

# The Non-Conforming Cycle 24

Leif Svalgaard

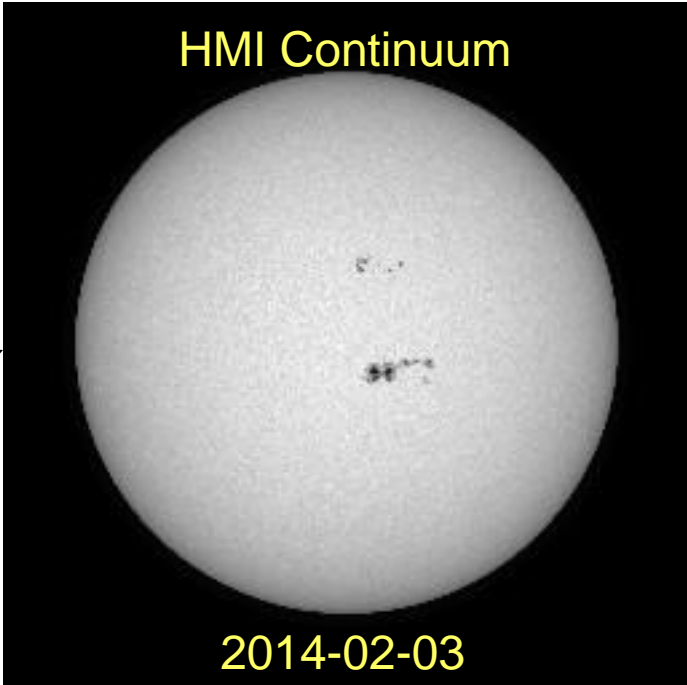
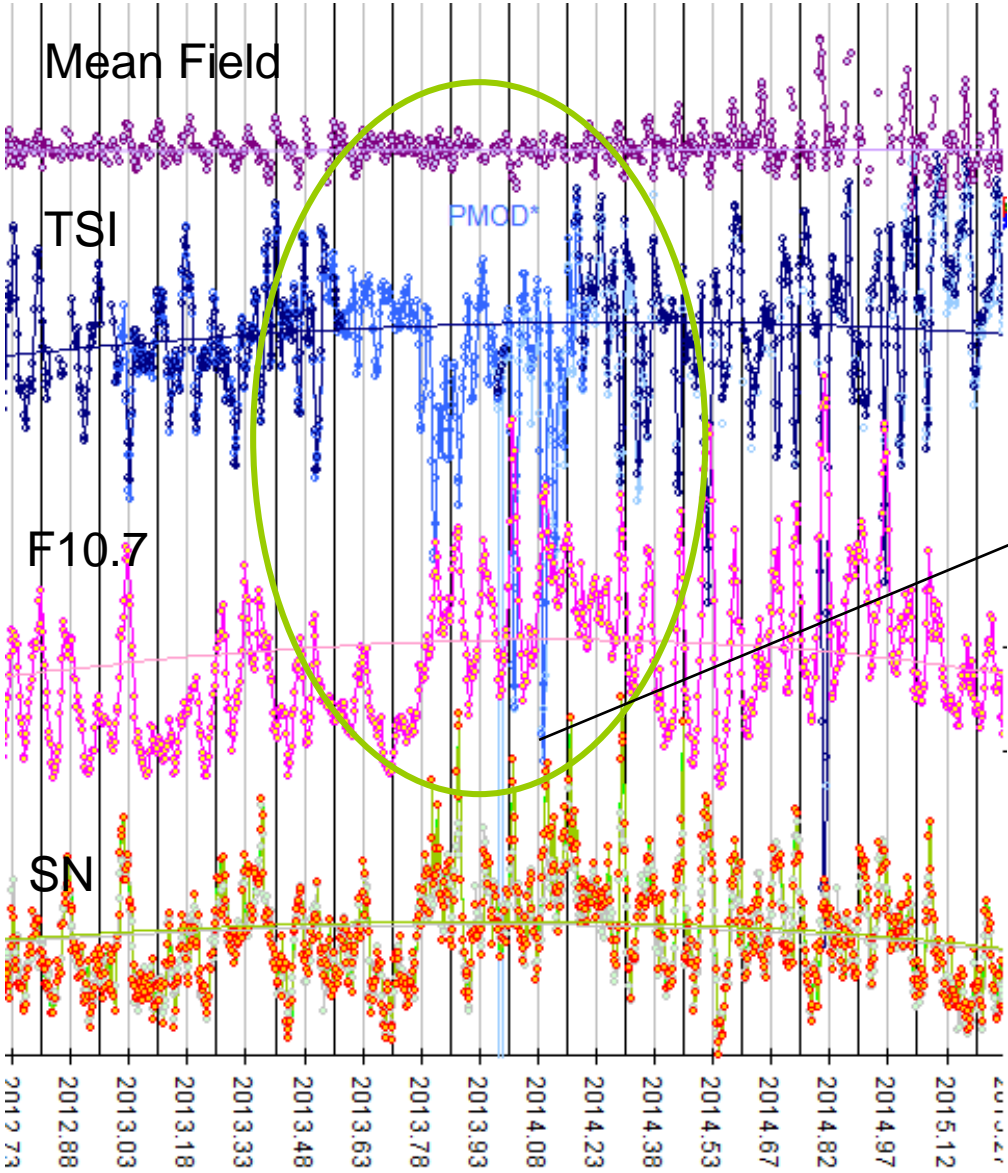
Stanford University

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With help from Monica Bobra and Xudong Sun



# TSI Low in 2013-2014

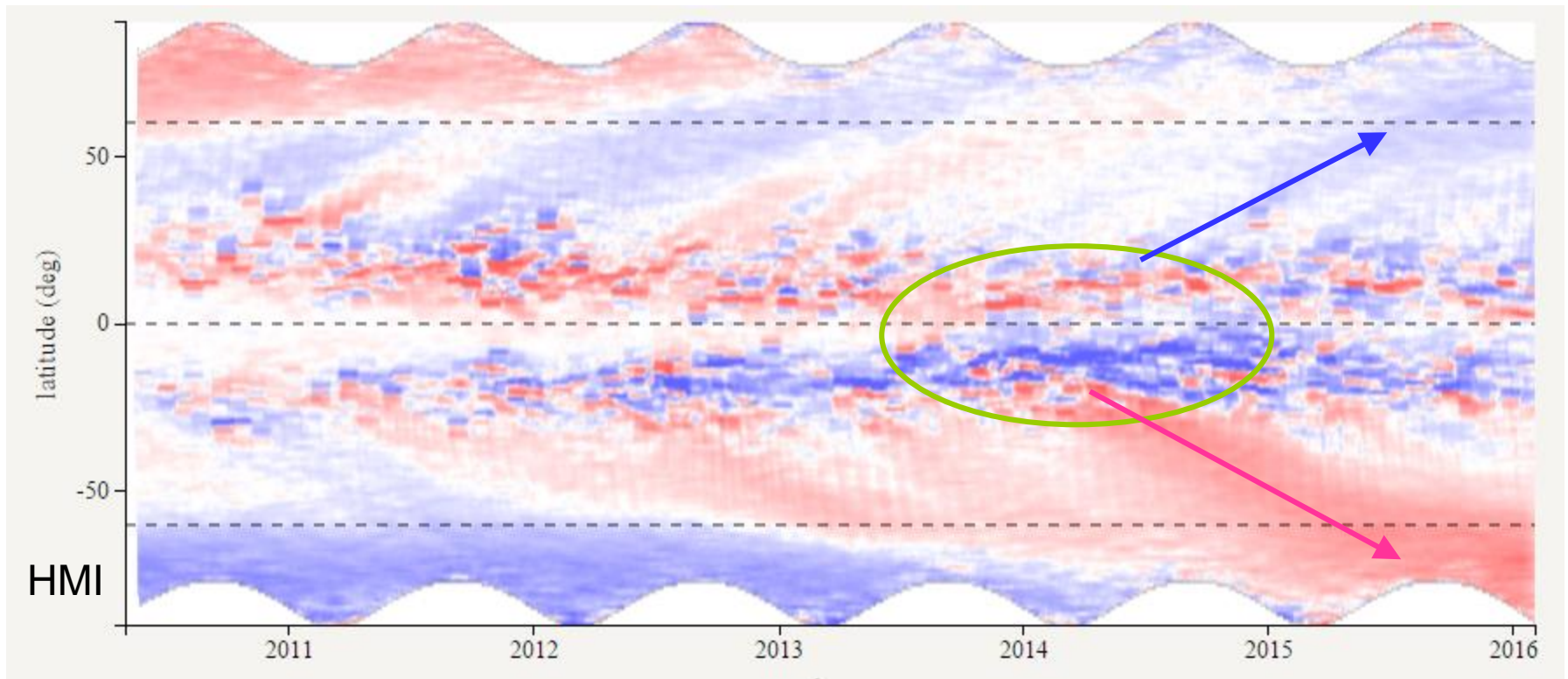


Kanzelhöhe Drawing



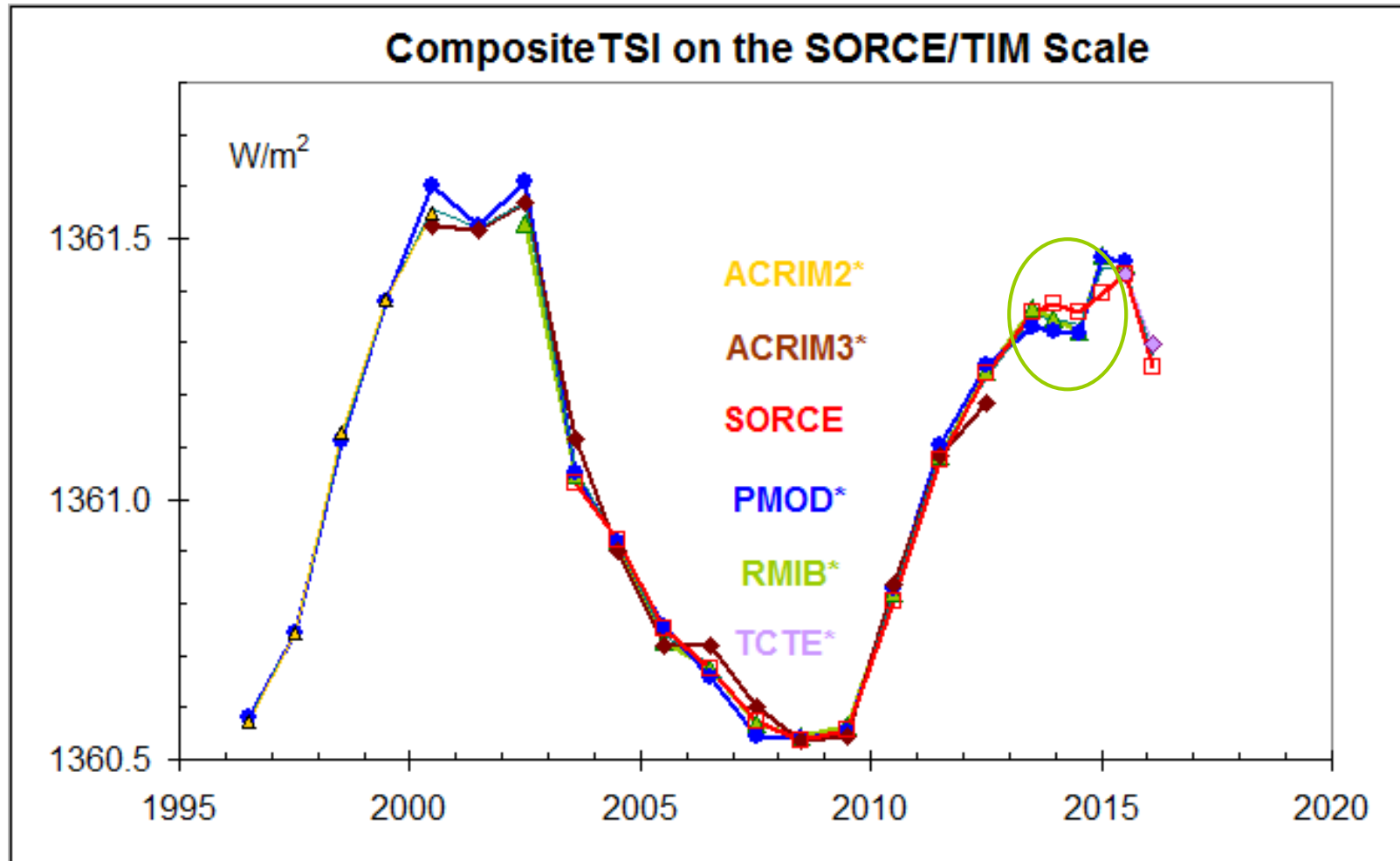
because of several large sunspots

# The Large Spots were a Source of Strong Magnetic Flux



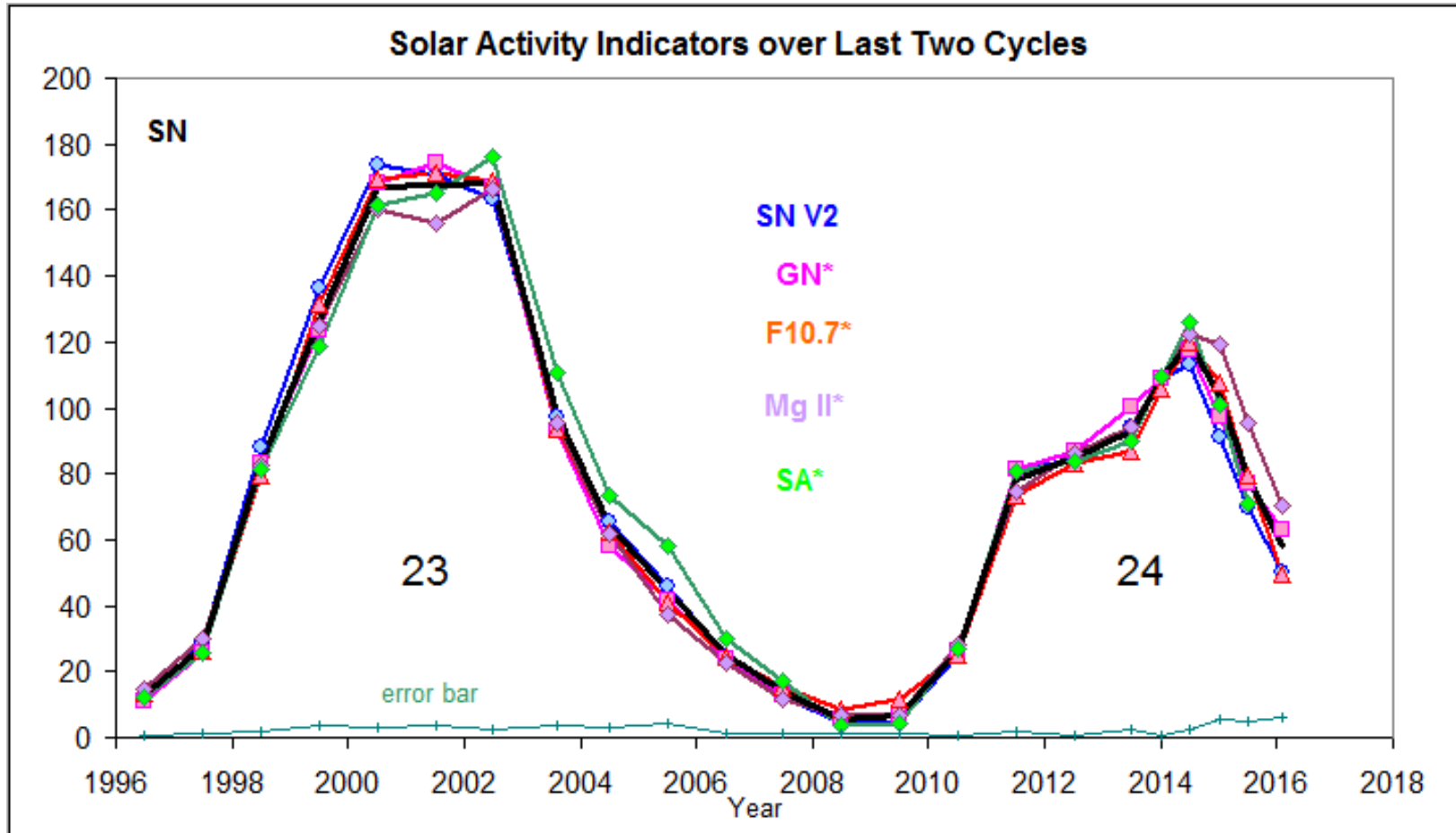
That helped reverse and rebuild the polar fields

# The Large Spots Took a Bite out of Total Solar Irradiance (TSI)



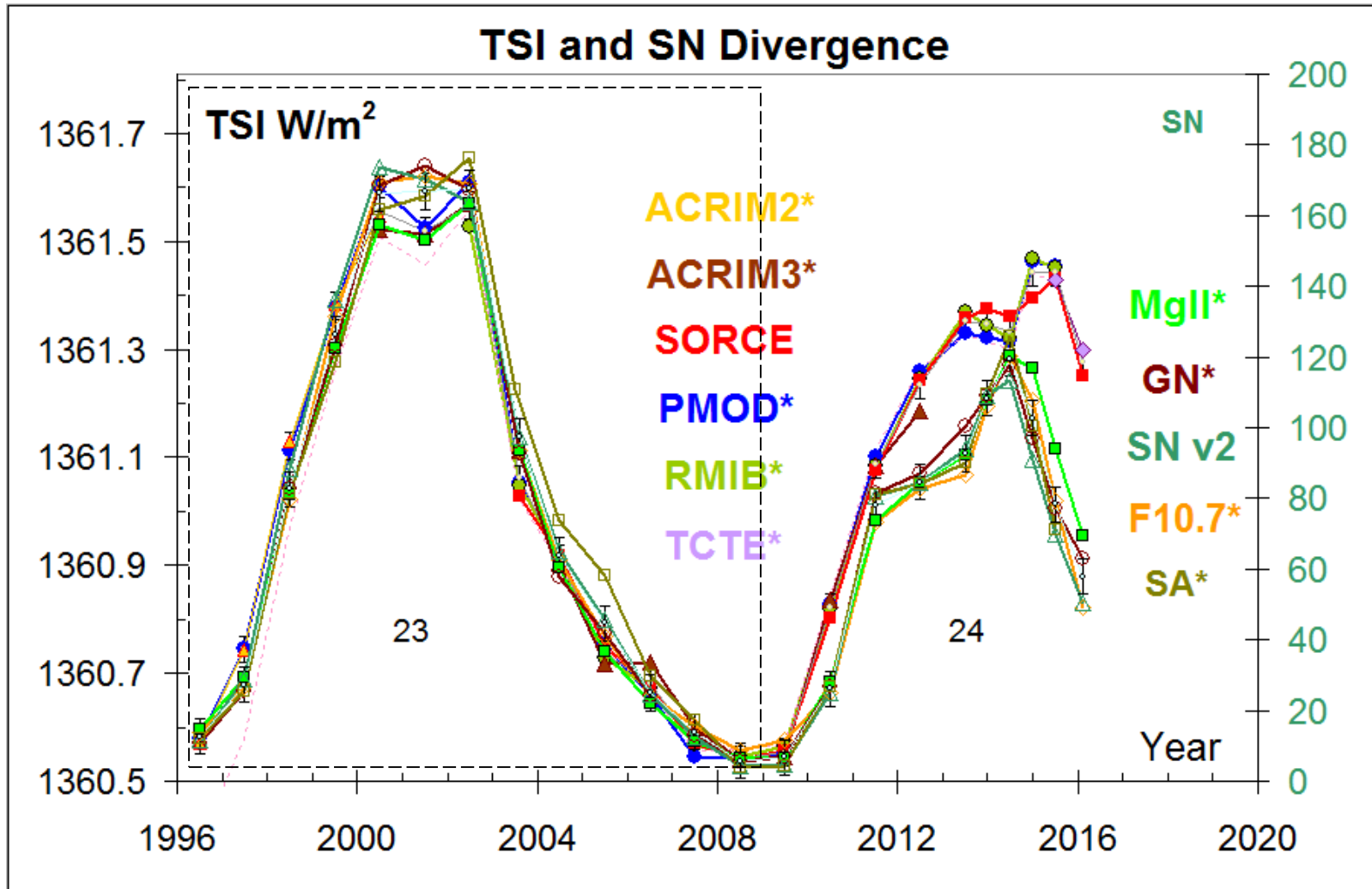
Composite of several instruments scaled to SORCE/TIM (LASP)

# The Usual Solar Indices all Agree



Sunspot Number, Group Number, F10.7 Flux, Mg II flux, Sunspot Areas all scaled to the Sunspot Number (V2)

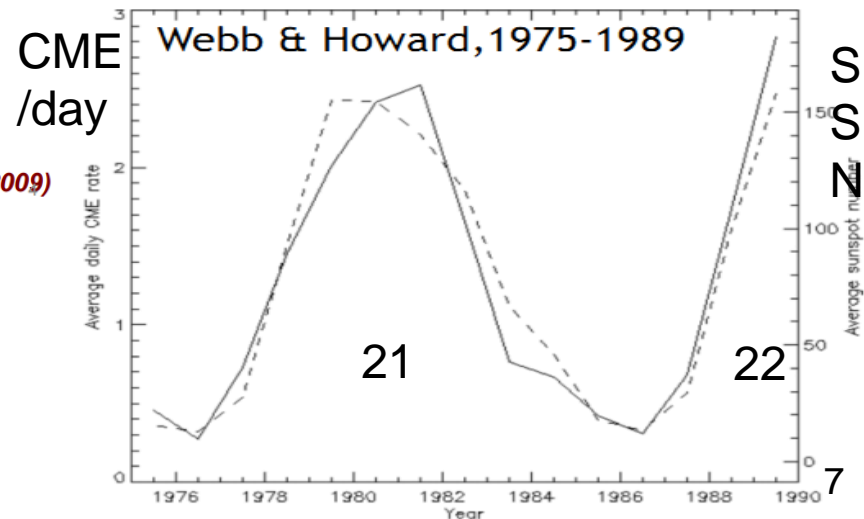
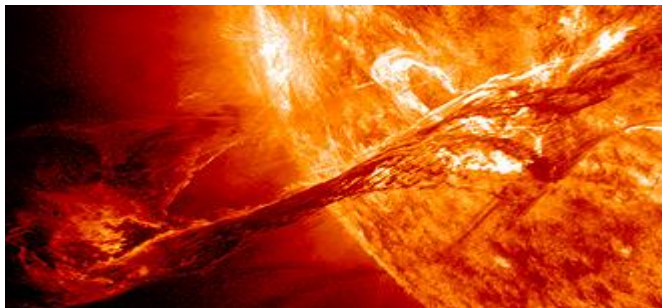
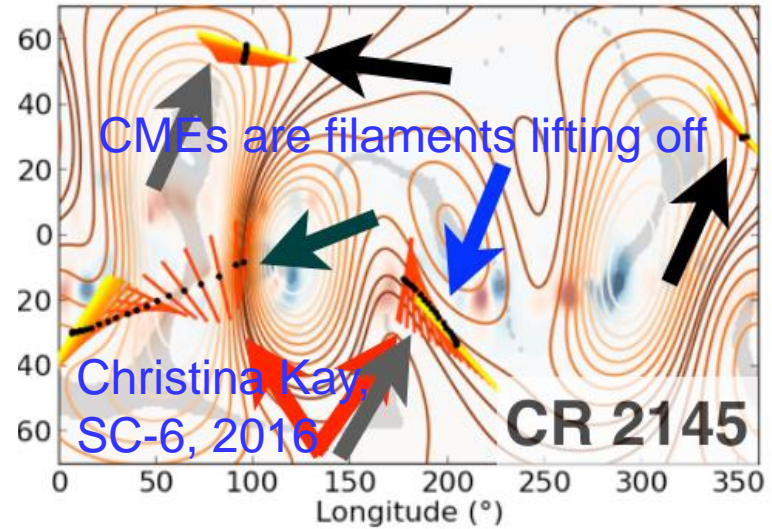
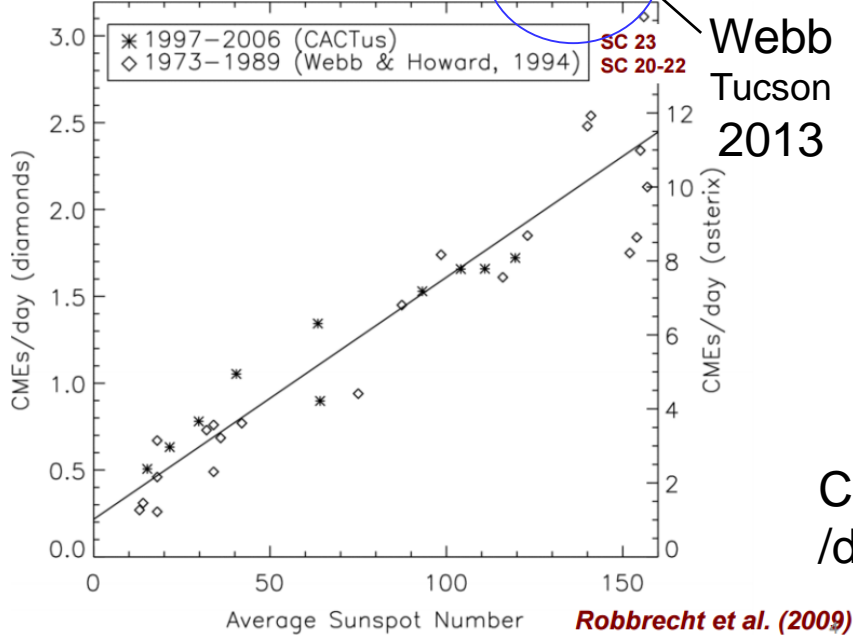
# Matching Indices on Cycle 23 Shows Disagreements for Cycle 24



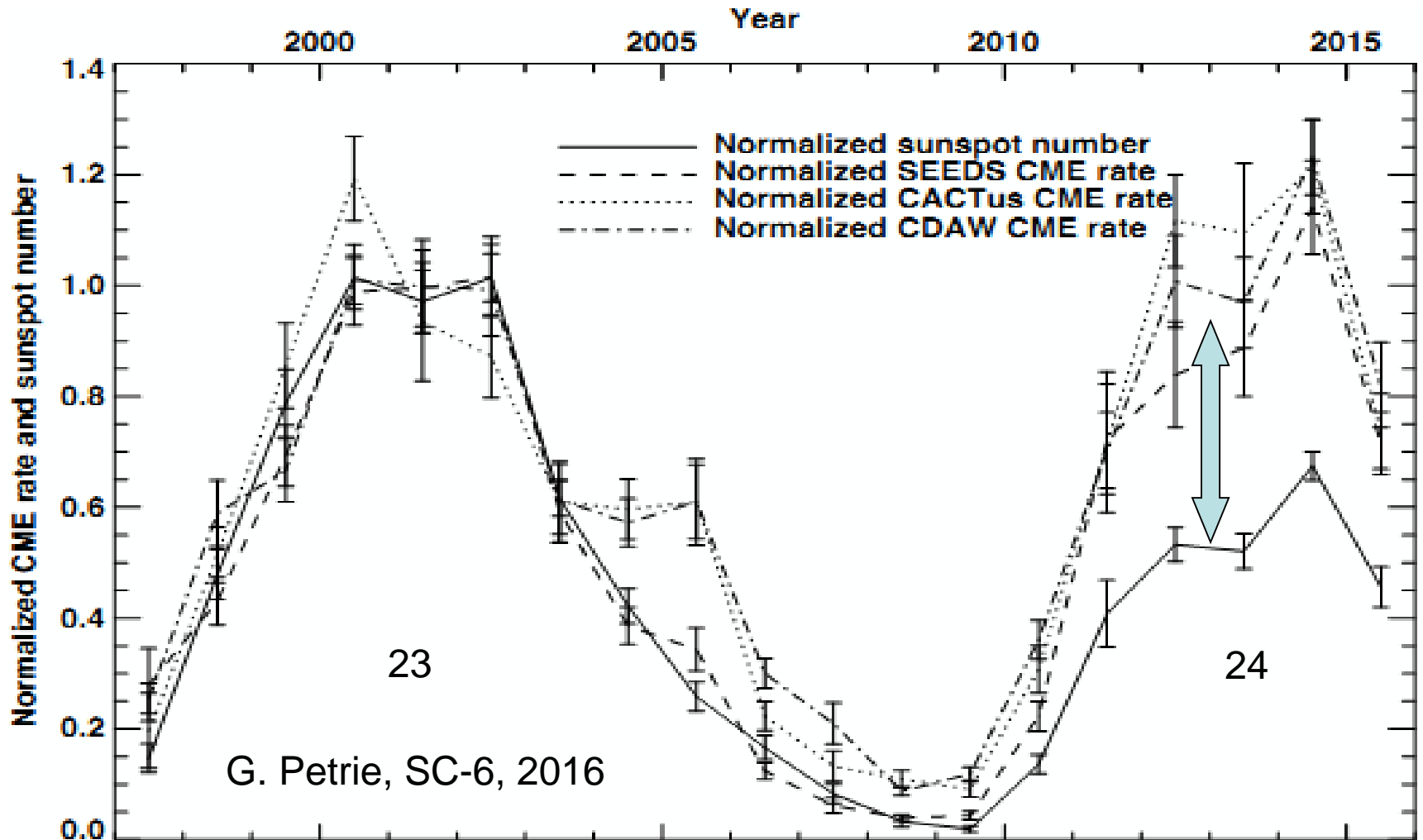
# CME Rate Followed SN...



**Annual CME & SSN Rates Remain Well Correlated ( $r \sim 0.9$ )**



# But no Longer in Cycle 24



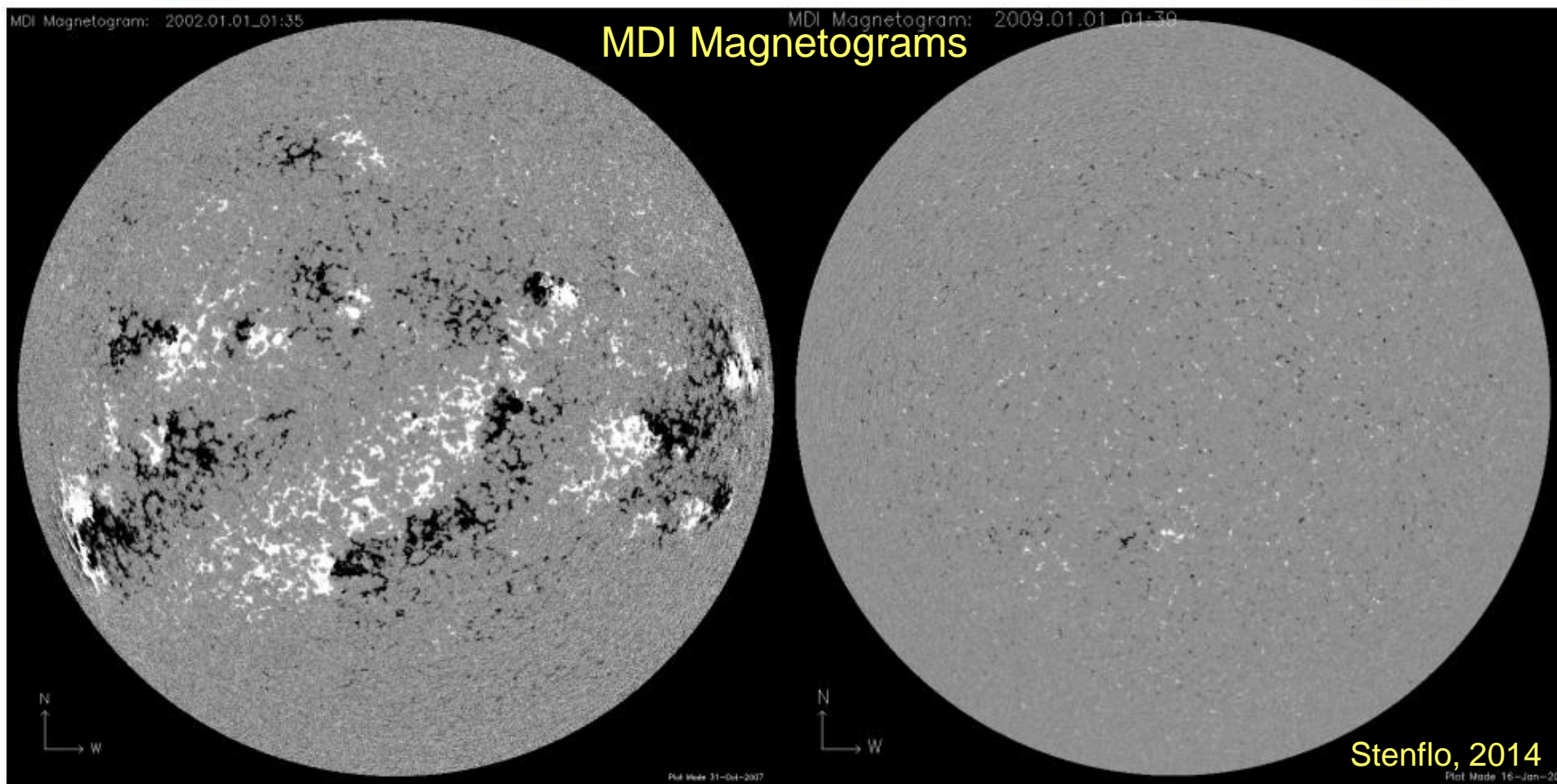
G. Petrie, SC-6, 2016



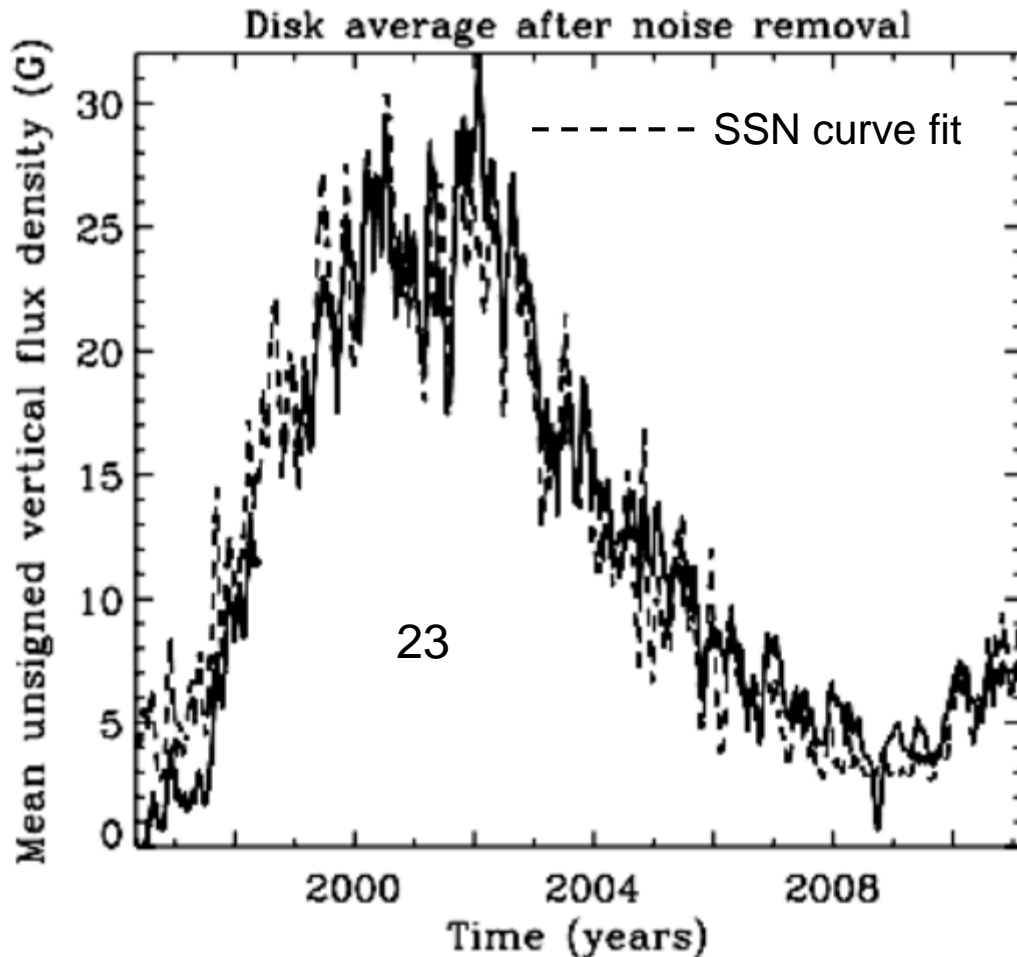
# The Sun's global magnetic pattern is closely related to the sunspot number (Stenflo, SSN WS Locarno, 2014)

2002

2009



# During Cycle 23 the Sunspot Number was Well Described by the Magnetic Flux



“There is a nearly one-to-one relation between the disk-averaged unsigned flux density and the sunspot number.”

“The dashed curve is the second-order fit function in terms of the sunspot number  $R_z$ :  $b_0 + b_1 R_z + b_2 R_z^2$ , where  $b_0$  ( $=2.7$  G) represents the average unsigned flux density in the absence of sunspots.”