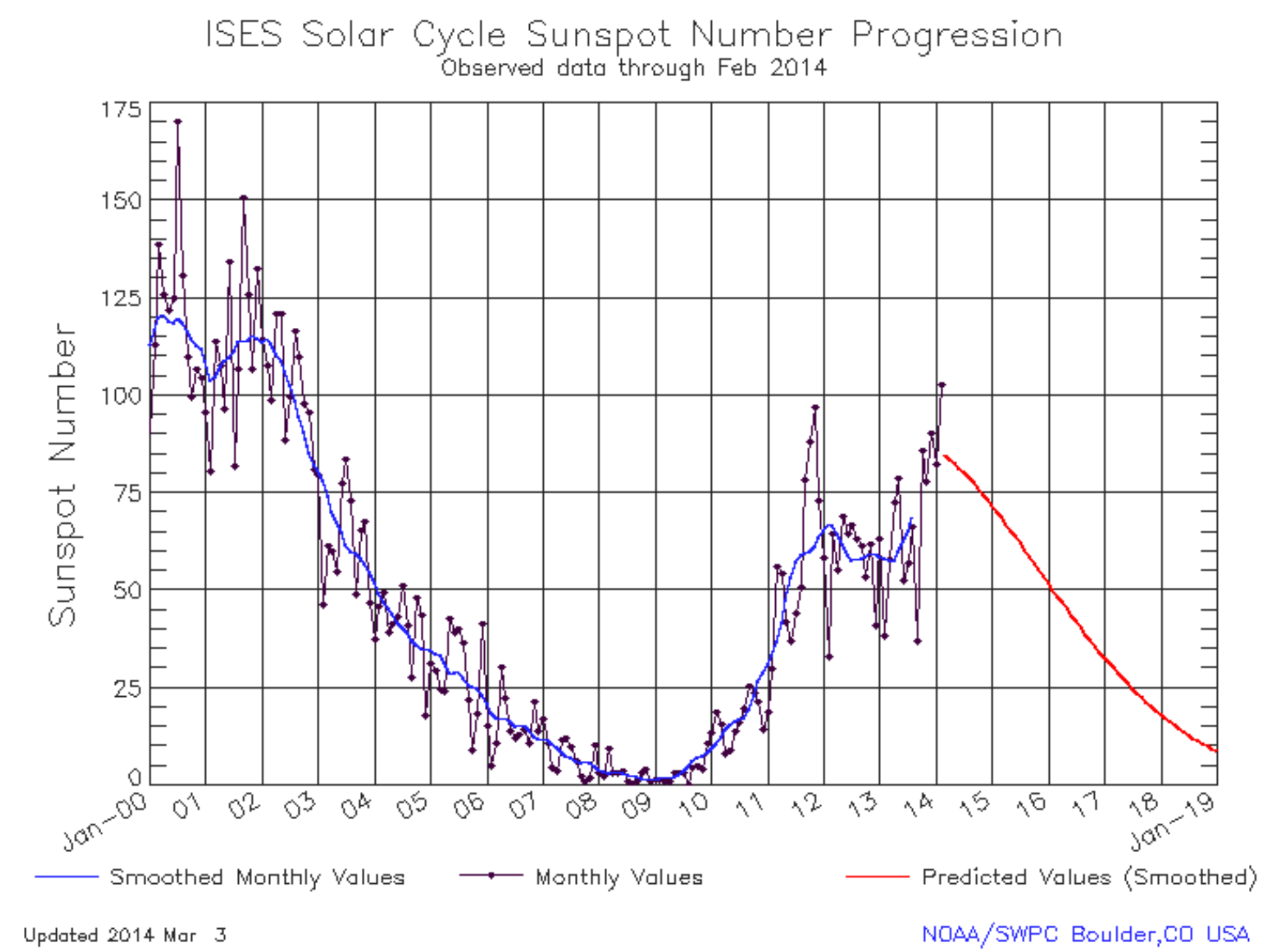
Introduction to Friday's Discussion of:

The Path Forward

The Van Allen Probes

Project Science Team


ISES Solar Cycle Sunspot Number Progression
Observed data through Feb 2014
Sunspot Number
175
150
125
100
75
50
25
0
Jan-00
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
17
18
Jan-19
Smoothed Monthly Values
Monthly Values
Predicted Values (Smoothed)
Updated 2014 Mar 3
NOAA/SWPC Boulder,CO USA

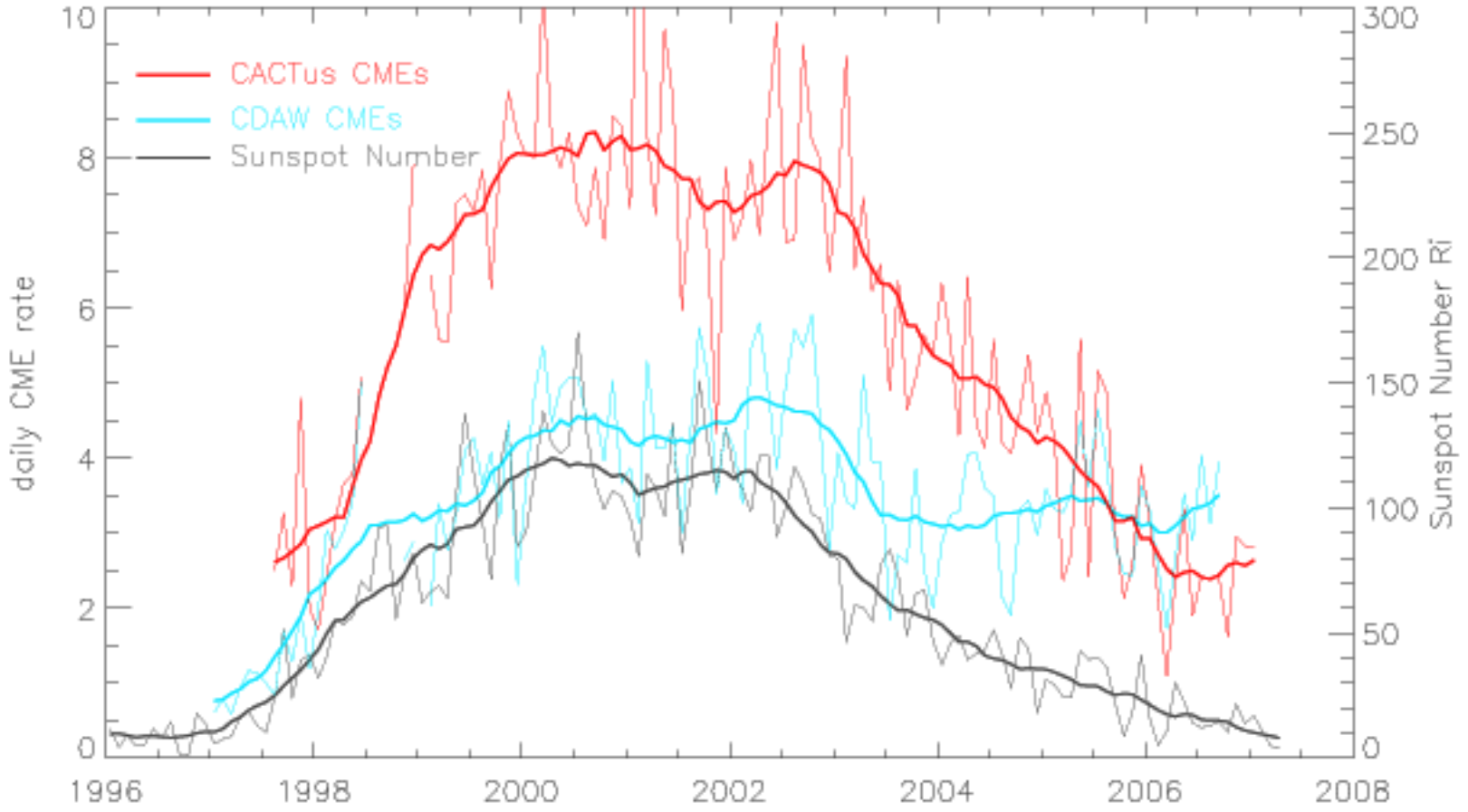


Figure 2: The CME daily occurrence rate detected by the CACTus archive (red) and the CDAW archive (blue) compared with the daily sunspot number (gray) during solar cycle 23. Thin curves: smoothed per month, thick curves: smoothed over 13 months (from Robbrecht *et al.*, 2009).

Restatement: What do we need to continue the Van Allen Probes Mission?

- Have we delivered what we have promised, and if not, how do we get there?
  - Mission design and execution
  - Data products, data fidelity, data availability, and archiving (Where are we?)
  - Level-1 verifiable requirements (Sibeck is working report)
  - Level-1 science objectives (Kessel is working presentation)
- Have we performed and can we document the performance of world-class science?
- Has our overall science output been sufficiently productive?
- Have we engaged the external scientific communities to the needed degree?
  - Have we made the involvement of the community easy?
  - Is the community in fact getting involved?
  - Are external scientists writing science papers using Van Allen Probes data?
  - NOTE: We likely need to repeat and update robust activities at the upcoming GEM meeting and Fall AGU
- What new and important science can we do with new data that we cannot do with existing data?

Some Random Ideas on new science

- Double the total data rate taking a risk of occasional pass losses
  - Get much more burst and high-time-resolution sampling
  - Address not just the existence of non-linear wave interactions but the pervasiveness and importance.
- Advance the orbit evolution (separation of lines of apsides) with a little bit of fuel.
  - Focus more on the radial propagation and evolution of phenomena.
  - This could be is particularly important for the injections in the inner magnetosphere and in the kind of shock propagation to be reported by Foster at our SWG.
- Coordinate with MMS
  - Will launch near 1 March 2015 with 12 RE apogee, will start science phase about 1 July 2015 at about 1700 LT and will precess to local noon in the Sept. 2015 time frame.
  - Best guess: When MMS is at 1700 LT, RBSP probes will be near 1900 LT. When MMS is near local noon, RBSP will be pre-dusk (maybe 1700 LT) (NEEDS WORK)
  - Wygant: MMS hovers near MP; Effect of MP on inner magnetosphere MP activity, specifically sunward convection wave in response to reconnection initiation. Characteristics of that wave.
  - What additional things does MMS have to offer that THEMIS does and has not?
- Coordinate with ERG
  - Present launch plan is December 2015; assume science phase begins 1 February 2016, well within RBSP extended mission window.
  - ERG characterized mid-latitude wave-particle interactions at the same time that RBSP is characterizing low latitude wave-particle interactions: evolution of interactions along field lines.
  - ULF wave structure along field lines.
- Any other new assets of note? Ground? CubeSats? Etc.

Thoughts from David Sibeck

- Good justifications for an extended mission include:
  - a different phase of the solar cycle
  - a different mode of operations, orbital separations, or orbit
  - joint work with other forthcoming spacecraft or ground arrays
- Senior Review requires:
  - the status of all instruments and spacecraft
  - status of all epo and pao activities and accomplishments
  - evidence that data are readily available and being used by others
    - Easy access, regular sessions where outsiders are taught to use data, participation by outsiders in our meetings).
  - statistics on insider/outsider papers
  - plan to make more complex data available
  - plan to integrate our various data tools
  - evidence of successful archiving and delivery
  - exciting science questions that cannot be answered with existing data set but rather require new observations