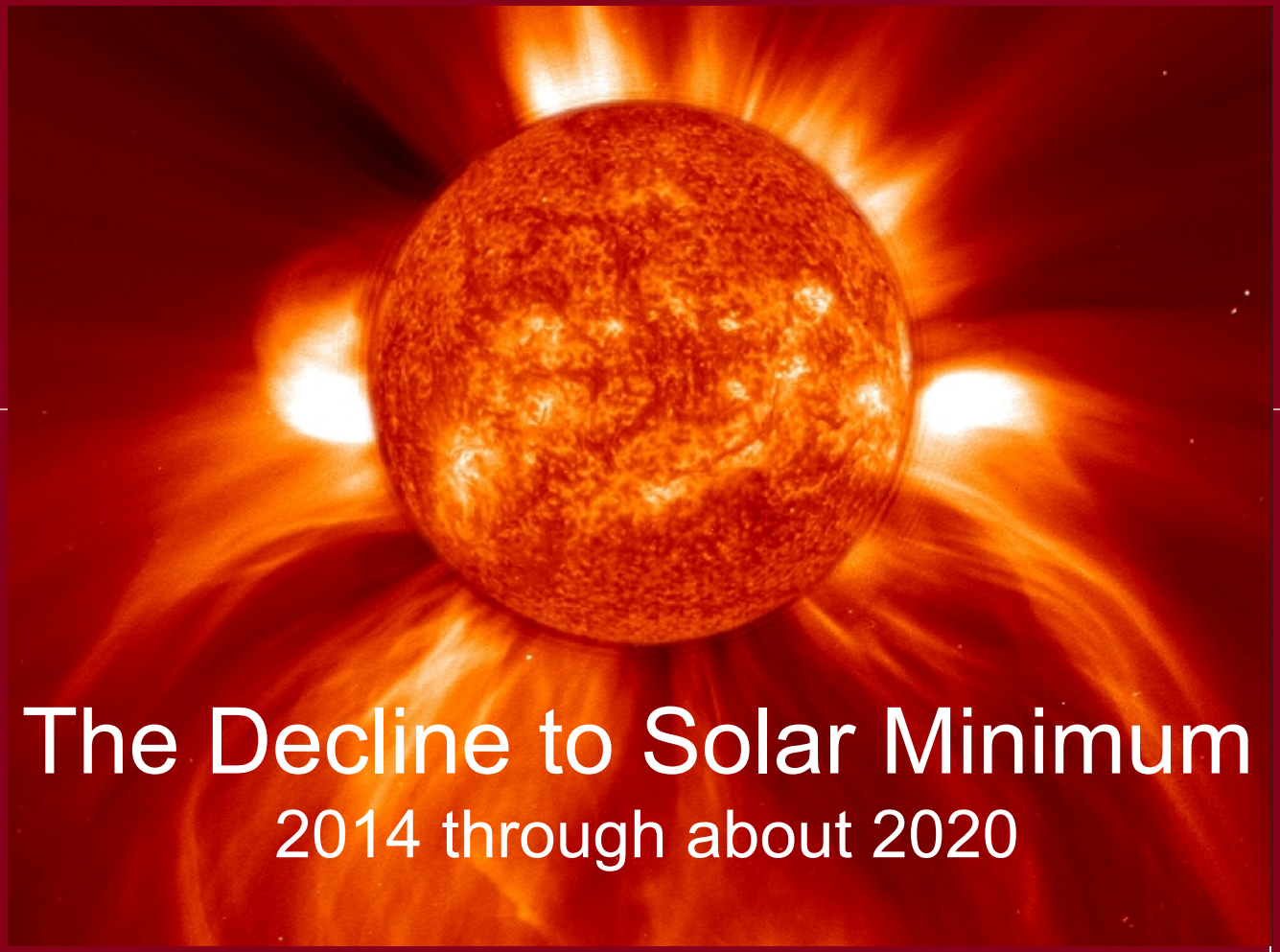
Propagation Trends 2015-2016



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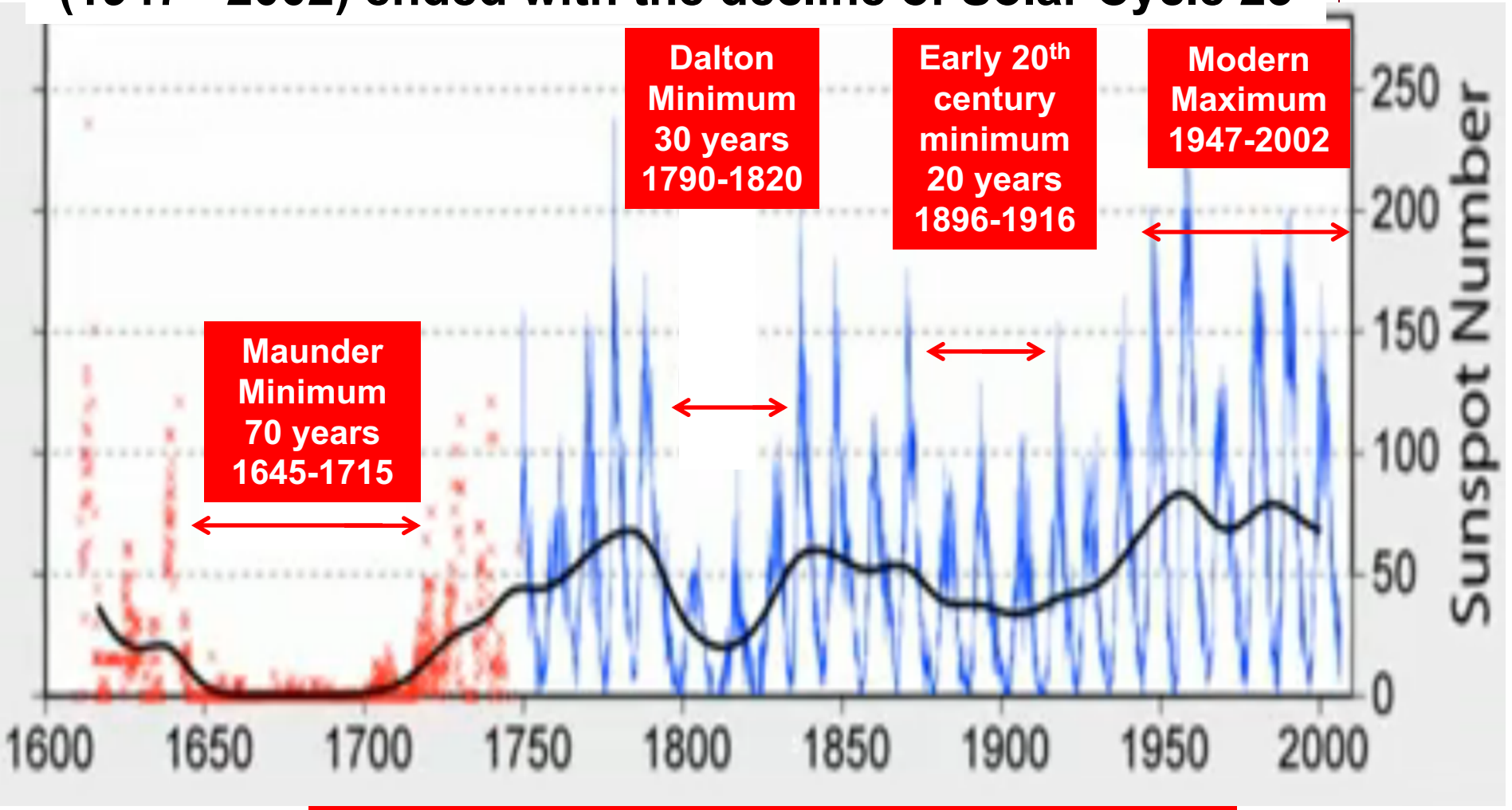
400 Years of Sunspot Observations

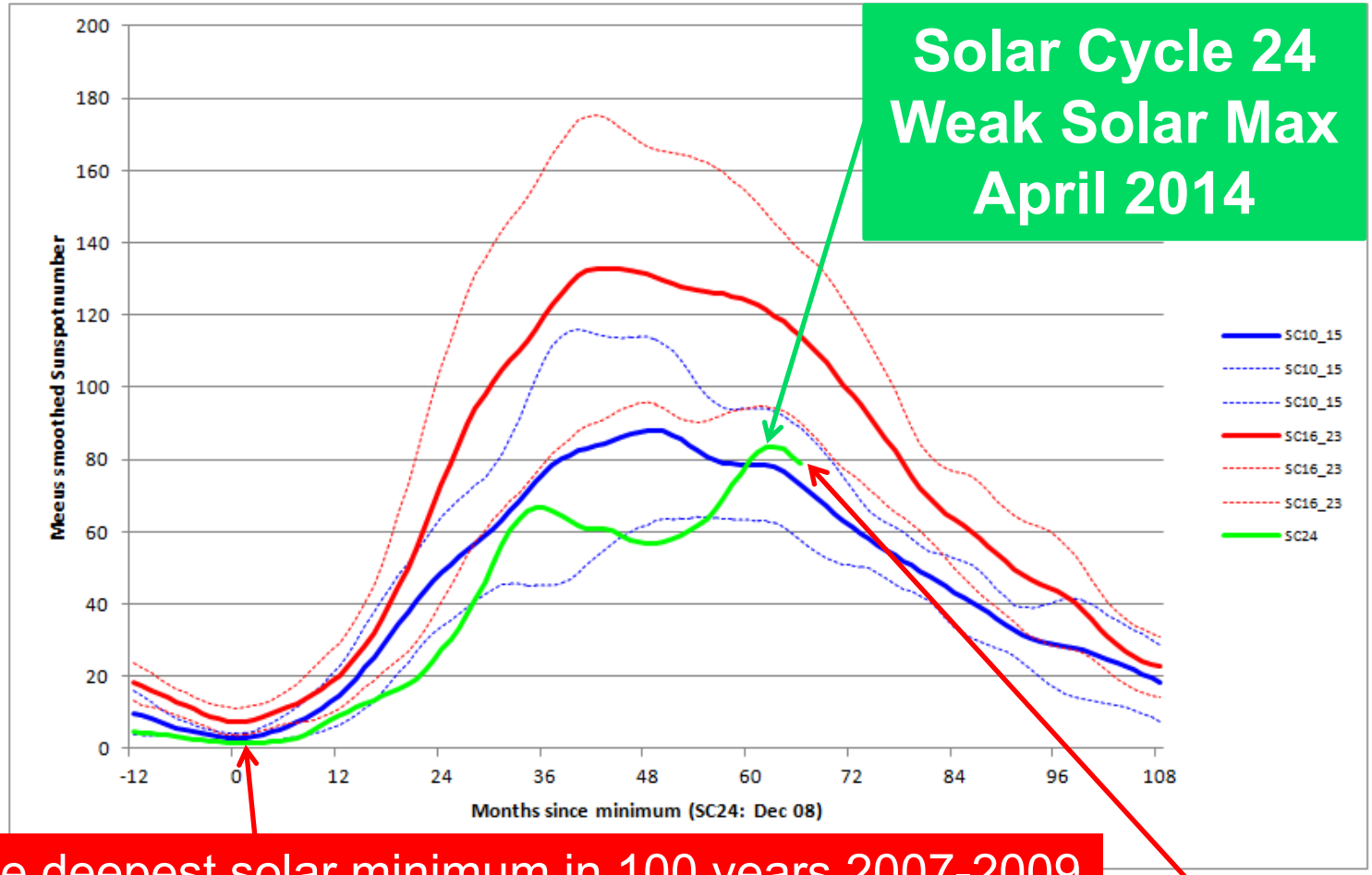
55 years of unusually high sunspot activity (1947 - 2002) ended with the decline of Solar Cycle 23



The 100 year Gleissberg Cycle is clearly visible in this data

Progress of Solar Cycle 24

compared to Solar Cycles 10 through 23



The deepest solar minimum in 100 years 2007-2009

second weakest solar maximum in 100 years - 2014

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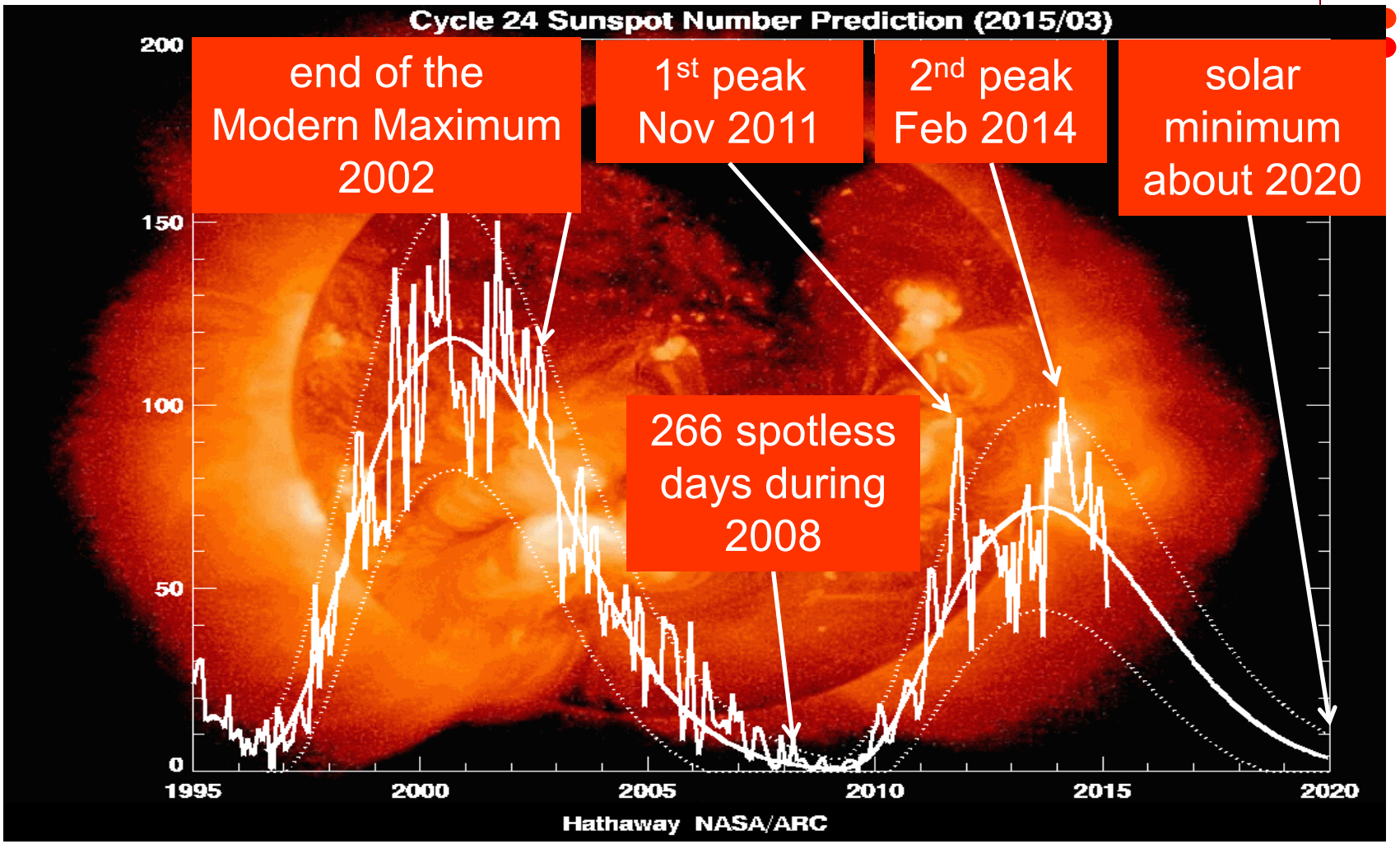
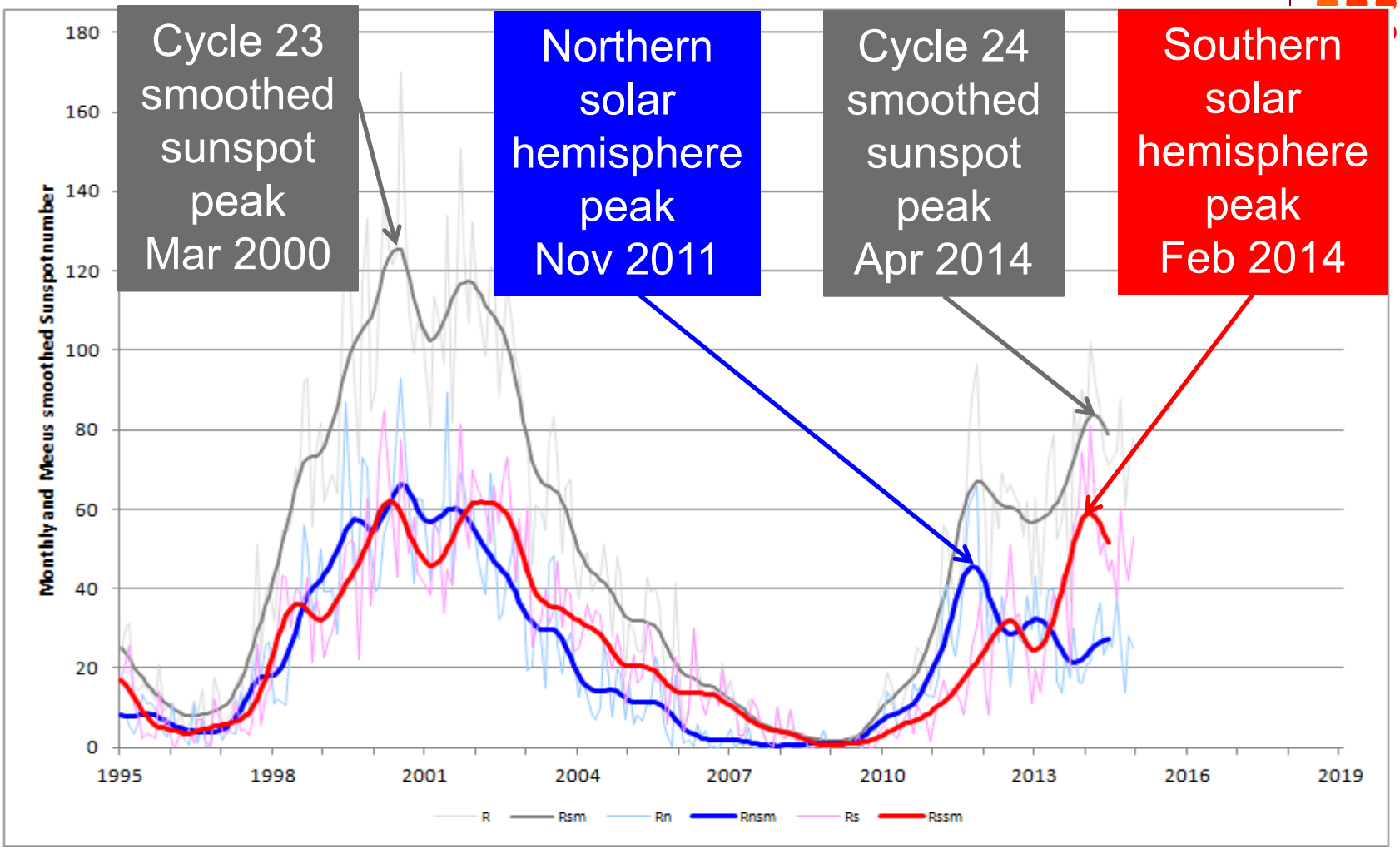
Solar Cycle Progress
Since Solar Cycle 23 Maximum



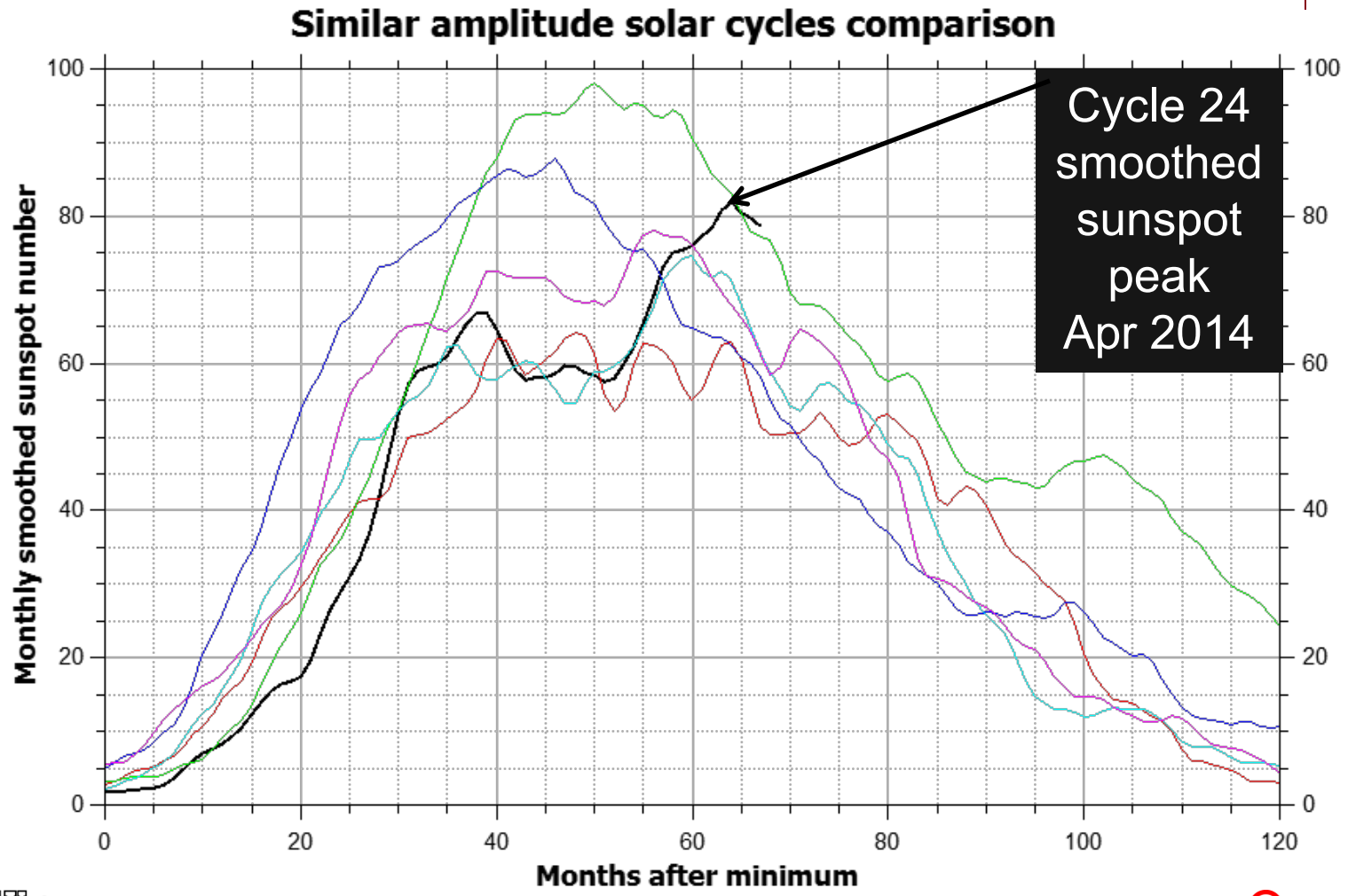
http://solarscience.msfc.nasa.gov/images/ssn_predict_l.gif

Double Peaked Solar Cycle 24



14 years between solar cycle 23 and cycle 24 peaks

Estimated Five Year Decline to Solar Minimum in about 2020



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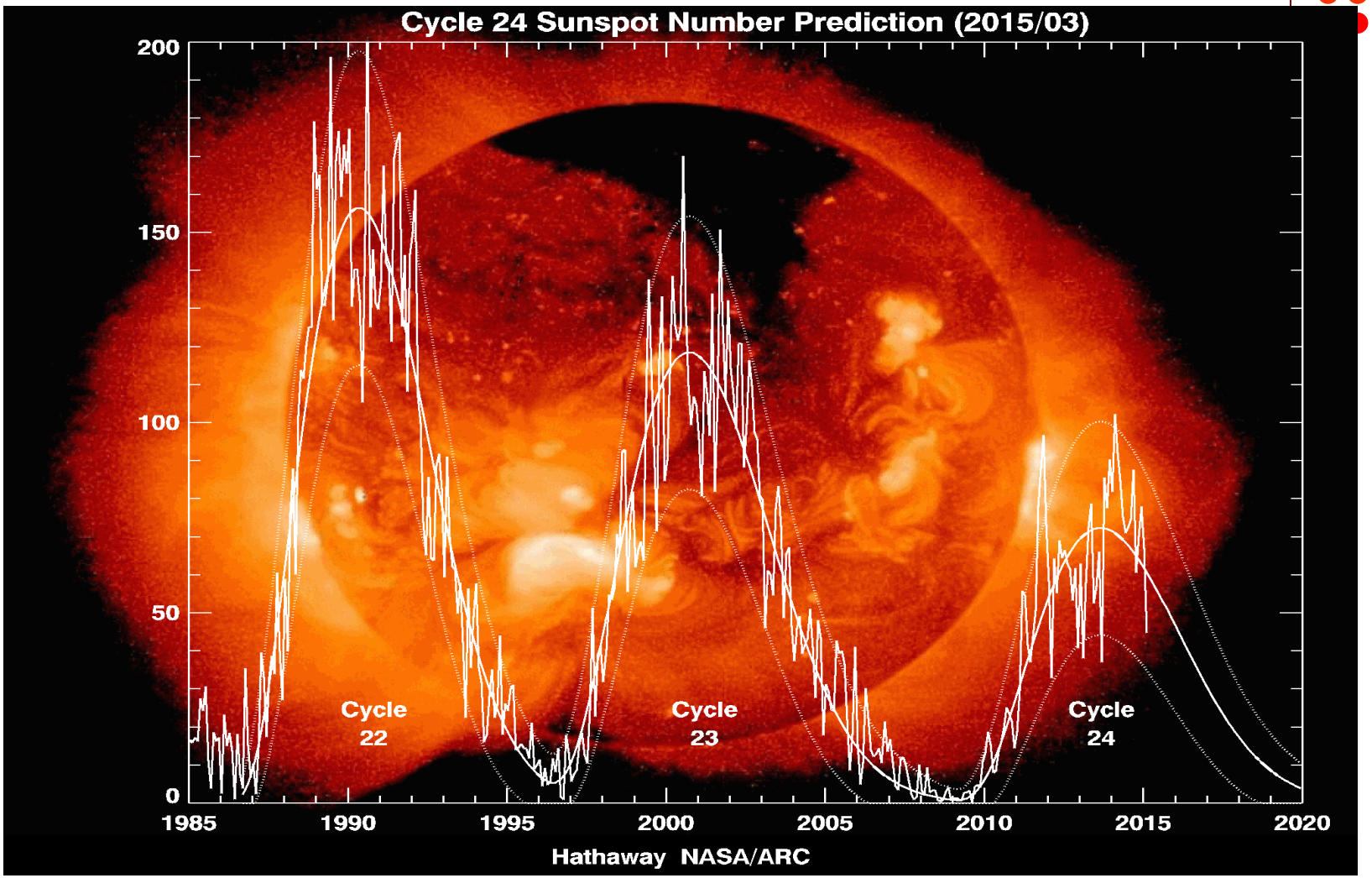
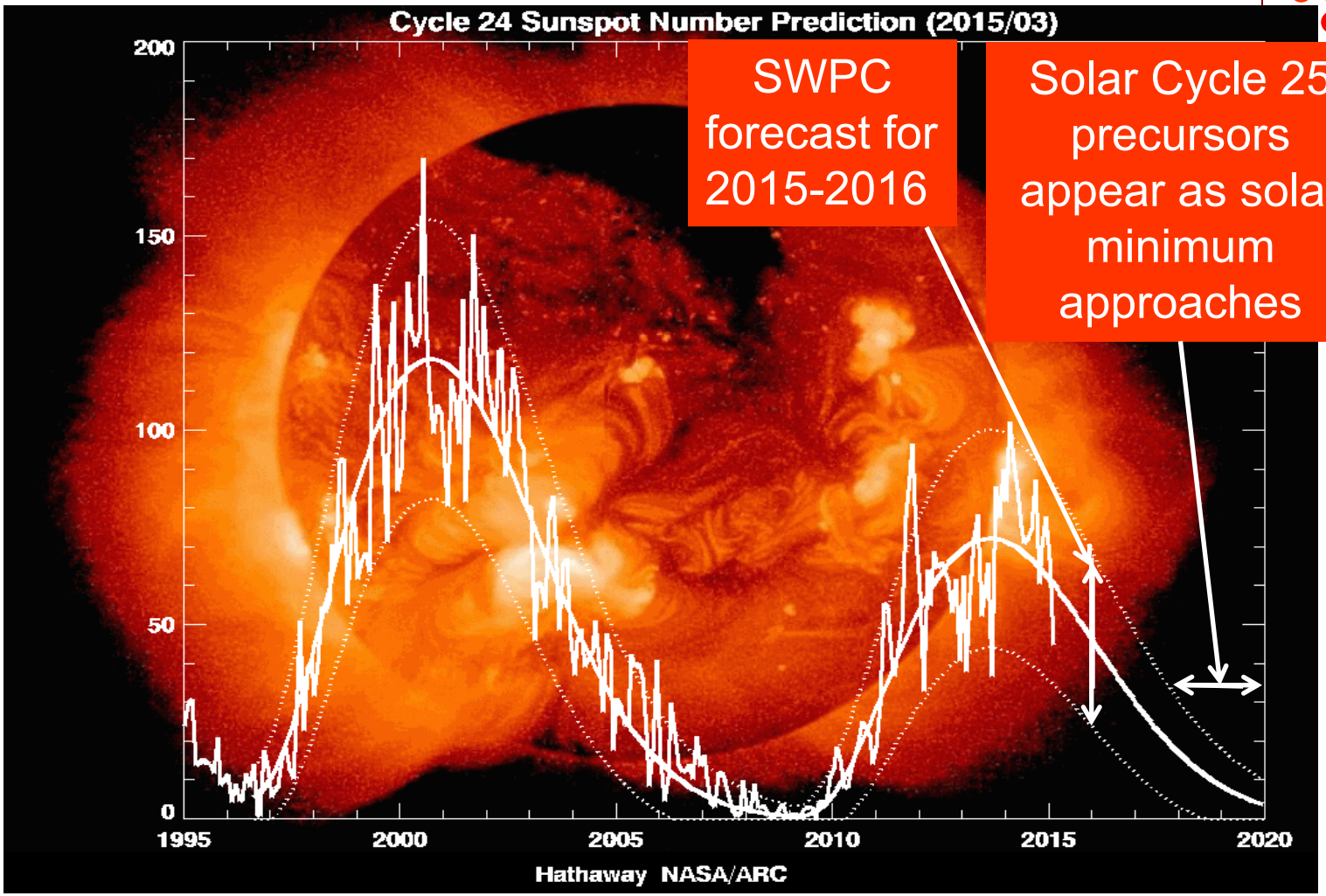
Weakening Sunspot Activity Since Solar Cycle 22



http://solarscience.msfc.nasa.gov/images/Cycle22Cycle23Cycle24big.gif

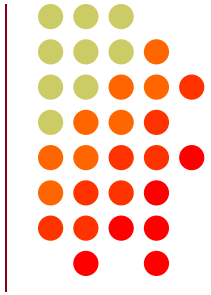
SWPC Forecasts the Next 12 Months to be Similar to 2011 and 2012 (except for the brief Nov 2011 peak)



spotless days will become common by 2018

Forecasting Solar Cycle 25

future indicators of a possible weak Solar Cycle 25

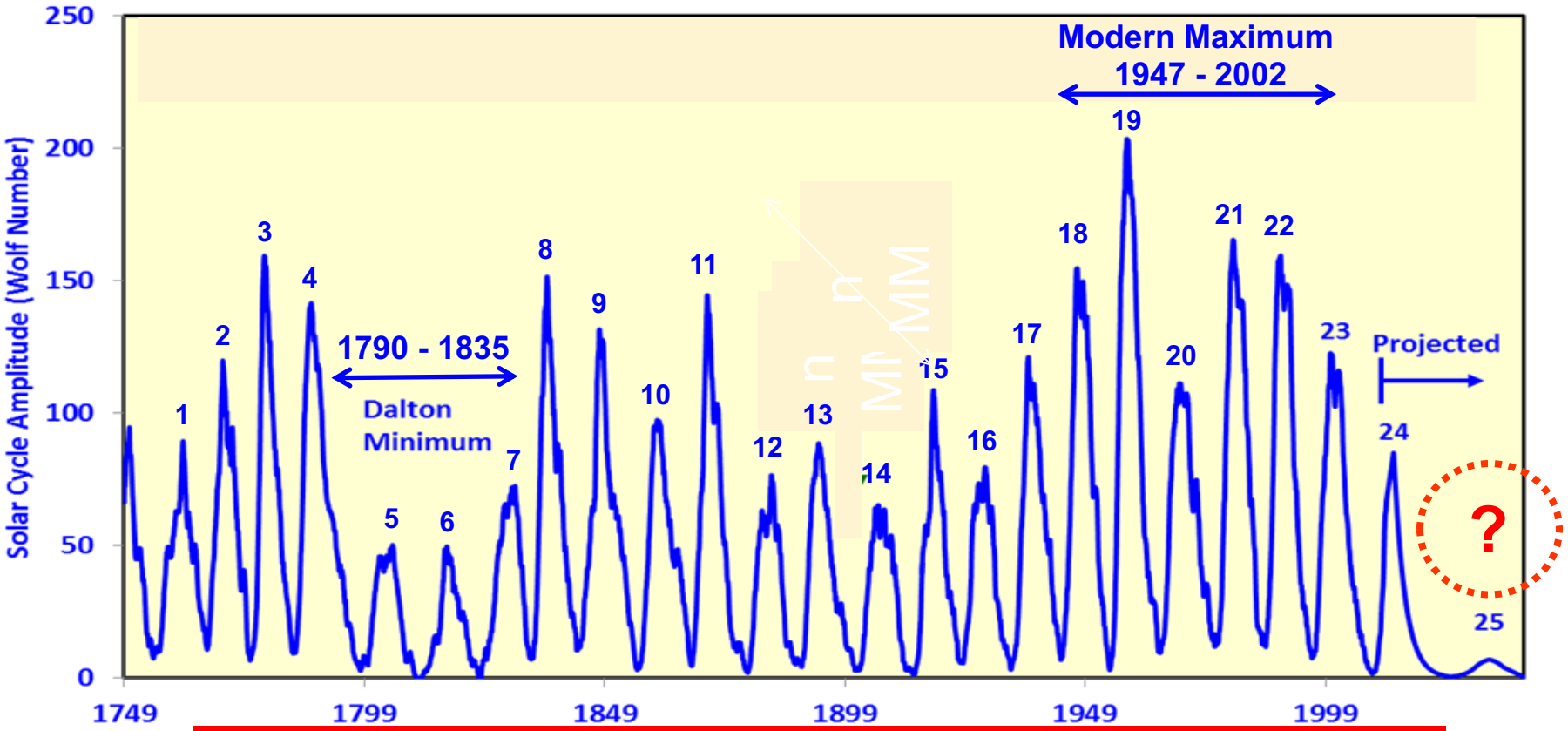


- Weaker than normal solar polar magnetic fields as they near peak intensity from 2018 through 2020
  - as reported by the Wilcox Solar Observatory
- Unusually large numbers of spotless days
- Quieter than normal geomagnetic field from 2018 through 2020
  - reported by the A-index
- Failure of the first Solar Cycle 25 sunspots to appear by 2020
- Solar minimum extending beyond 2020

An accurate forecast is not possible until two or three years *after* solar minimum

A Long Range Estimate of Solar Cycle 25

could sunspots nearly disappear by 2025?



some solar scientists expect Cycle 25 to be the weakest solar cycle (SSN=7) in more than 300 years