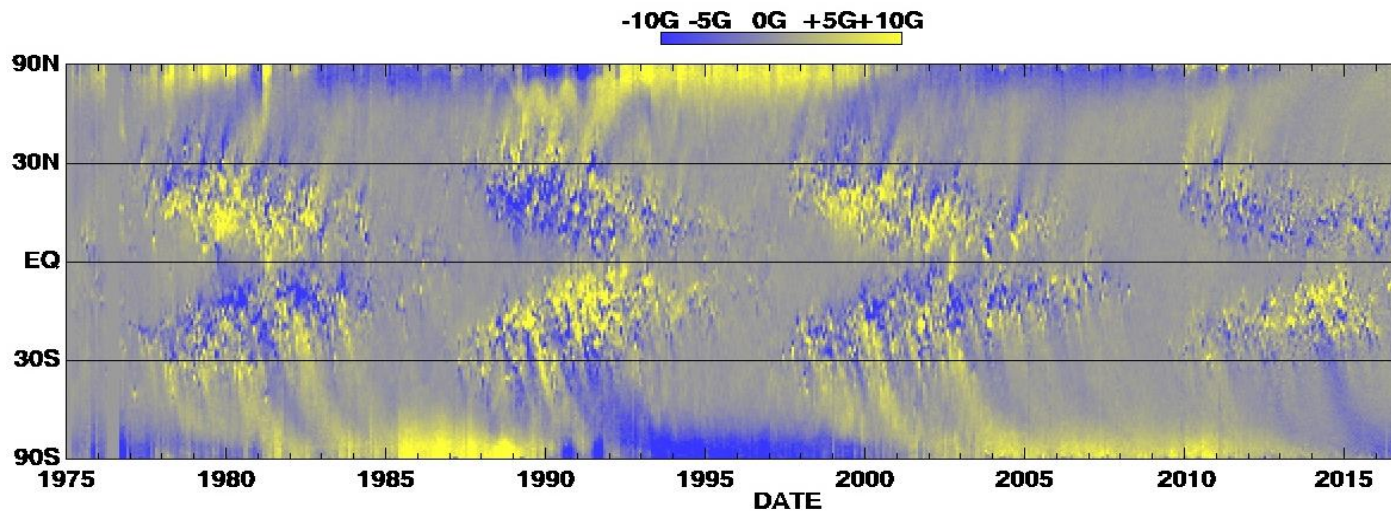
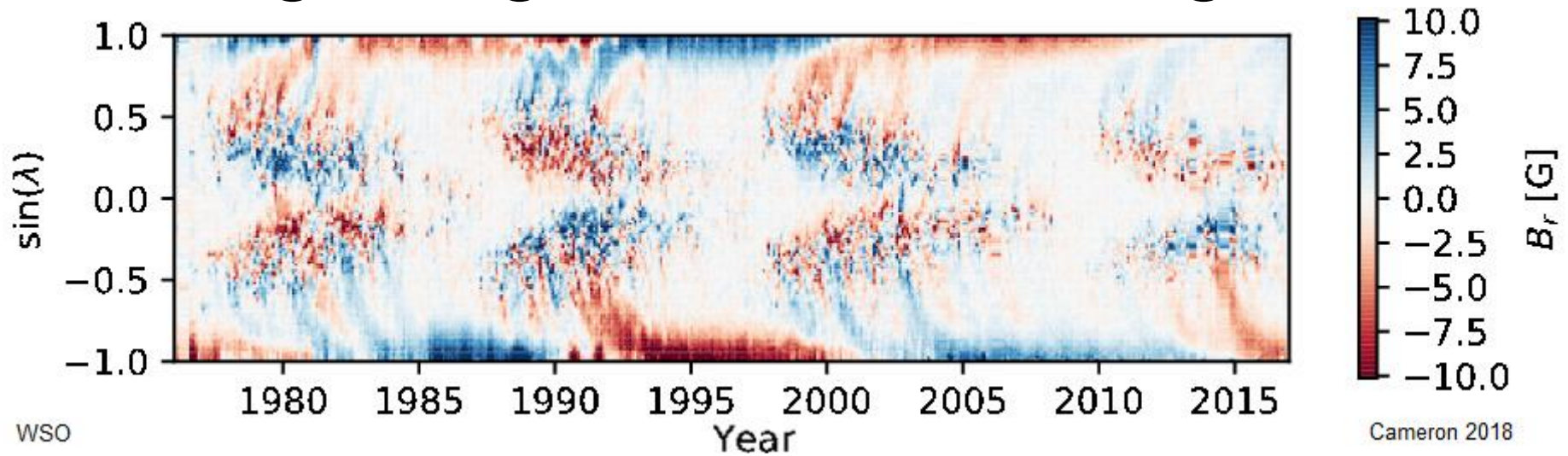




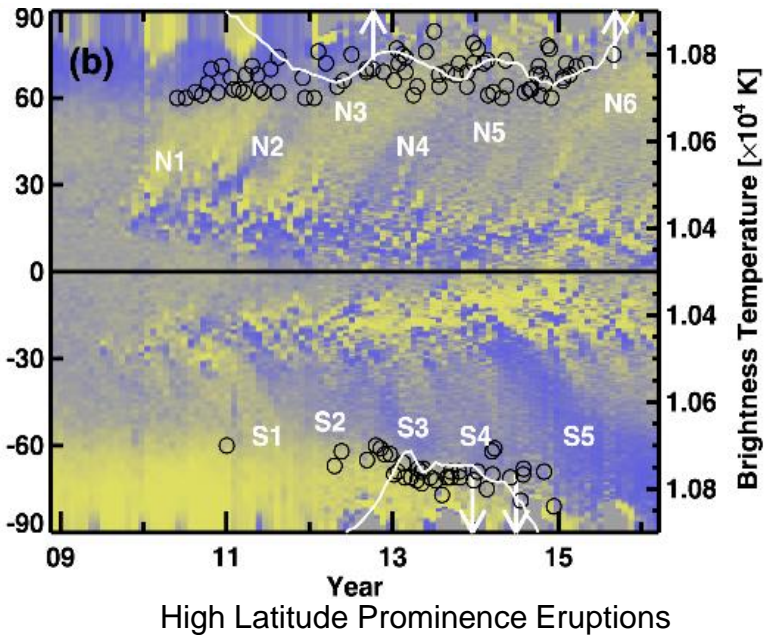
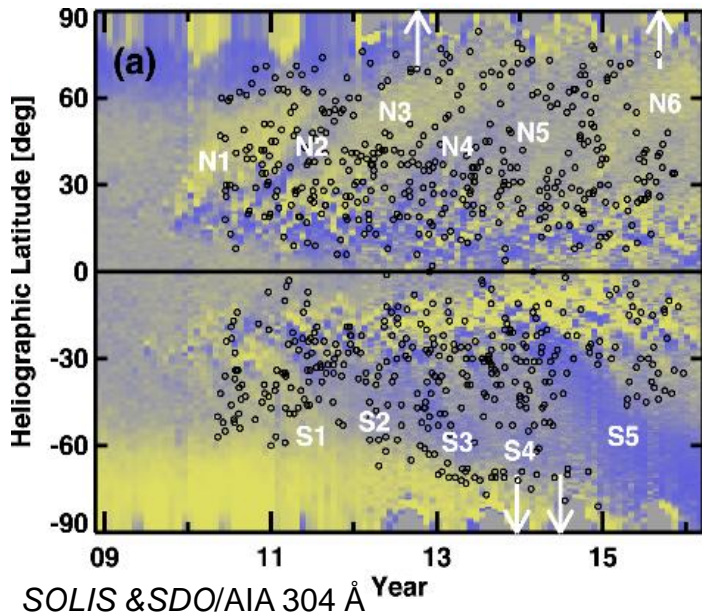
Super-Synoptic Maps and Solar Polar Fields

Leif Svalgaard
Stanford University
Feb. 2018

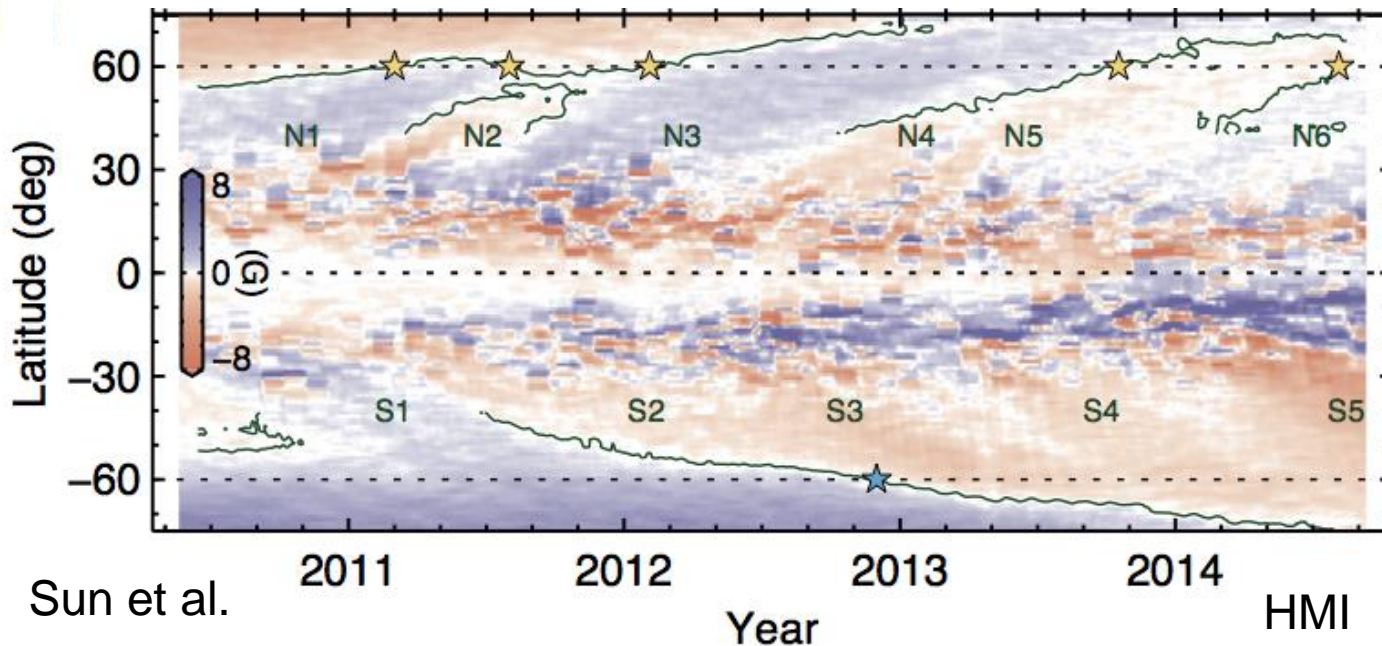
Standard View of Magnetic Fields Migrating to the Polar Regions



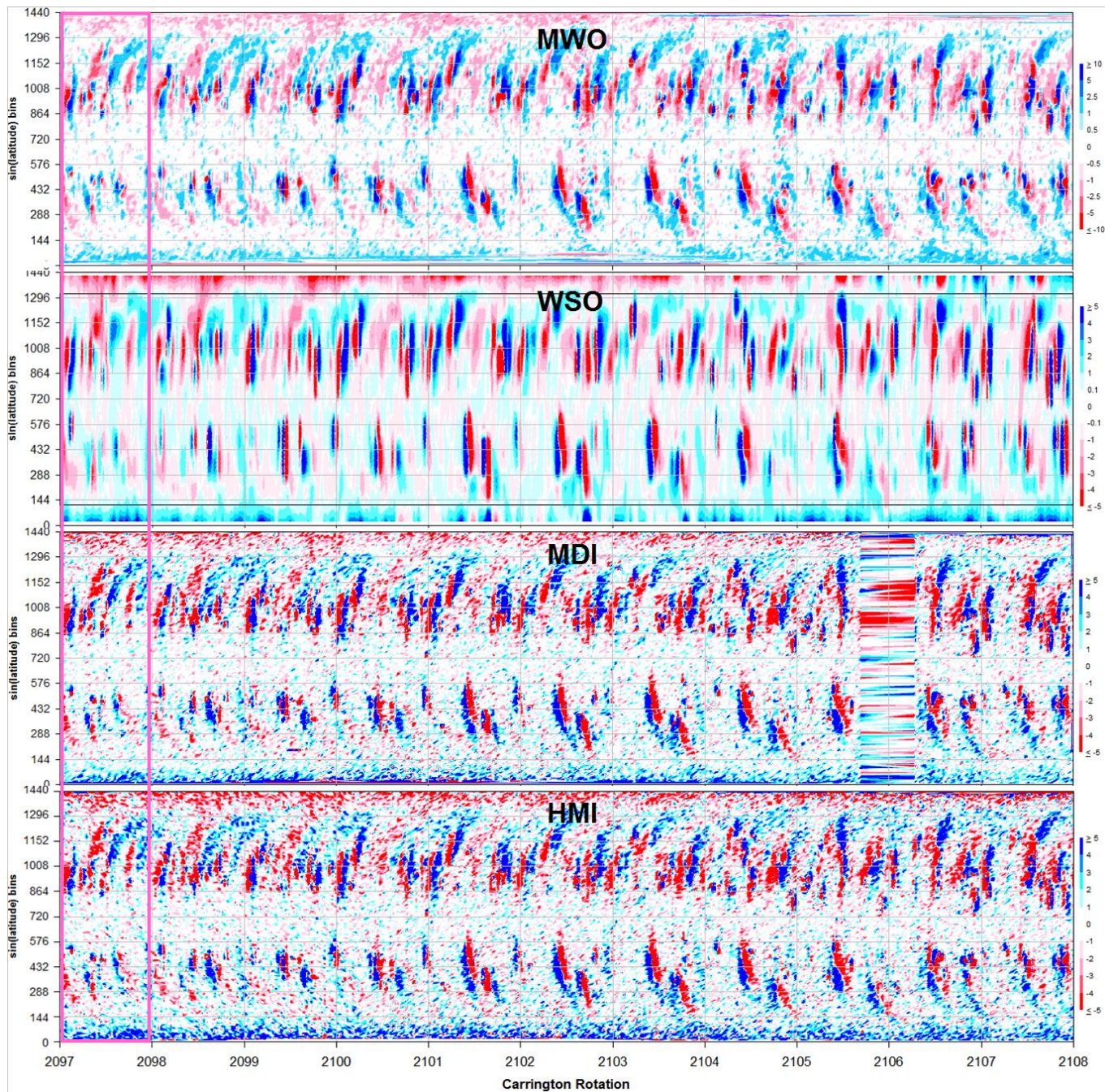
Zonal
averages
in time
producing
broad uni-
polar
migrating
areas 2



The False Notion of Broad ‘Tongues’ of Migrating Flux



Einstein: “Make things as simple as possible, but no simpler!”



Super-Synoptic Maps show what is really going on: The flux is concentrated in narrow 'streaks' and the two polarities move together

The maps are shown for the period of overlap of MWO, WSO, MDI, and HMI

This is No News, of Course

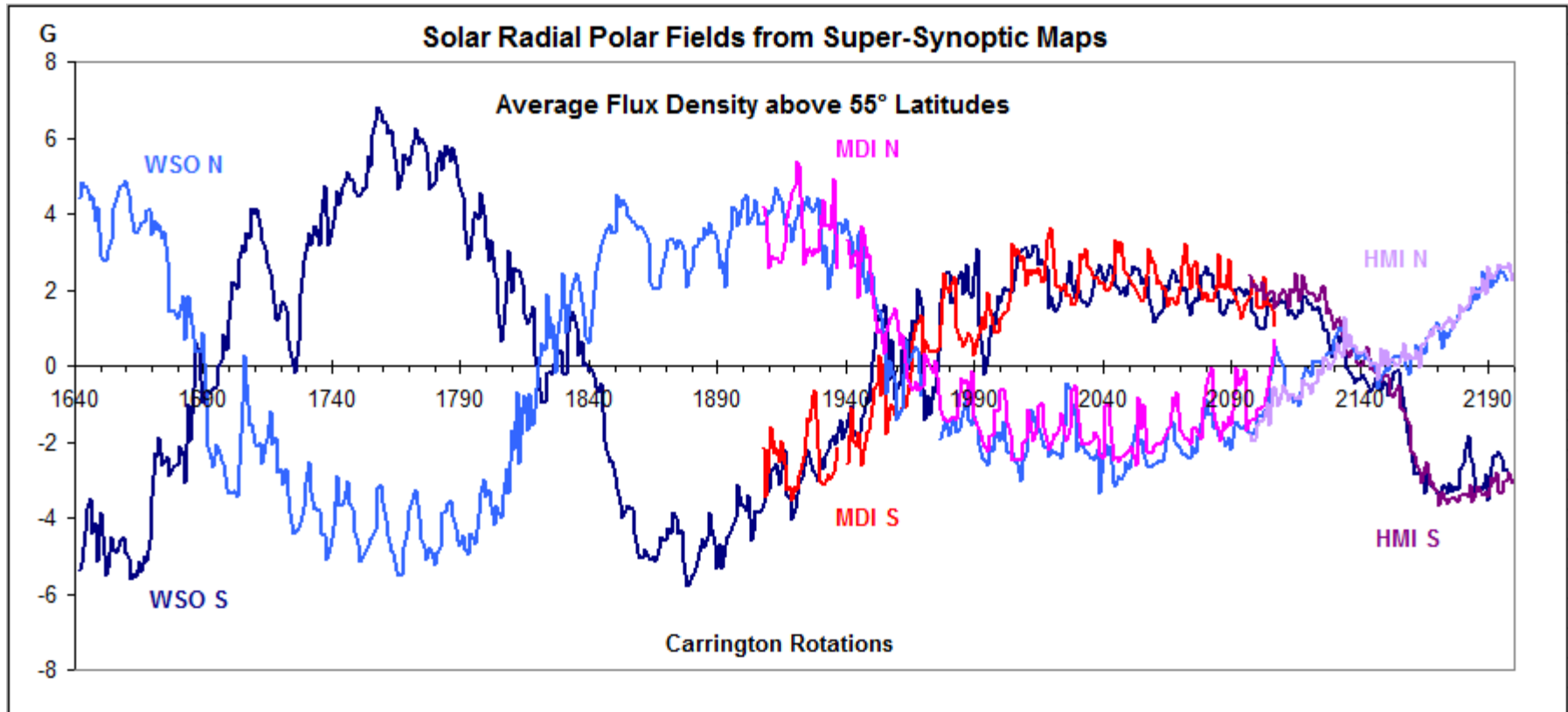
B.1 Polar Crown Filaments and the Polar Magnetic Field, K. TOPKA and R. L. MOORE, Caltech, BBSO, and B. J. LABONTE and R. HOWARD, Mt. Wilson Obs., Carnegie Institution of Washington. We report on the results of a follow up study to the recent results of Howard and LaBonte (submitted to Solar Physics) concerning the evolution of solar photospheric magnetic fields

....

conclude that the observed behavior of polar crown filaments during the solar activity cycle supports the results of Howard and LaBonte in that the solar polar magnetic field arises from discrete injections of field from active region latitudes and that there exists in the sun a meridional flow. We further

conclude that magnetic field of both polarities must be migrating poleward, but that the following polarity dominates slightly.

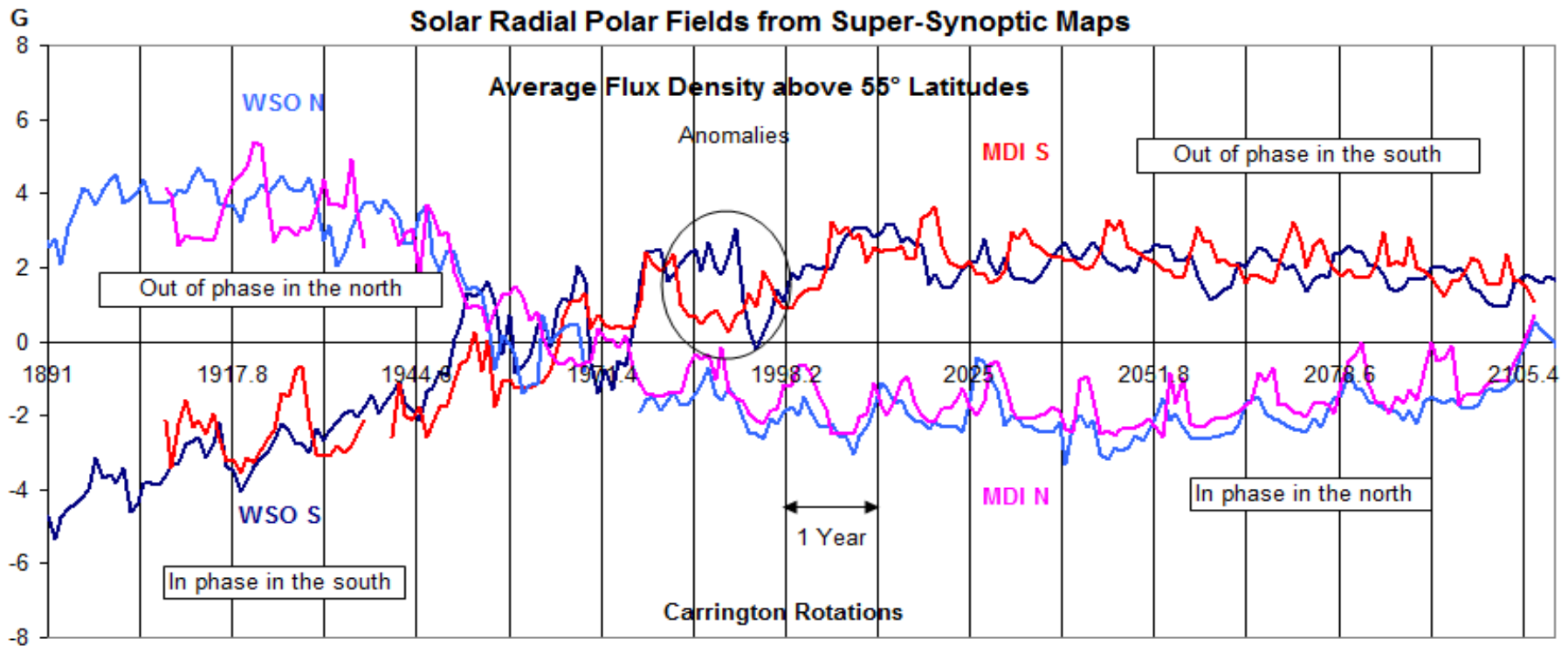
Polar Fields from WSO, MDI, and HMI from Radial Super-Synoptic Maps



WSO multiplied by 1.8 to correct for saturation.

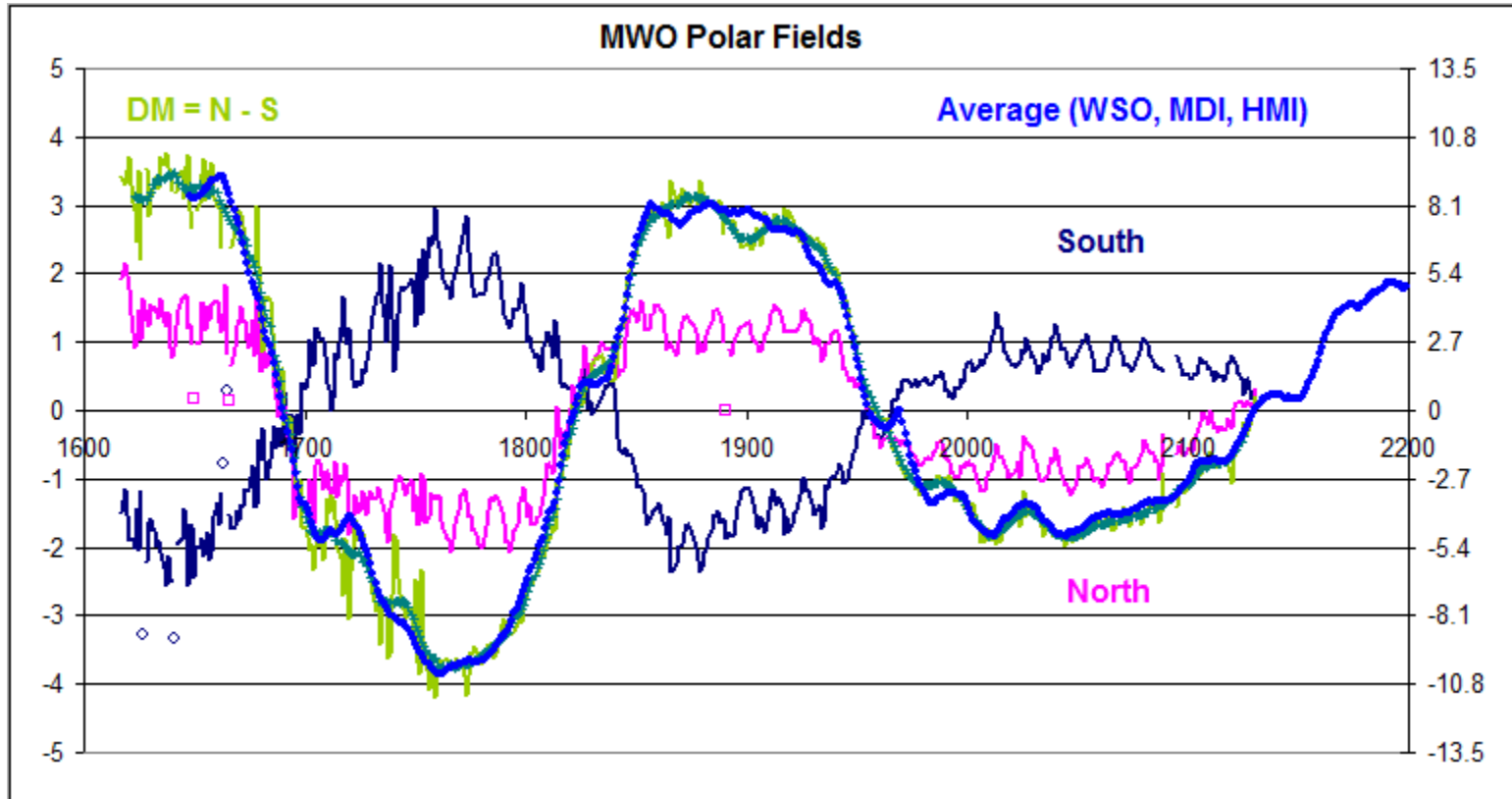
MDI multiplied by 0.6 to put on HMI scale [for polar region]

MDI Annual Modulation Issue



The phase of the annual modulation for MDI varies in a strange way.
I don't know why.

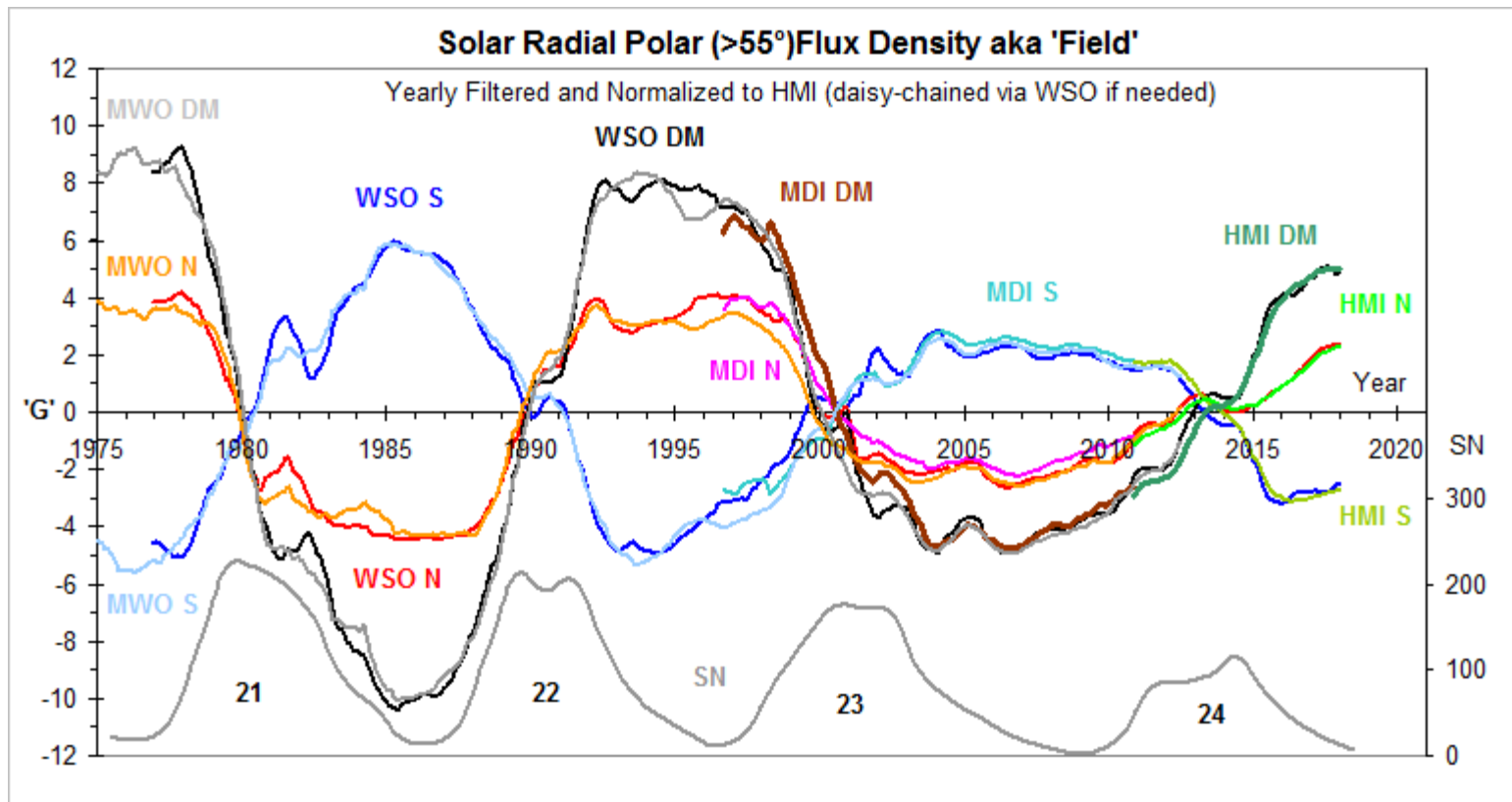
Comparing with MWO Polar Fields



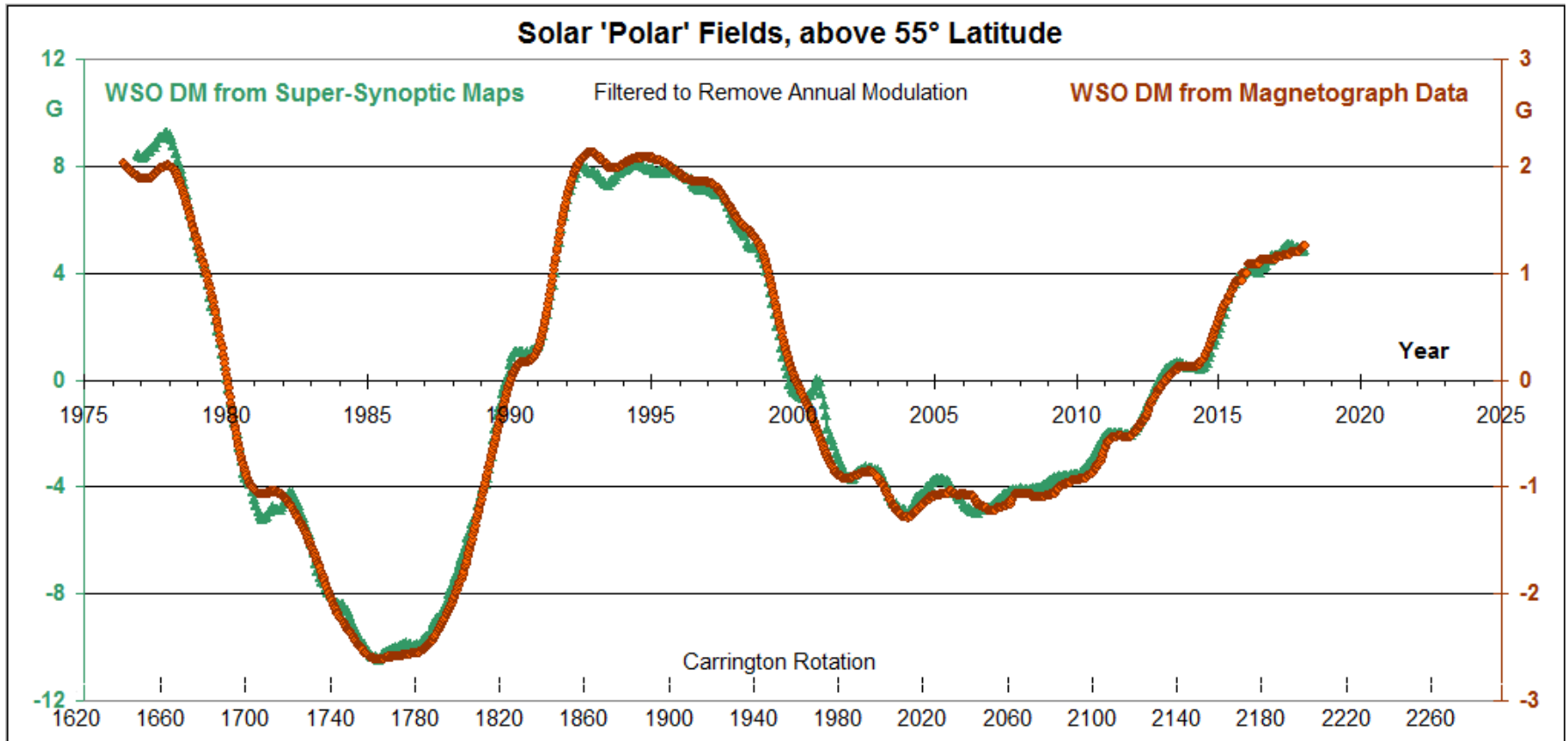
It is amazing how good the agreement is (after scaling).

This allows us to take the polar fields back to 1974

Remove the Annual Modulation by 1-yr Boxcar Averaging



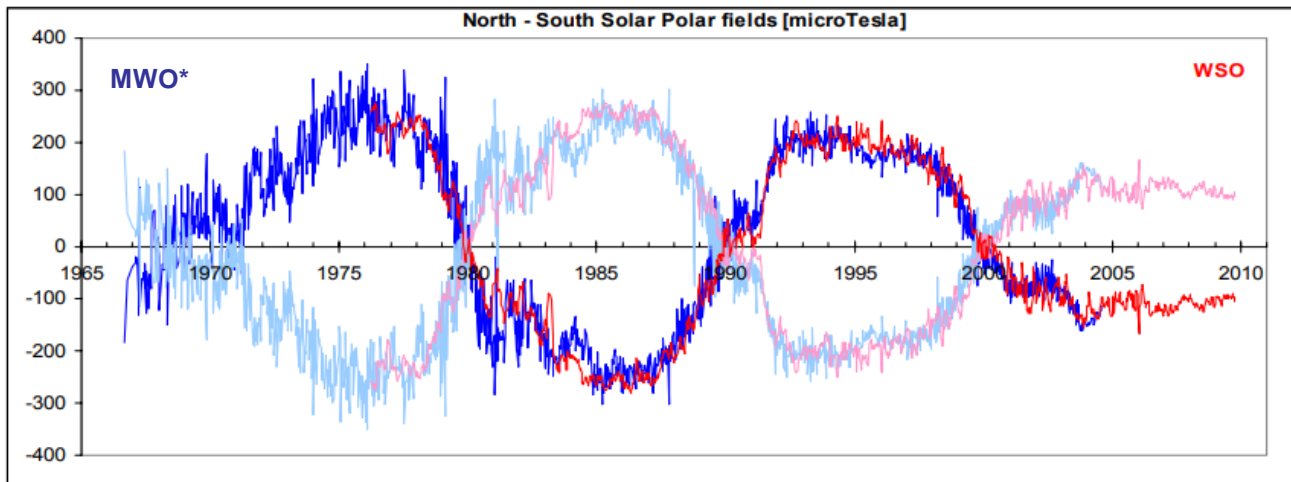
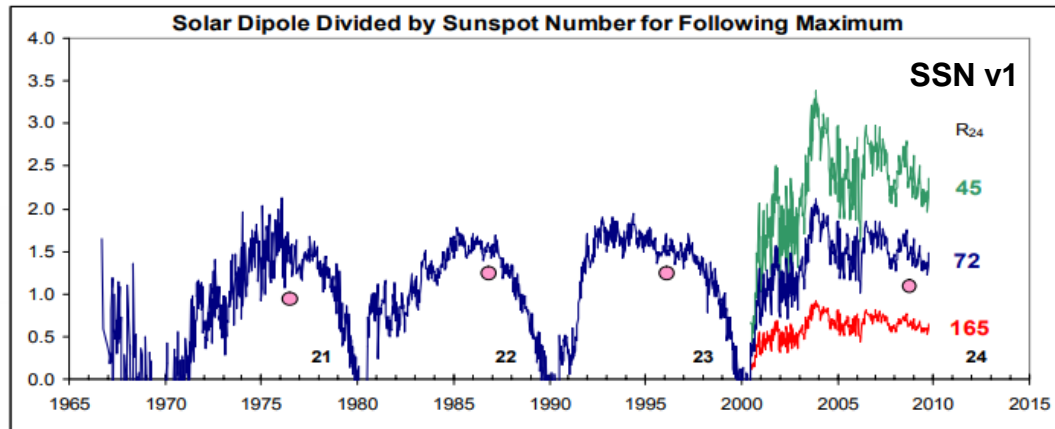
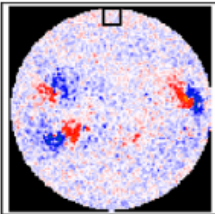
Comparison with Magnetograph Polar 'Pixel' Fields



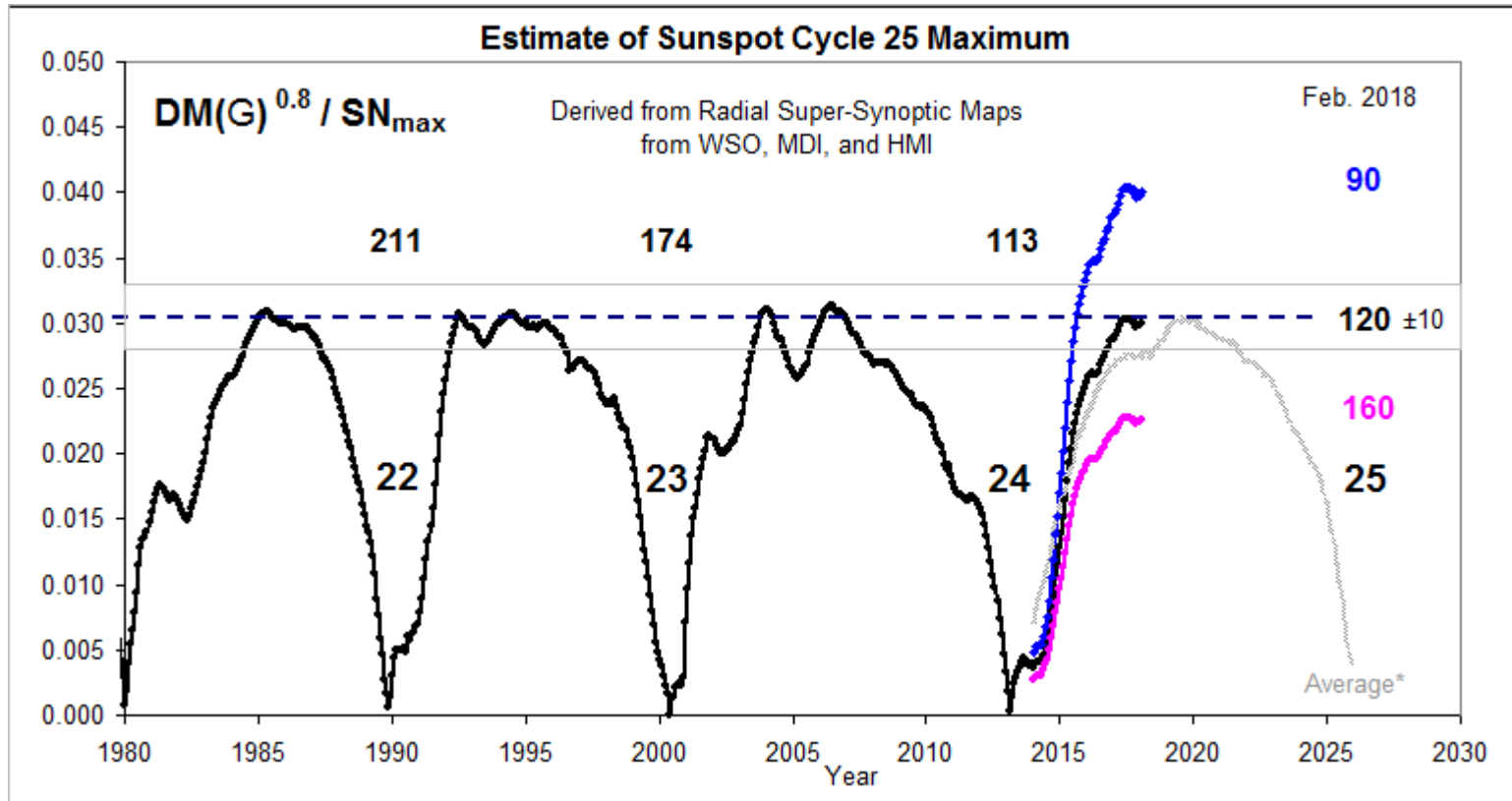
Conversion factor: WSO Radial = 4.0 WSO Pixel

Prediction of SC24 a Cycle Ago

Polar Fields



Prediction of Cycle 25



Should the polar fields increase further, SC25 would be correspondingly higher