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Upcoming next Deep minimum Global Earth Temperature

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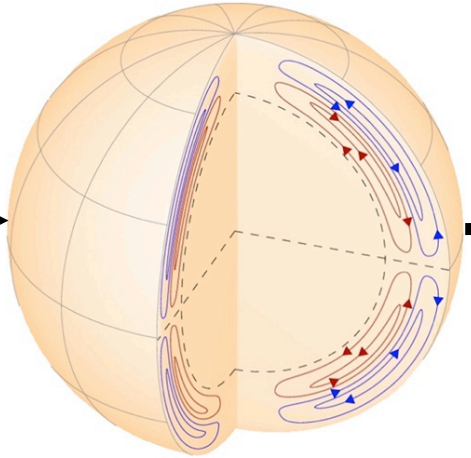
The Solar variability

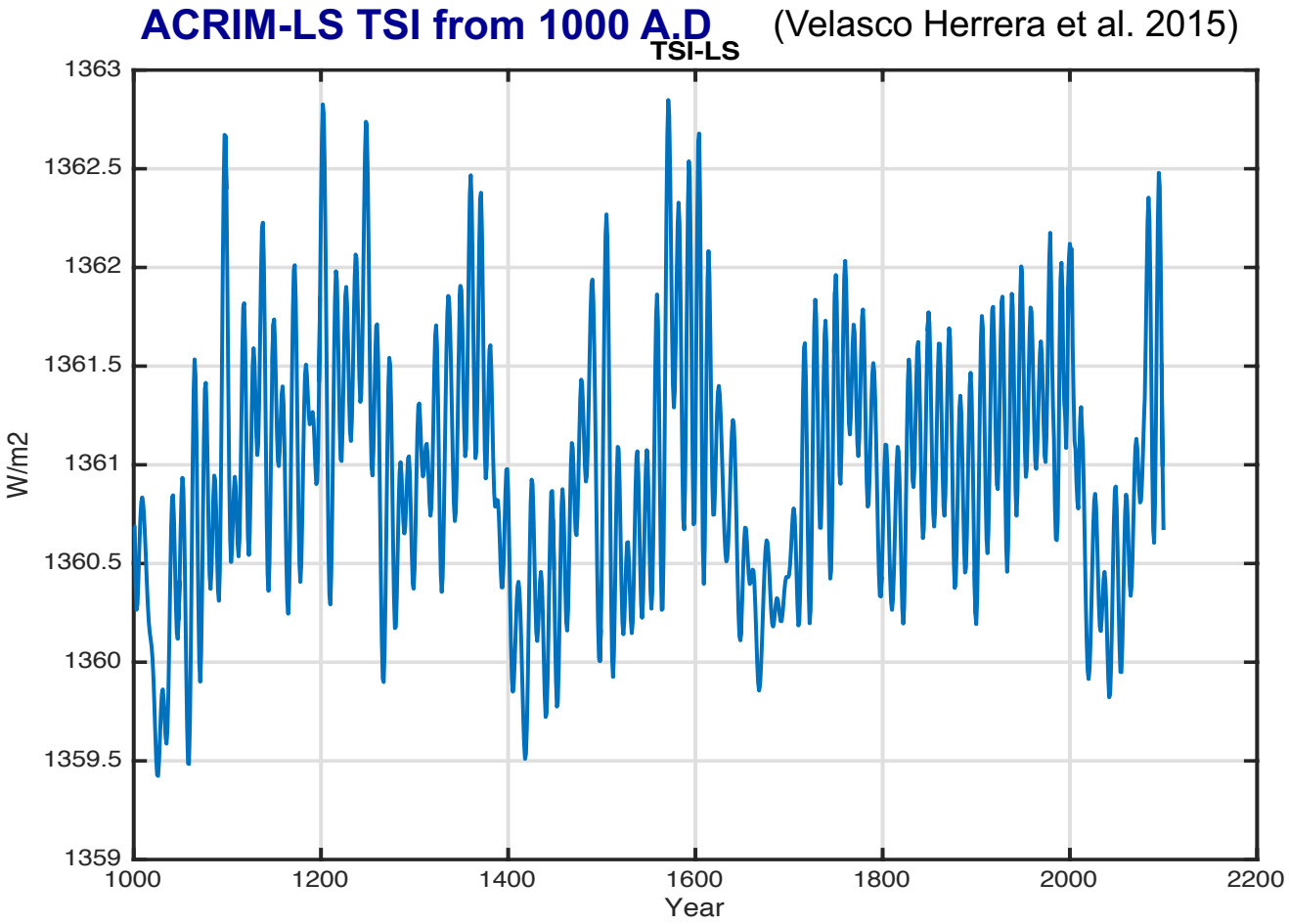
- Has Solar irradiation stationary periods?
- If not, we can never predict future climate
- If so, the periods must have an external stationary source
- It so, the periods will influence temperature on Earth

A force

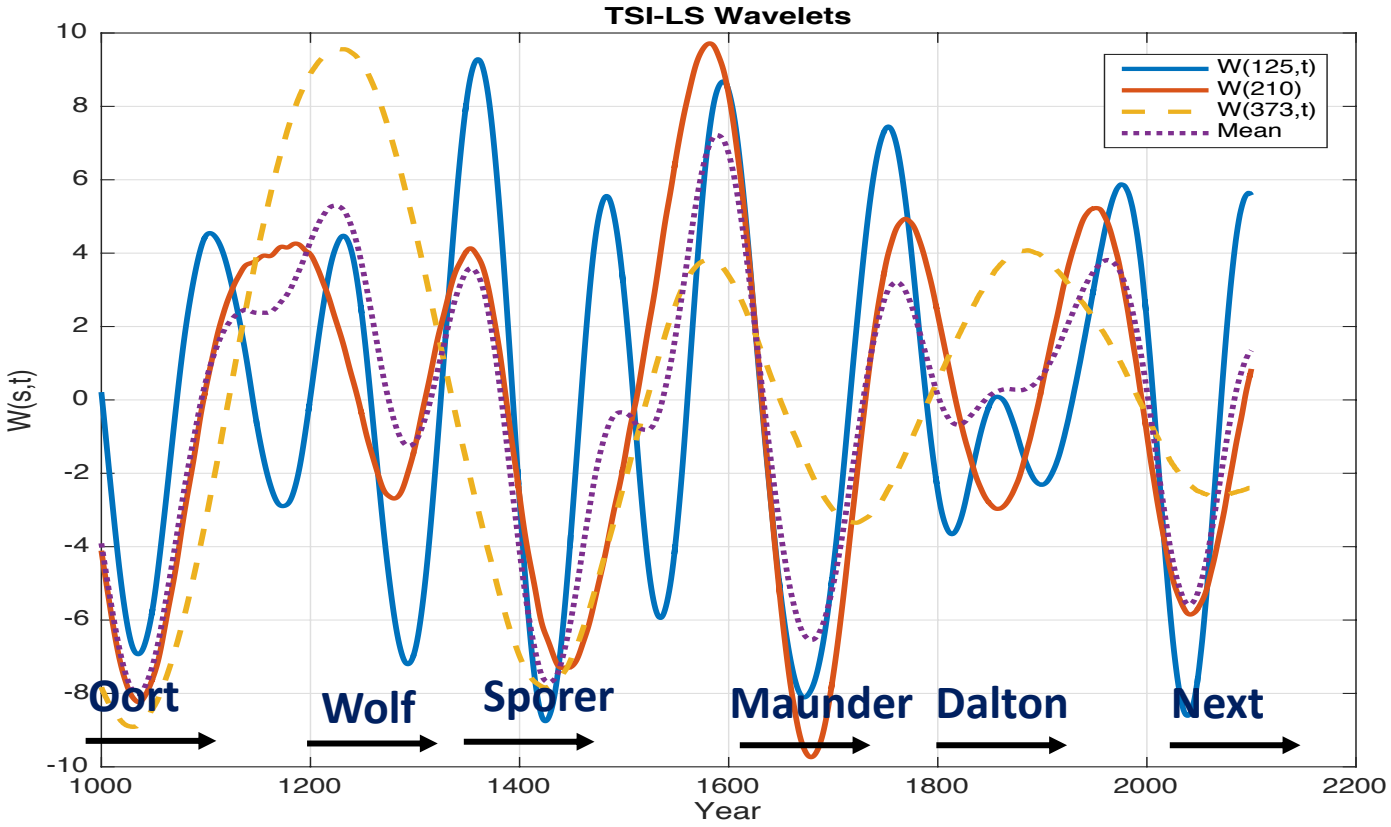


TSI variability

Total Solar Irradiation



Total Solar Irradiation (wavelets)



Coincidence: Large Planets, Solar position TSI period spectrum

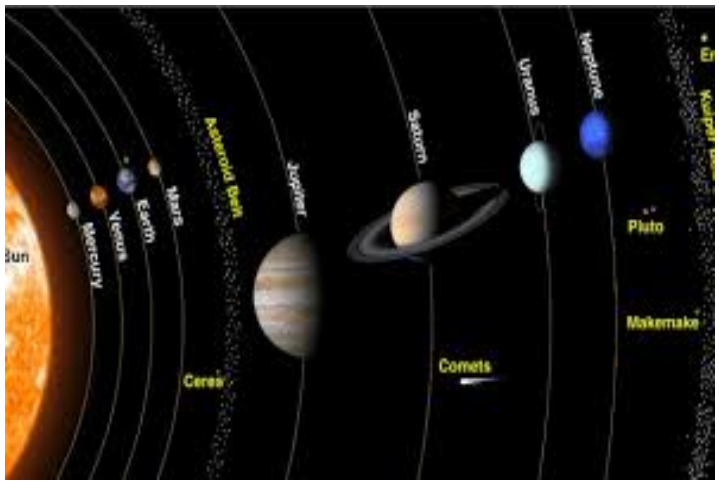
Coincidence: To known deep solar minimum

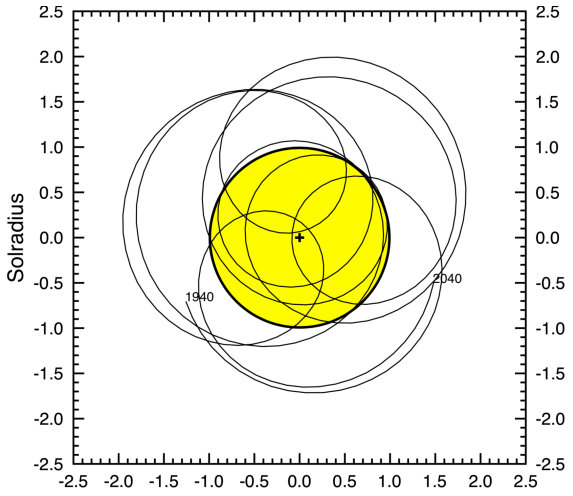
Next deep solar minimum => 2060

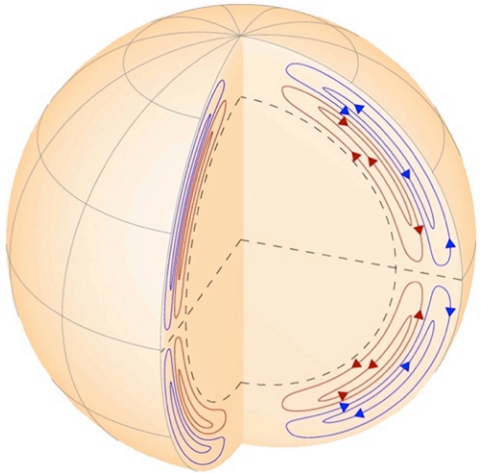
Source of Solar variability

Yndestad and Solheim, 2017, New Astronomy

Planets Position Oscillation ==> **Solar Position Oscillation** ==> **Total Solar Irradiation Oscillation**





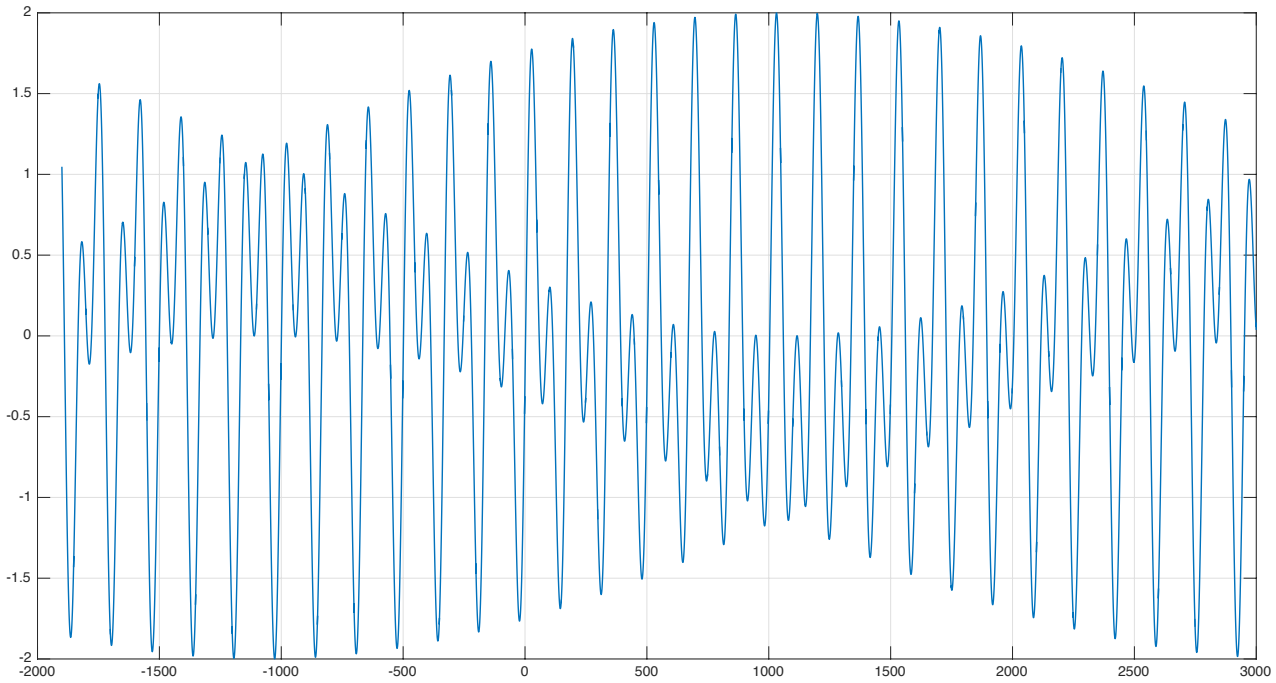


Planet (Jupiter, Saturn, Uranus, Neptune) Oscillations
⇒ Solar Position Oscillation
⇒ Stationary TSI Oscillation

Solar Oscillation Model (UN)

Uranus-Neptune: Solar Model: 2000BC – 3000 AD

TSI Index



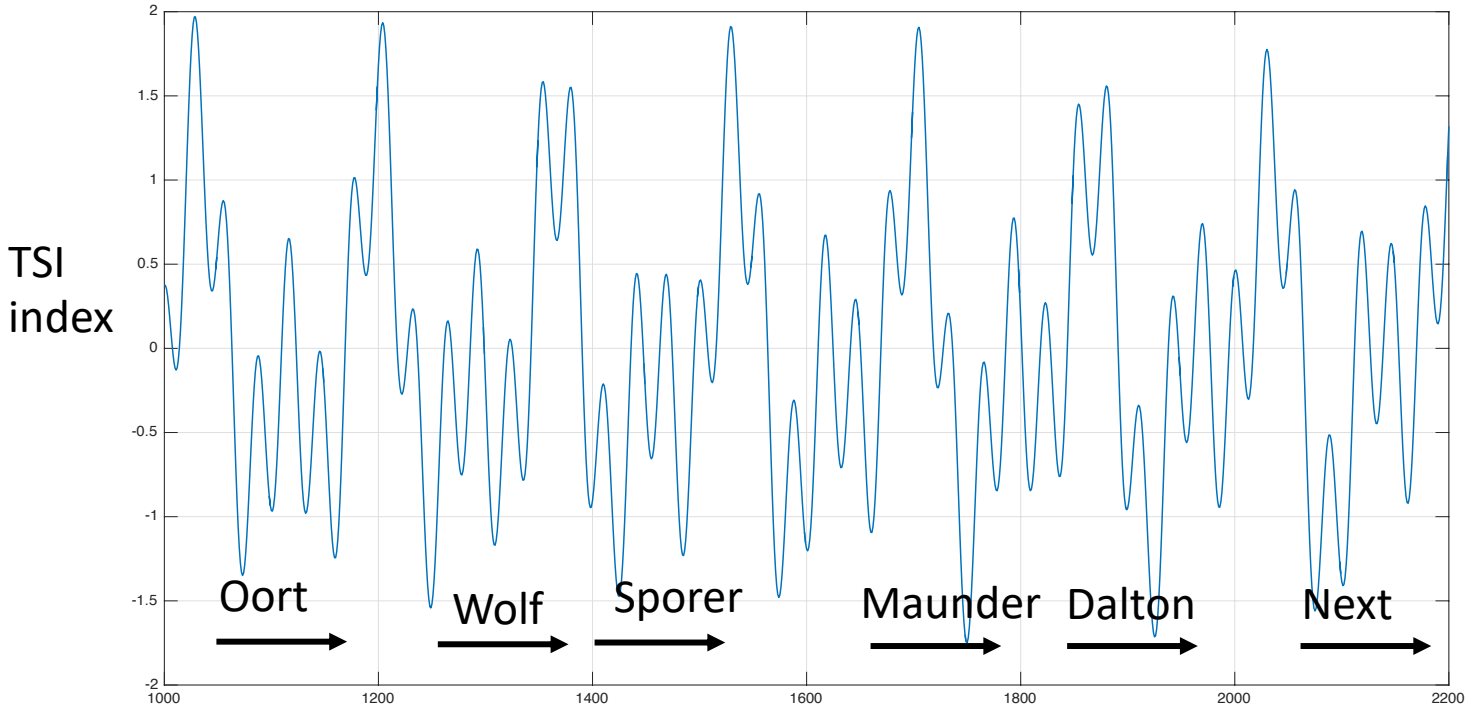
Uranus-Neptune: Period-phase coincidence: 4250 years

More solar irradiation: **80 BC - 2150 AD, max 1030 AD**

Less solar irradiation: **2150 AD - 4275 AD, min 3250 AD**

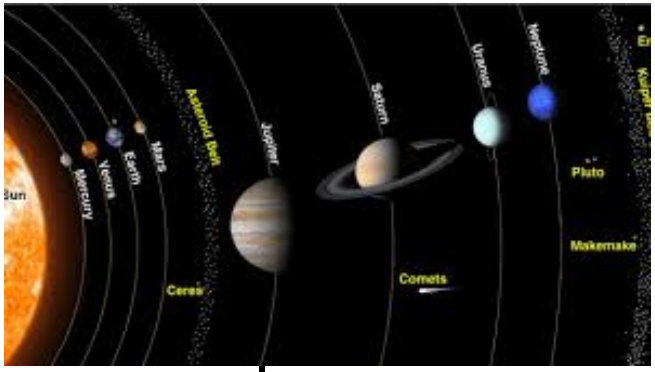
Solar Oscillation Model (SUN)

Saturn-Uranus-Neptune Model: 1000 – 2200 AD

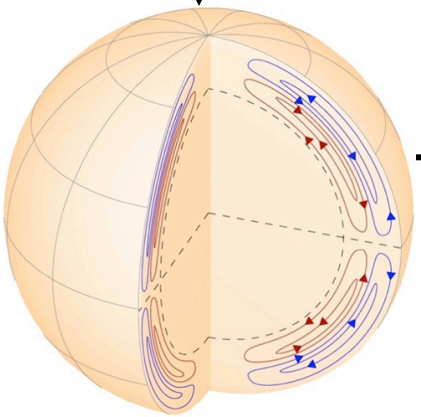


Deep minimum: Coincidences to known minimum solar periods:
Next deep solar minimum: 2090

Global Earth Temperature variability



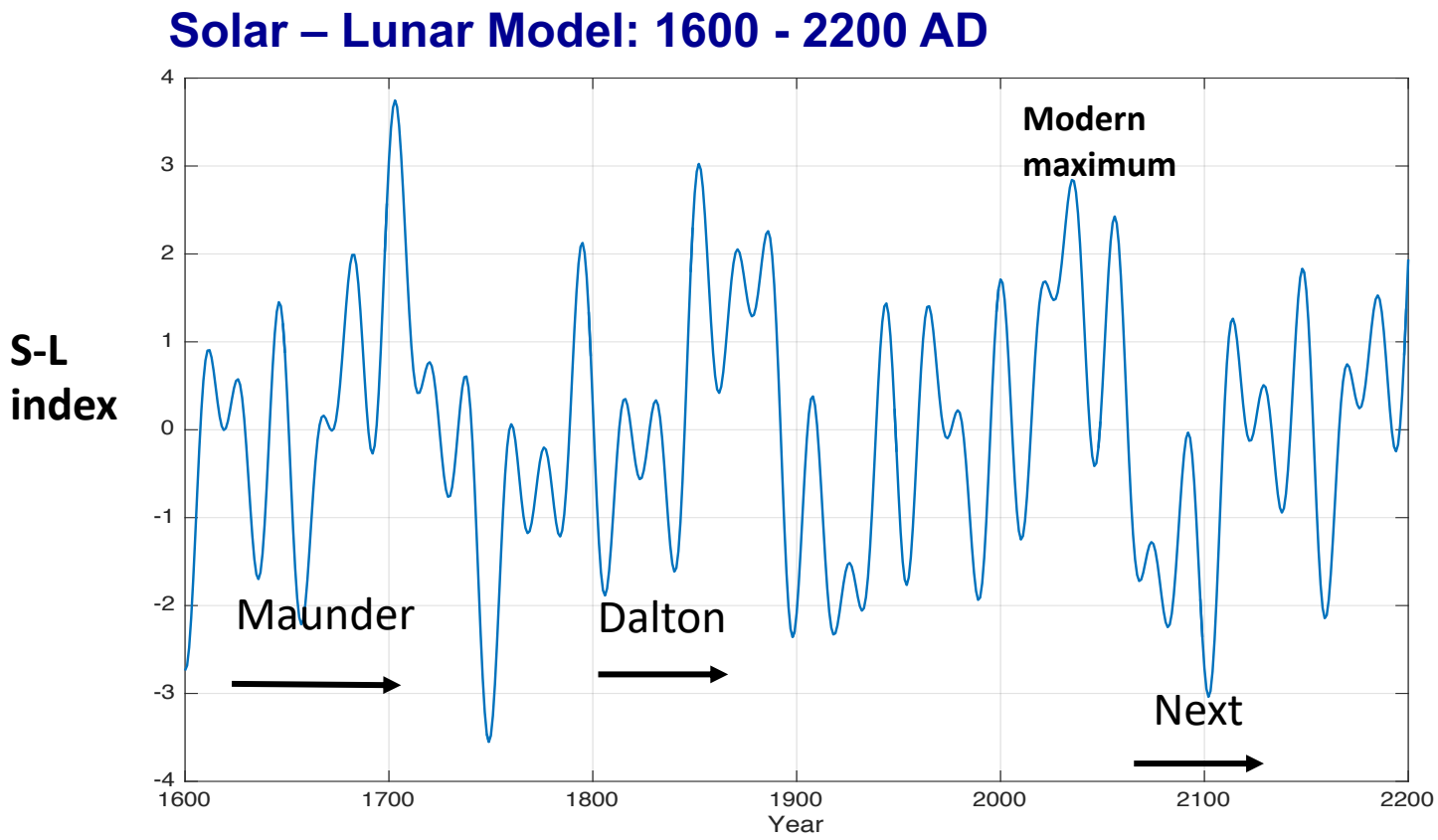
Forced
Lunar nodal tide



Forced TSI
Solar spectrum

Global
Temperature
variability

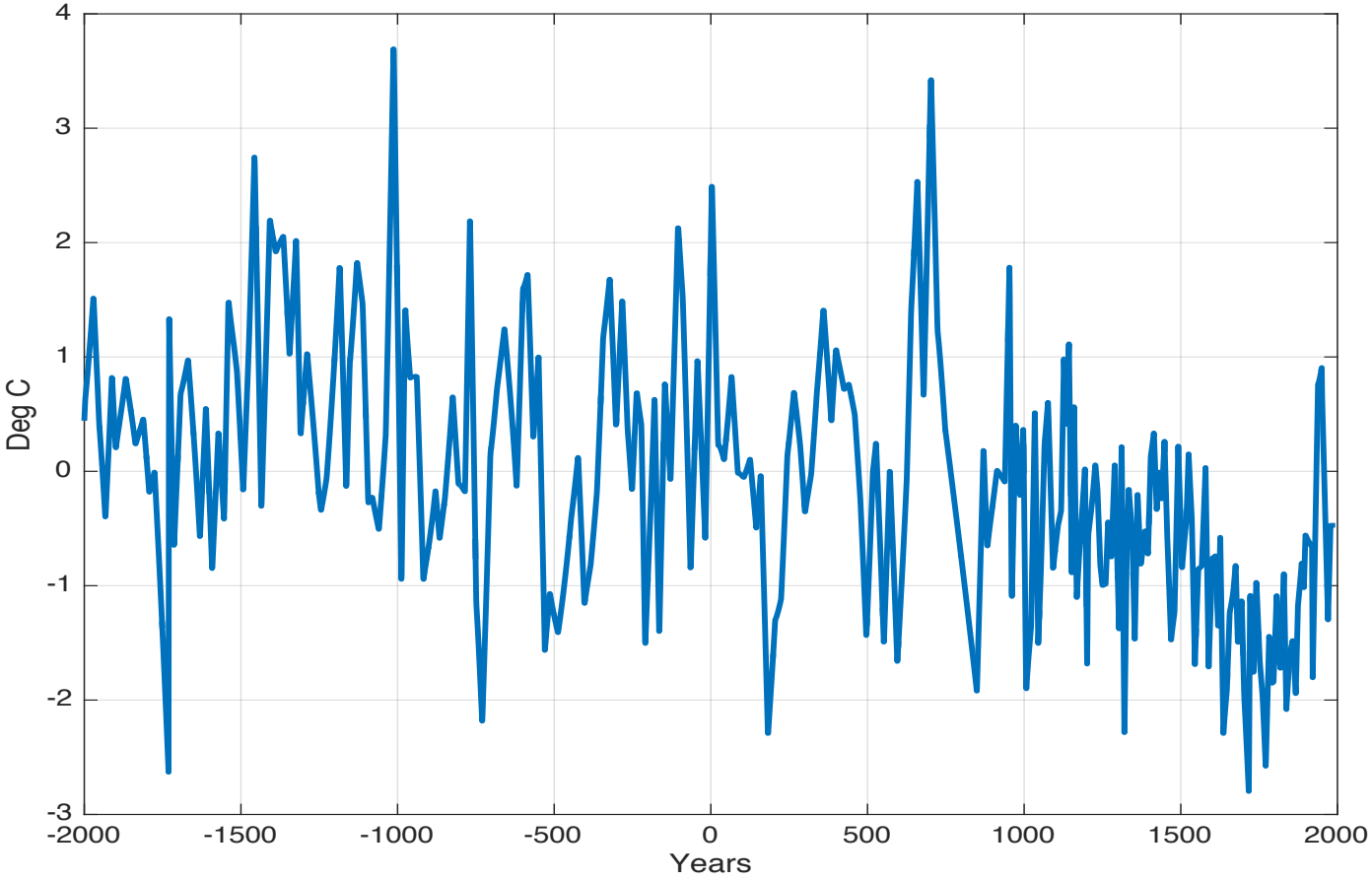
Solar-Lunar Model



Coincidences to known deep solar minimum
Modern maximum: 2035 AD
Next deep minimum: 2100 AD

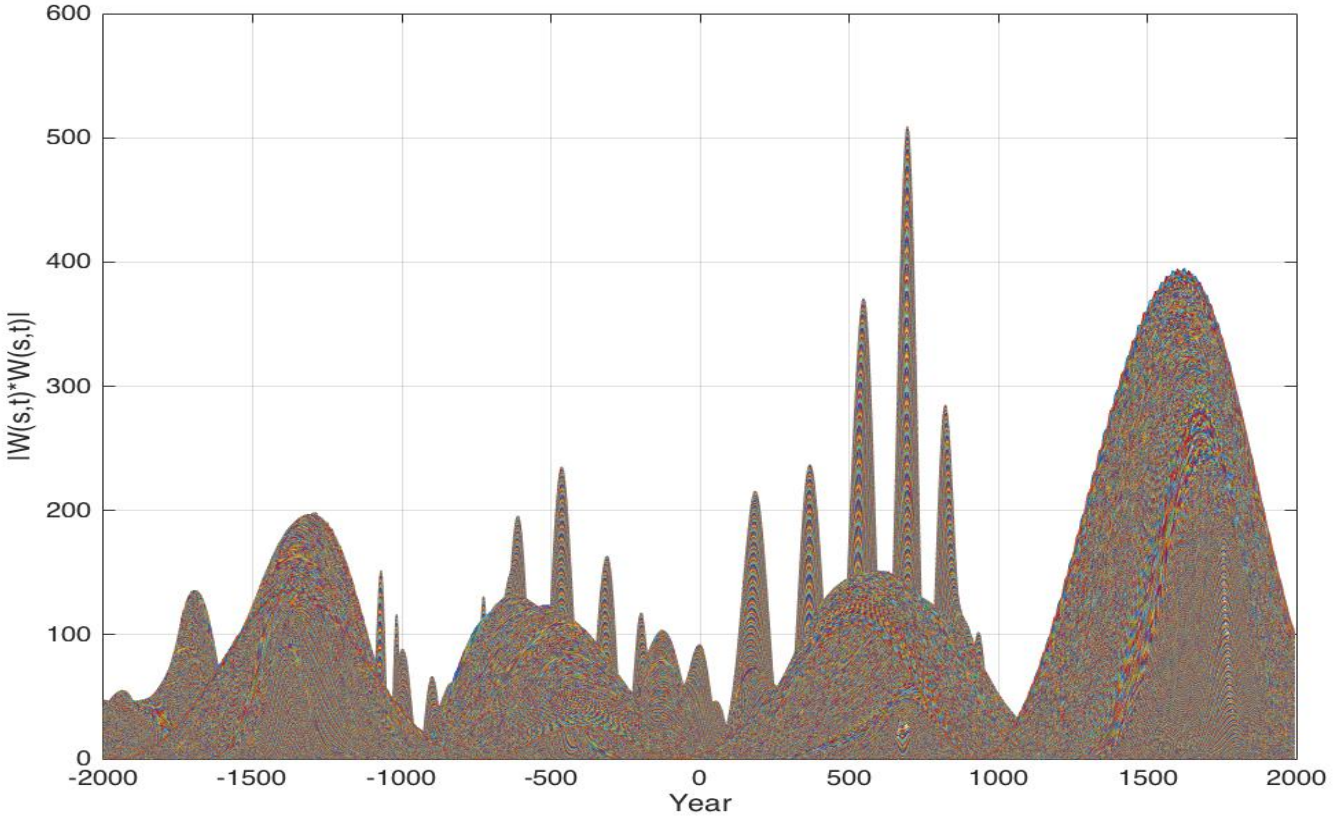
Greenland Temperature (GISP2)

2000 BC to 2000 AD



Greenland Temperature (GISP2)

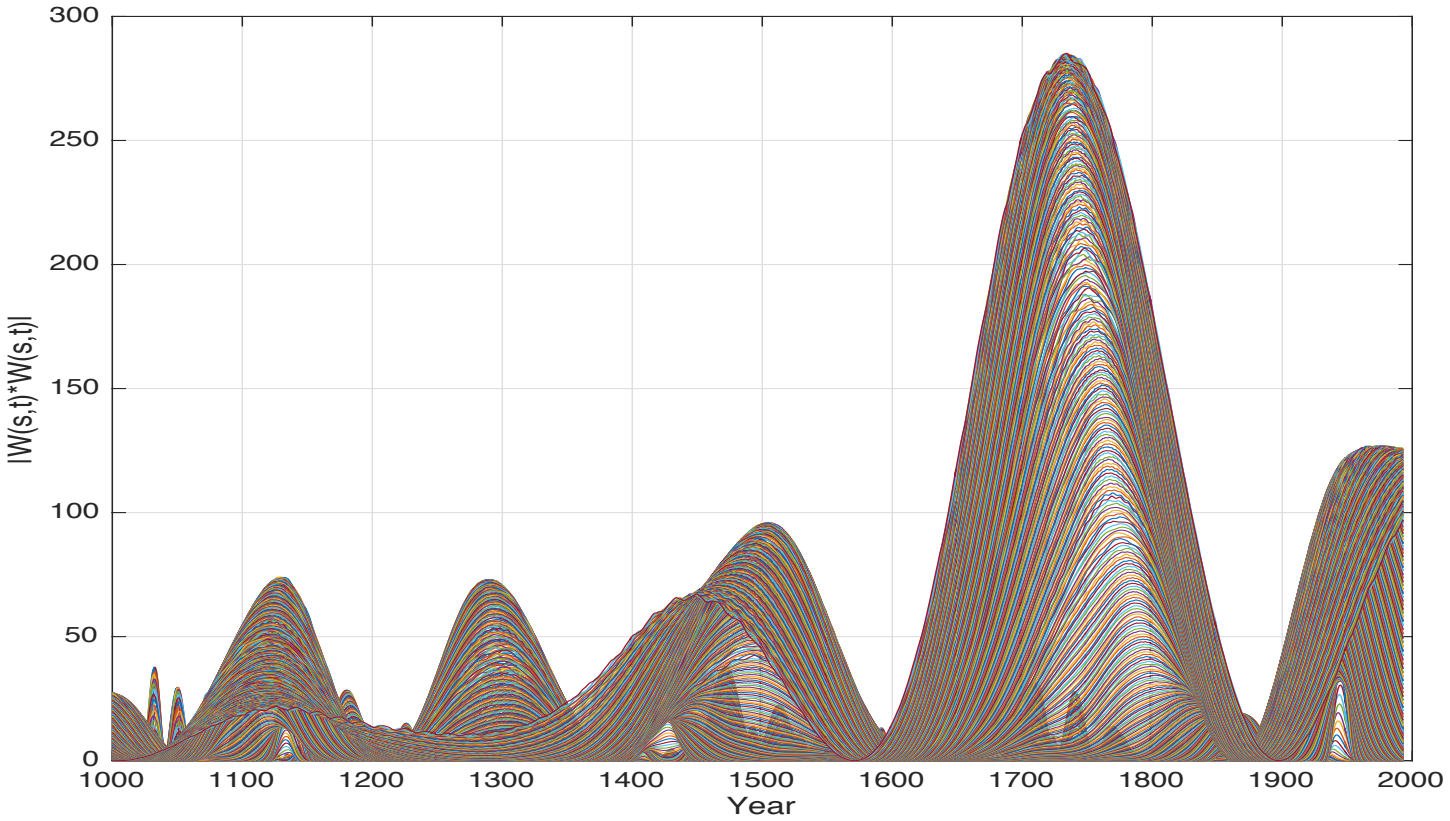
Wavelet Power spectrum: 2000 BC to 2000 AD



Period-phase locked to Solar-Lunar spectrum
Stationary 2046-yr period (Hallstatt-period)
Cold period: 1100 AD – 2150, Minimum: 1613

Greenland Temperature (GISP2)

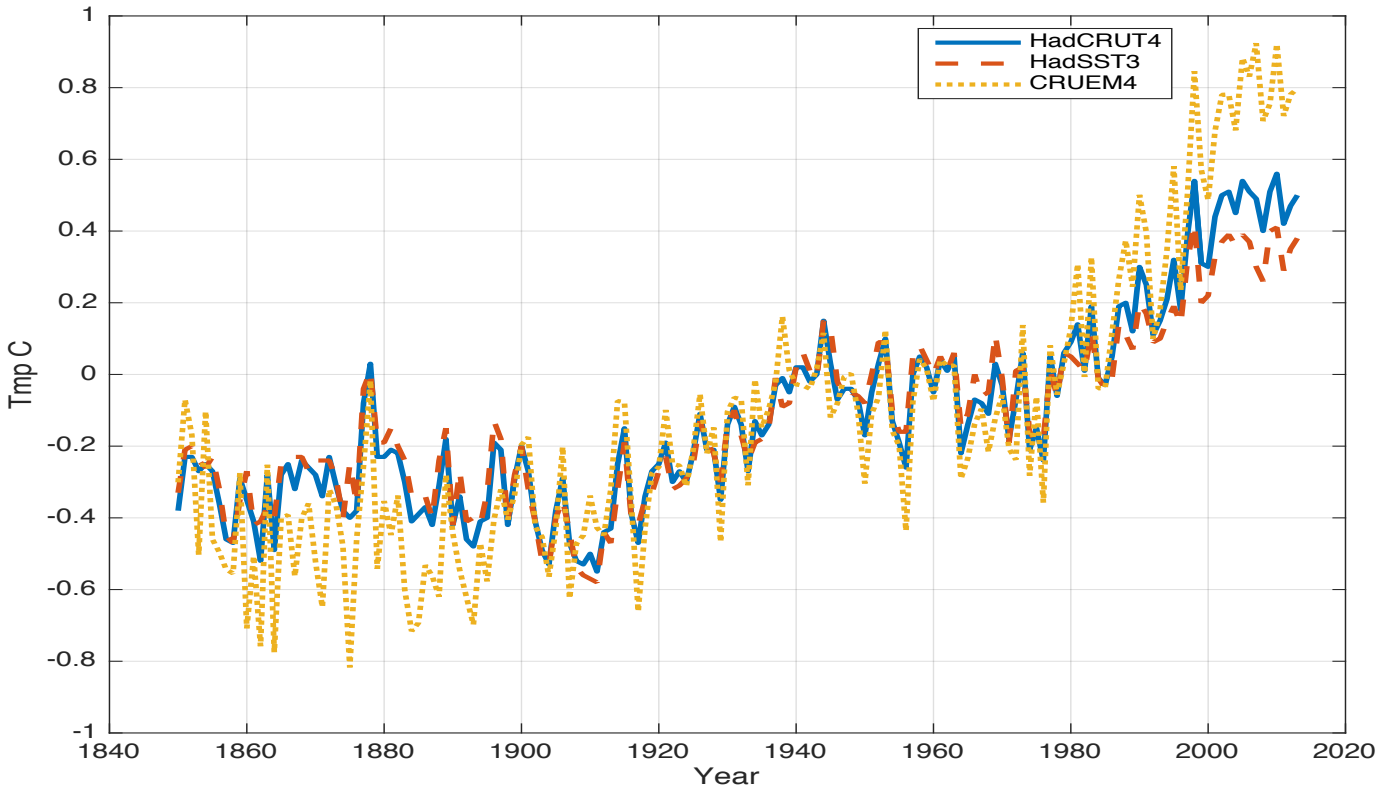
1000 AD to 2000 AD



Period-Phase locked to Solar-Lunar periods
Modern warm period: 1840 – 2050 AD
Next cold period: 2050 – 2160 AD; Deep minimum: 2155 AD

Global Earth Temperature

HadCRUT4: 1850 to 2017 AD



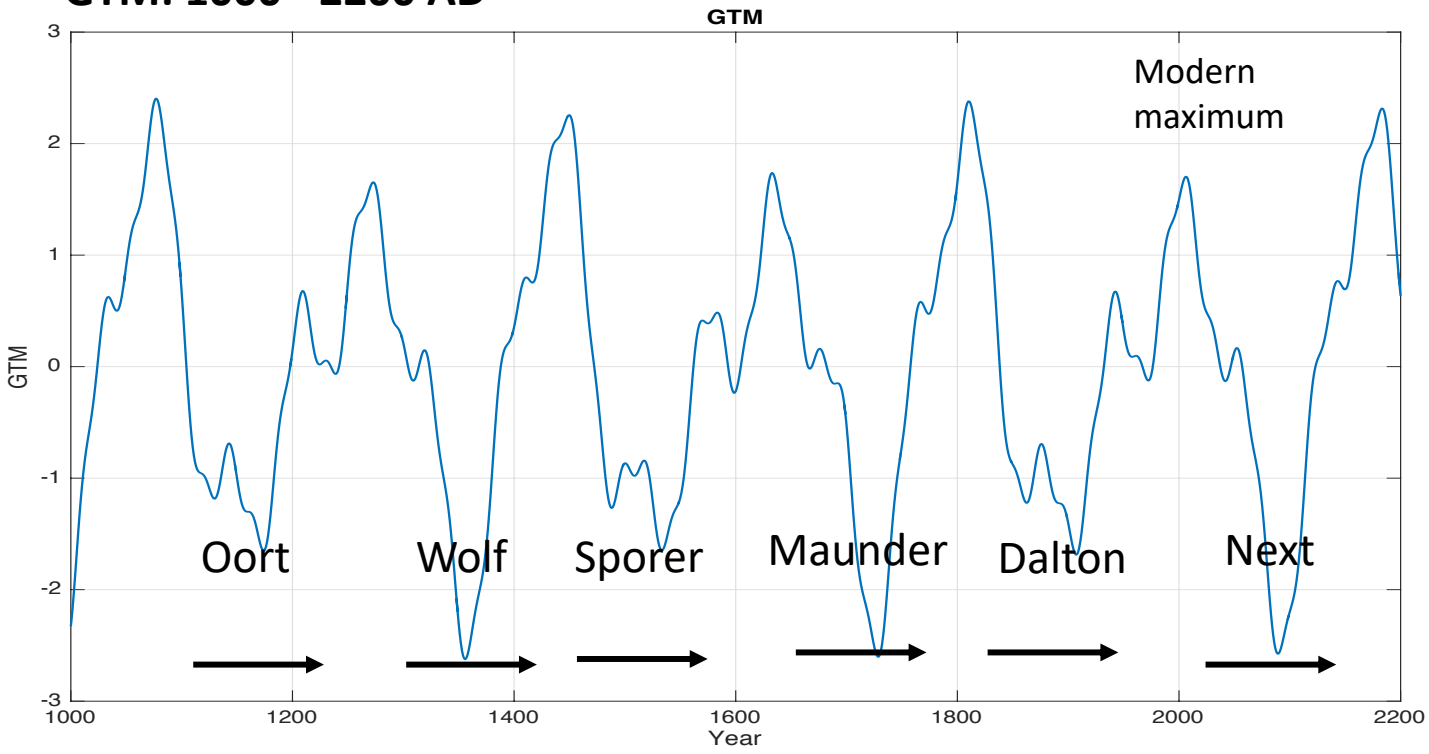
Period-phase locked to Solar-Lunar periods

Solar-Lunar Spectrum correlated (R = 0.91) to HadCRUTE4

Global Temperature Model

Model based on HadCRUTE4 data series

GTM: 1000 - 2200 AD



Period-phase locked to Solar-Lunar periods

Minimum temperature => Known minimum solar variability

Next deep minimum temperature: 2090

Summary

Independent data show same results

	Oort	Wolf	Spører	Maunder	Dalton	Next 1	Next 2
Solar minimum (Usoskin,)	1040	1305	1470	1680	1805		
Sunspots minimum (Yndestad, Solem, 2017)	1026	1249	1473	1696	1811	2035	
TSI-LS minimum (Yndestad, Solam, 2017)	1035	1289	1418	1672		2060	
Solar Model Minimum	1074	1249	1425	1749	1865	2075	2250
Solar-Lunar Model Minimum	1075	1245	1428	1747	1895	2100	2250
Global Temperature Model (HadCRUTE4)		1354		1729		2090	
Greenland 420-yr (GISP2-1k)		1290		1754		2154	
Greenlan 2046-yr (GISP2-4m)				1613			263

Thank you

2004: Greenland temperature (wavelet) (PC1)

A stationary 186-yr period from 500 to 2000 A.D

Q1: Why minimum temperature in 1850?
Q2: Will there be a cold period in 2040?