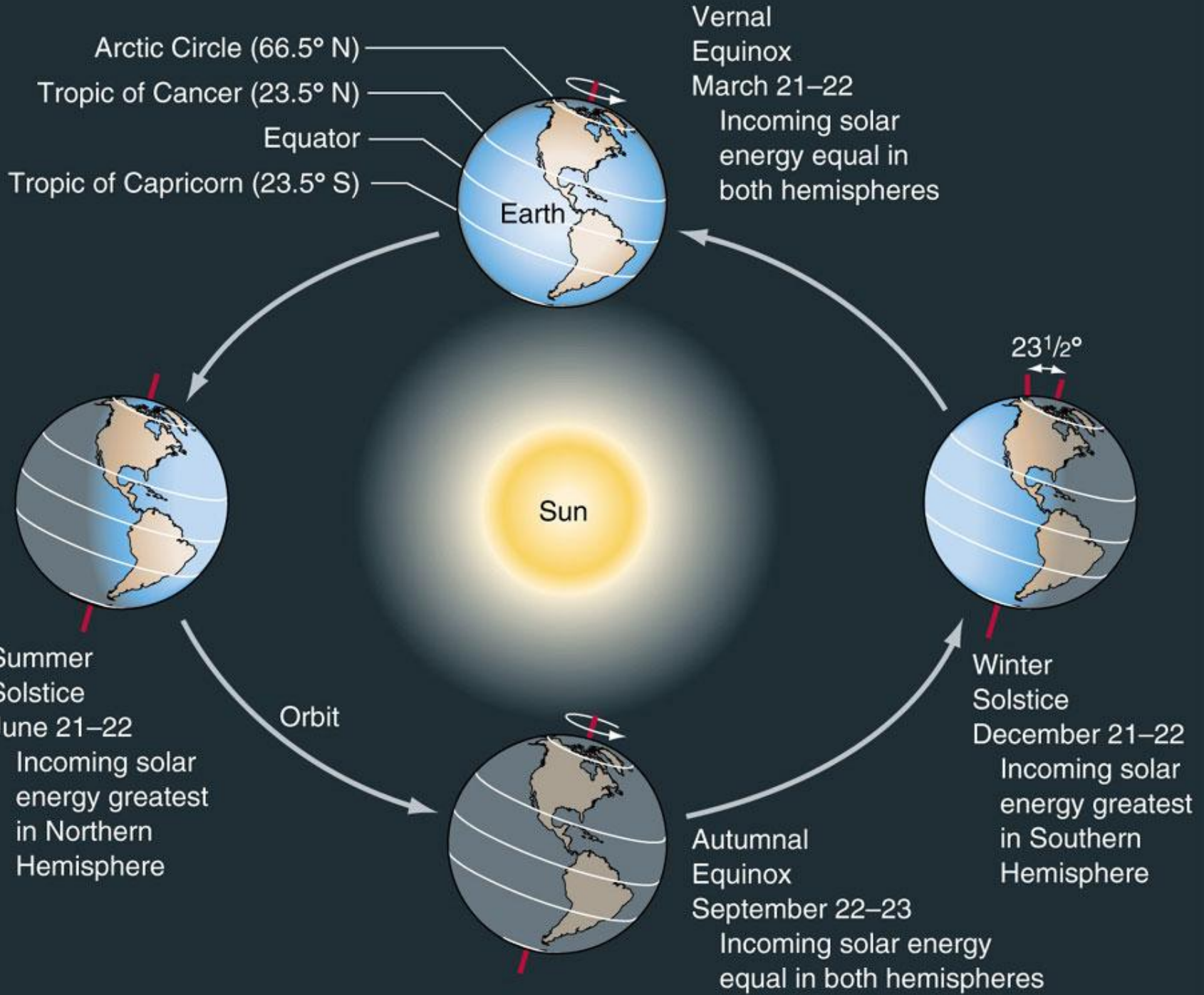
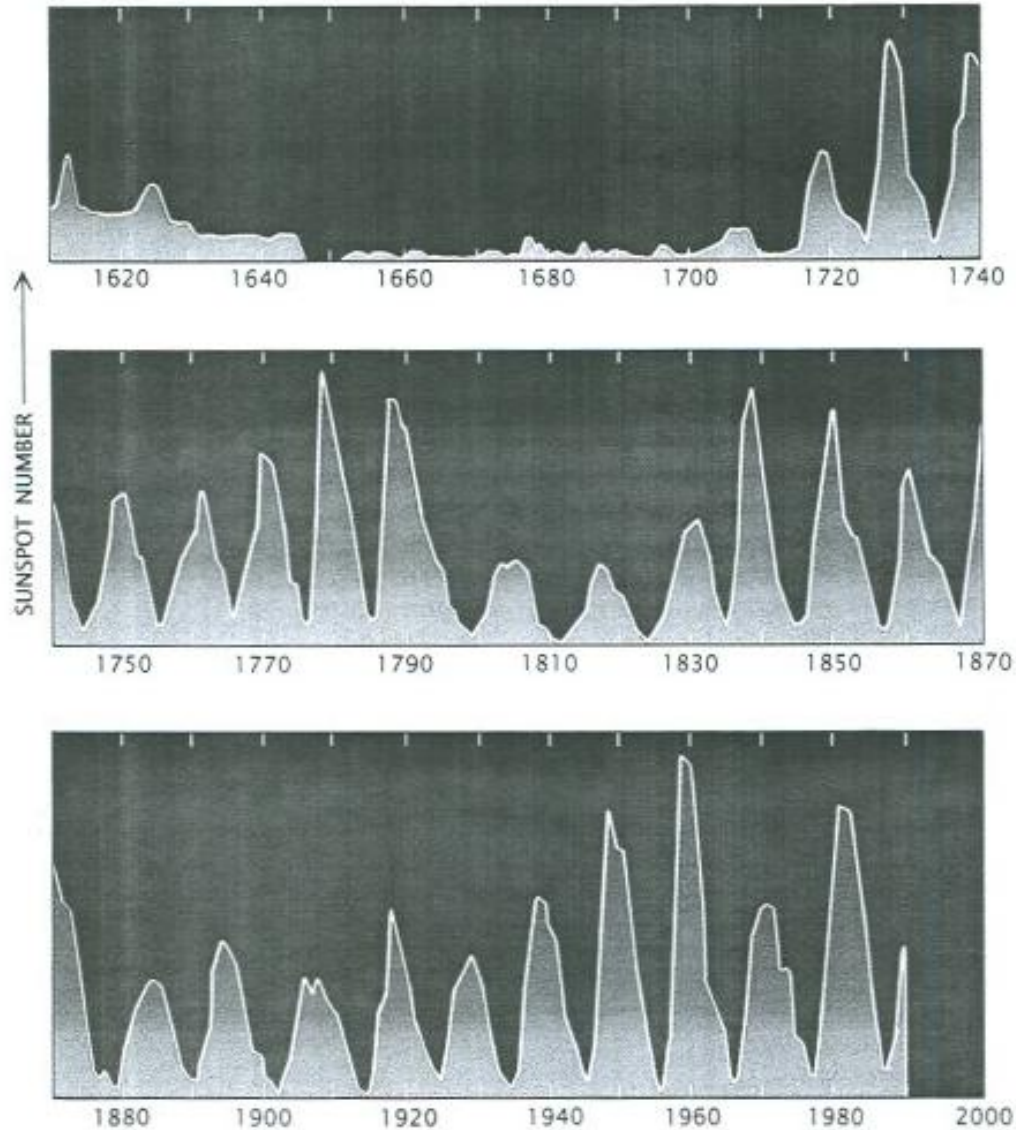


Radiação solar

- Fonte variável de energia



Manchas solares



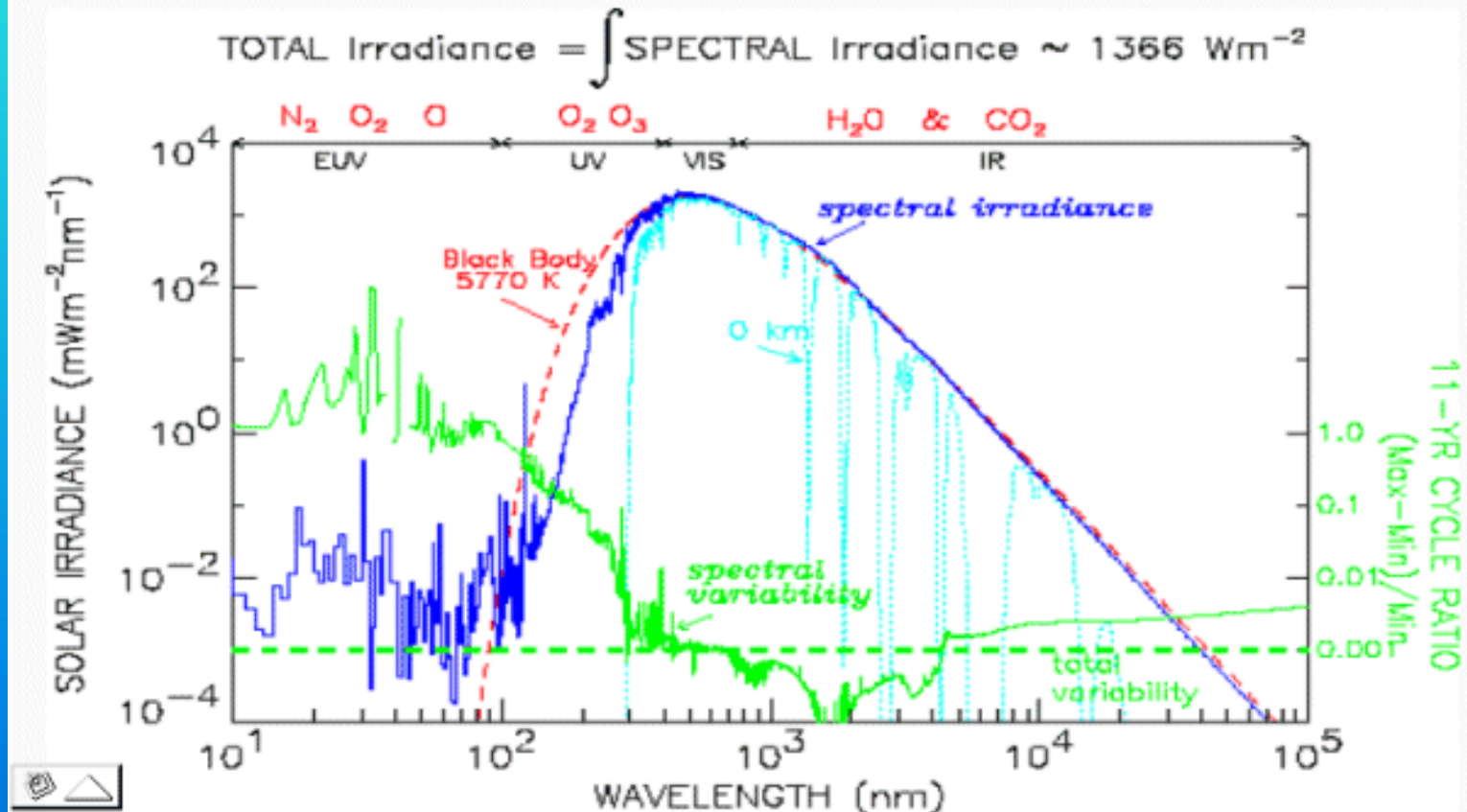
Extraído de
Foukal, P. V,
The Variable
Sun, Scientific
American,
1990



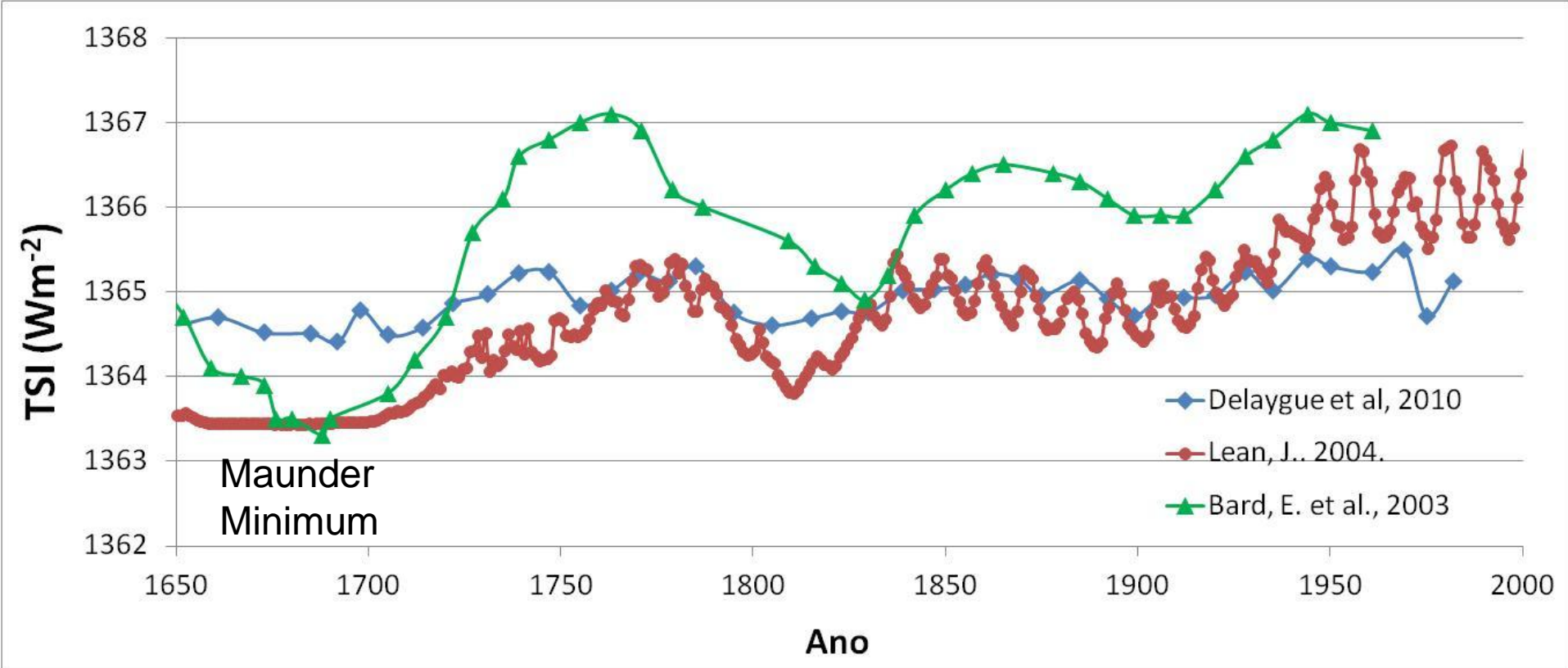
Variações na radiação solar são devidas a:

- Órbita elíptica (ciclo anual)
- Rotação da Terra (ciclo diurno)
- Atividade solar (minutos a anos)

SOLAR SPECTRUM, VARIABILITY and ATMOSPHERIC ABSORPTION

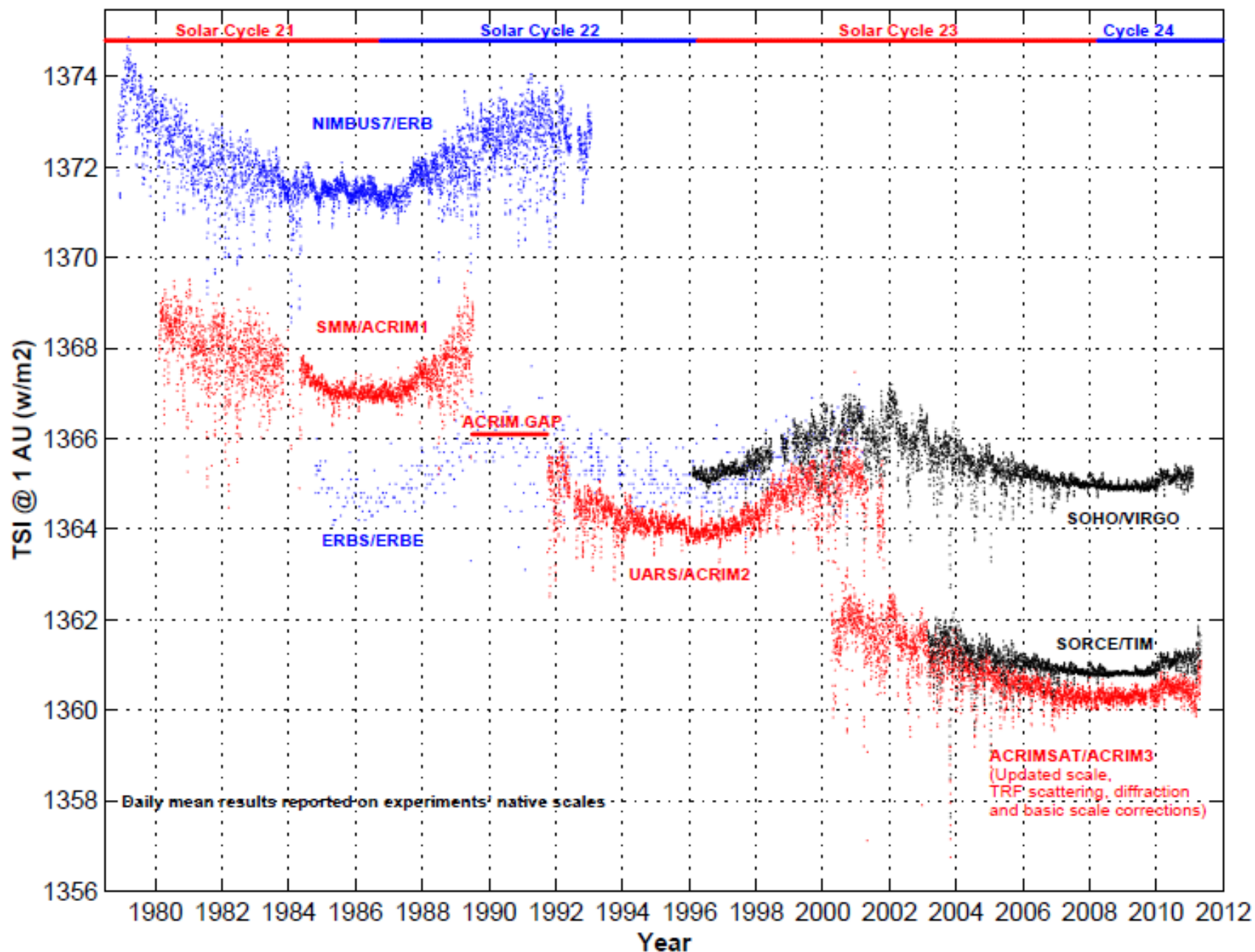


<http://science.nasa.gov/headlines/images/sunbathing/sunspectrum.htm>

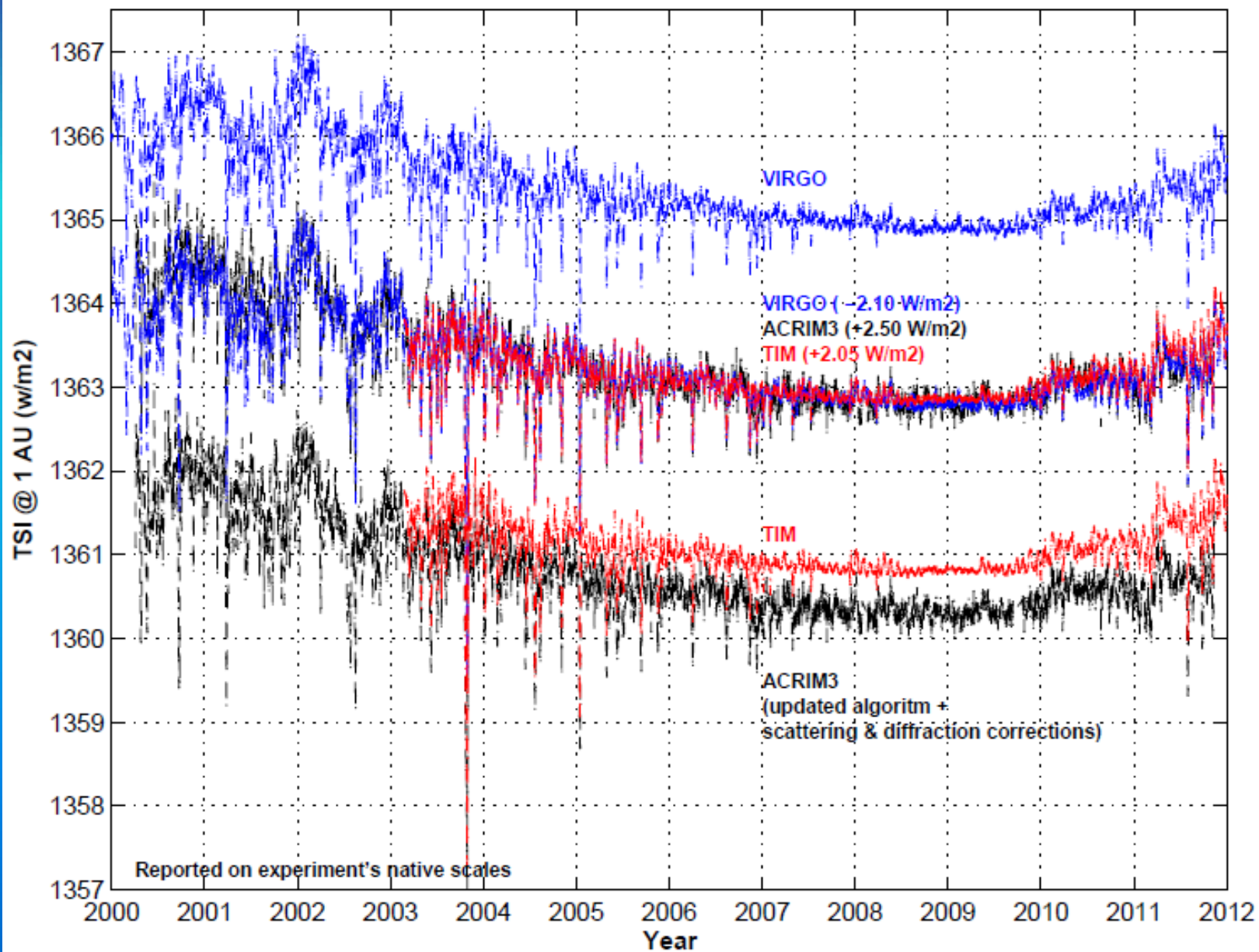


- Delaygue et al., 2010: reconstrução a partir da análise do ¹⁰Be em amostras de gelo coletadas na Antártica ($1364,9 \pm 0,2 \text{ Wm}^{-2}$)
- Lean, 2004: ciclo de 11 anos das manchas solares + background ($1364,7 \pm 0,8 \text{ Wm}^{-2}$)
- Bard et al., 2003: ¹⁰Be + modulação geomagnética ($1365,3 \pm 1,3 \text{ Wm}^{-2}$)

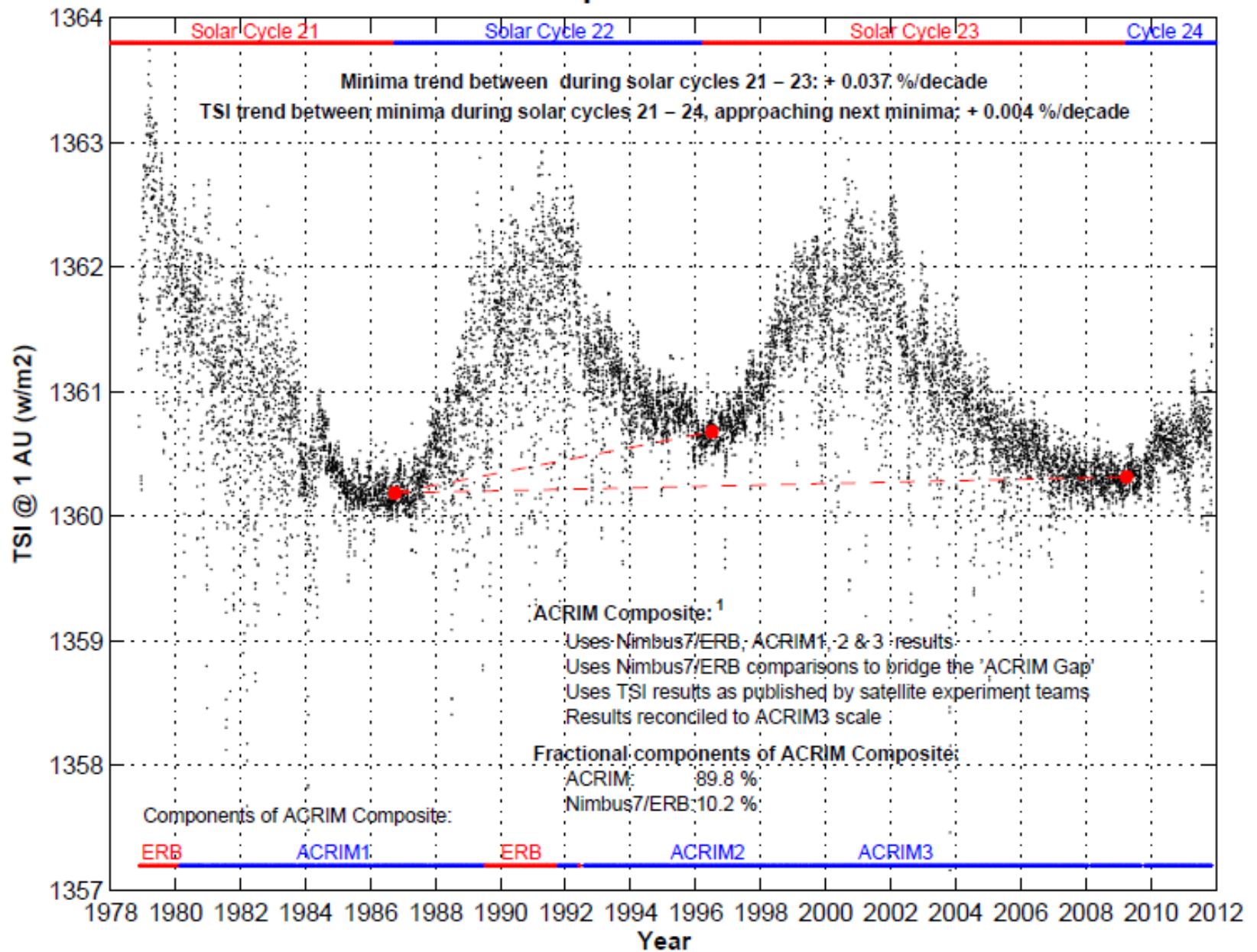
TOTAL SOLAR IRRADIANCE MONITORING RESULTS: 1978 to Present



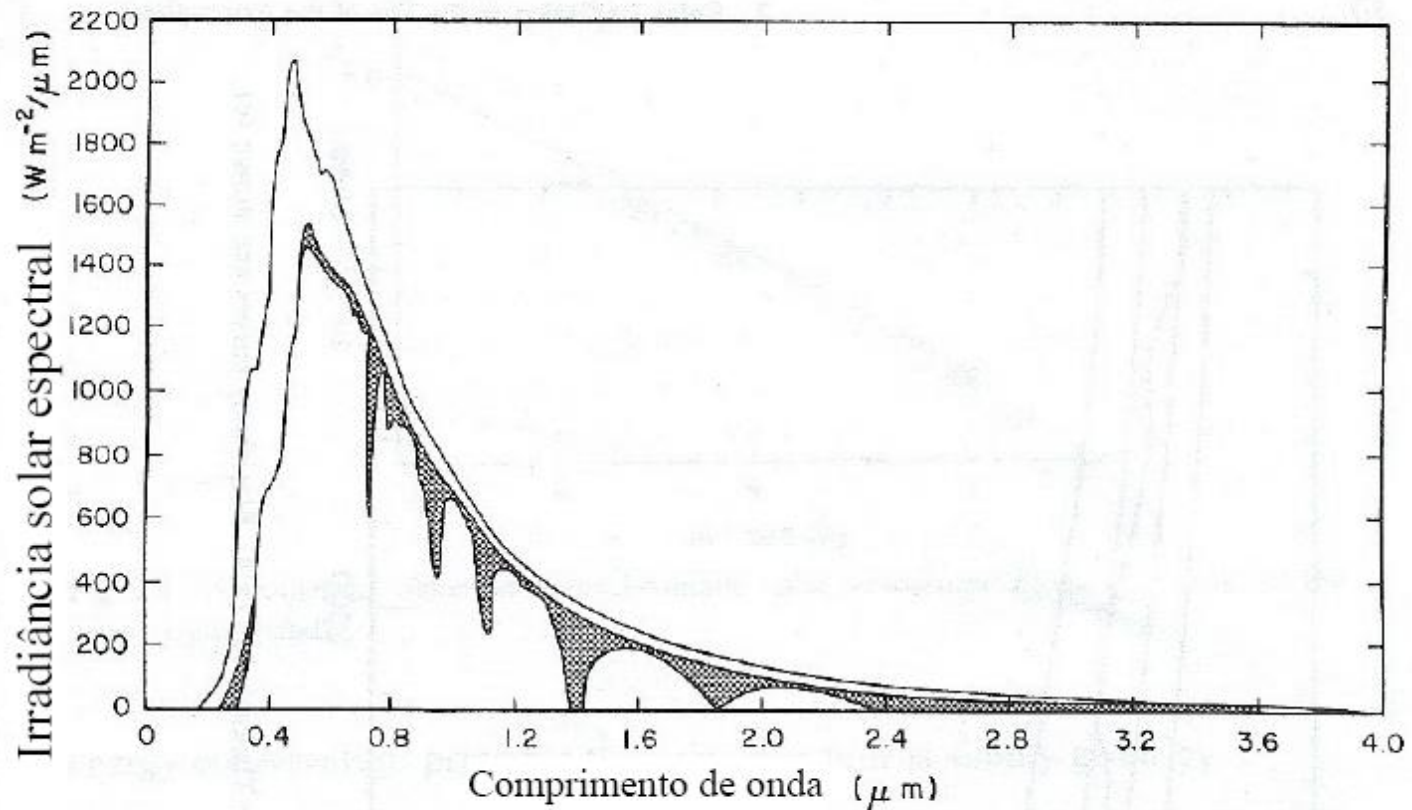
TOTAL SOLAR IRRADIANCE MONITORING DURING ACRIM3 MISSION



ACRIM Composite TSI Time Series



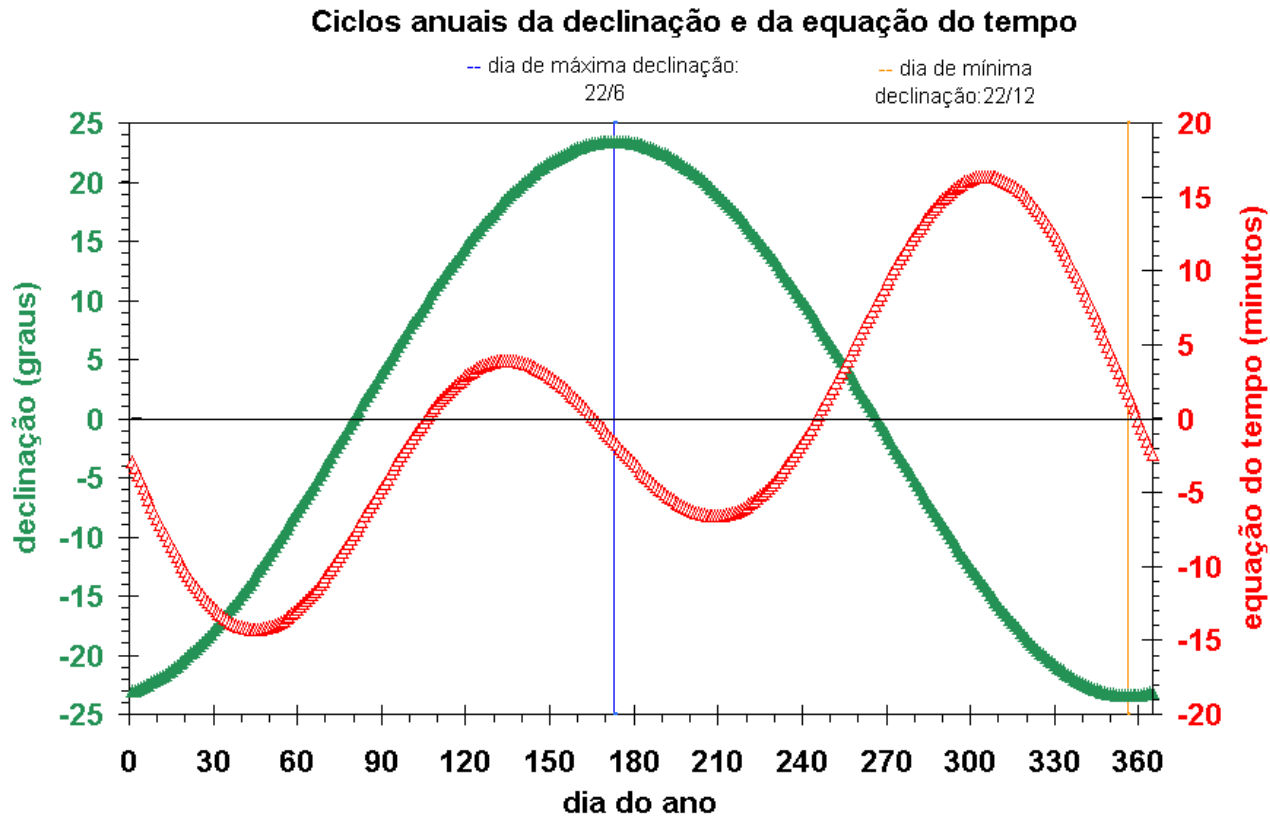
¹ Willson & Mordvinov, GRL, 2003



0.3	0.5	0.7	0.94	1.1	1.38	1.87	2.7	3.2
O ₃	O ₃	O ₂	H ₂ O	H ₂ O	H ₂ O	H ₂ O	H ₂ O - CO ₂	H ₂ O

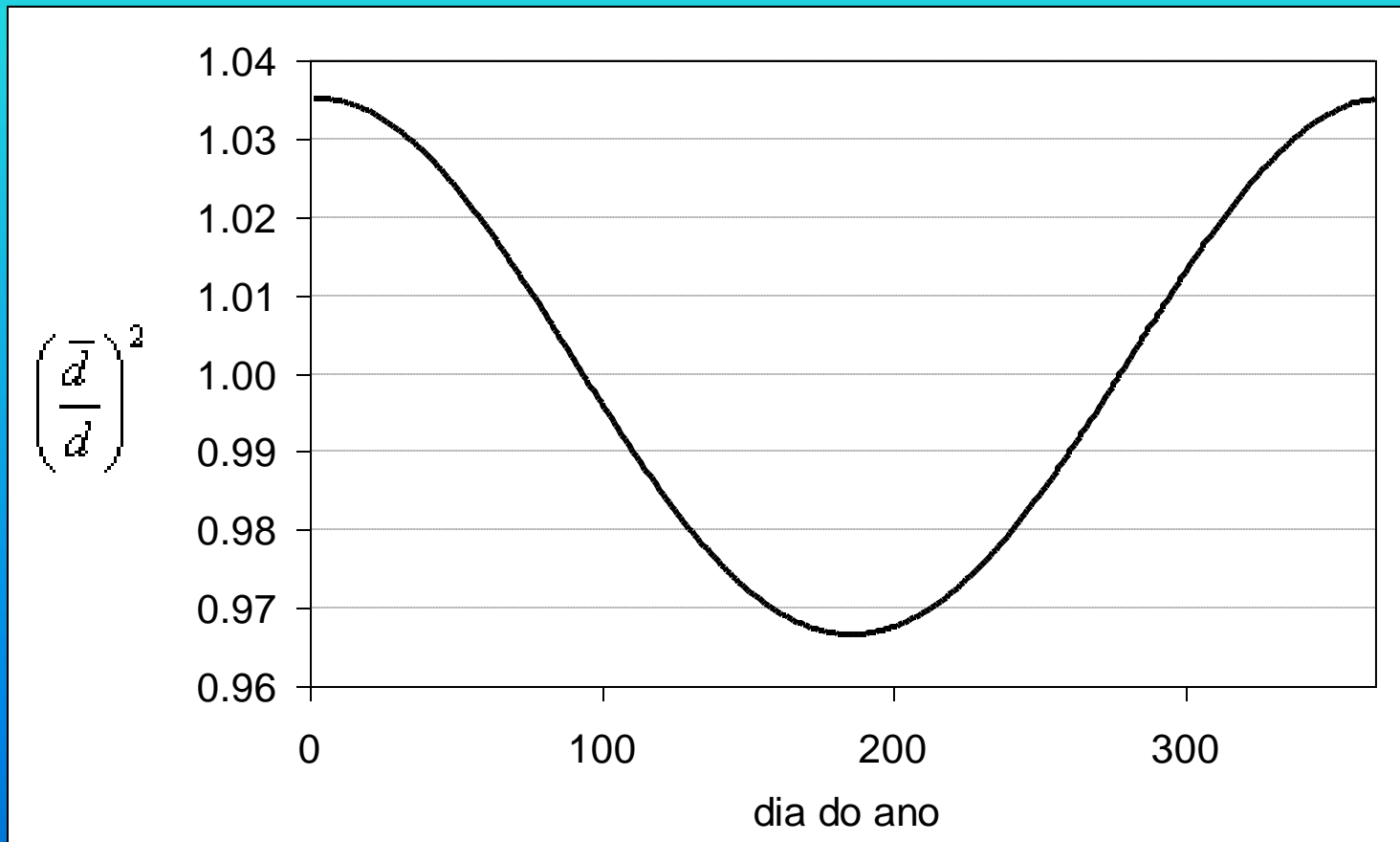
- Os modelos de TR comumente utilizados não consideram o efeito das manchas solares

Declinação e Equação do Tempo



A curva verde é a variação anual da declinação; a vermelha é a variação anual da equação do tempo.

Correção de excentricidade



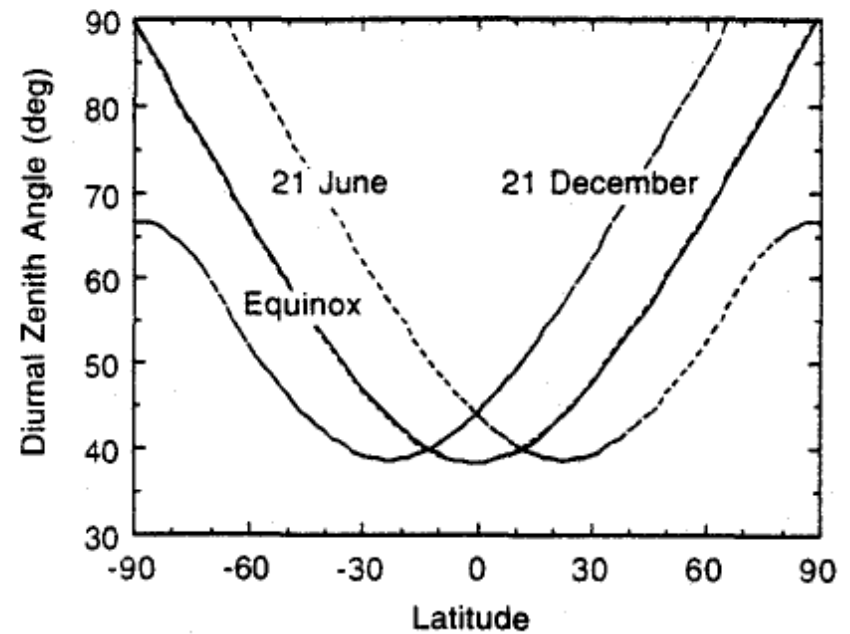
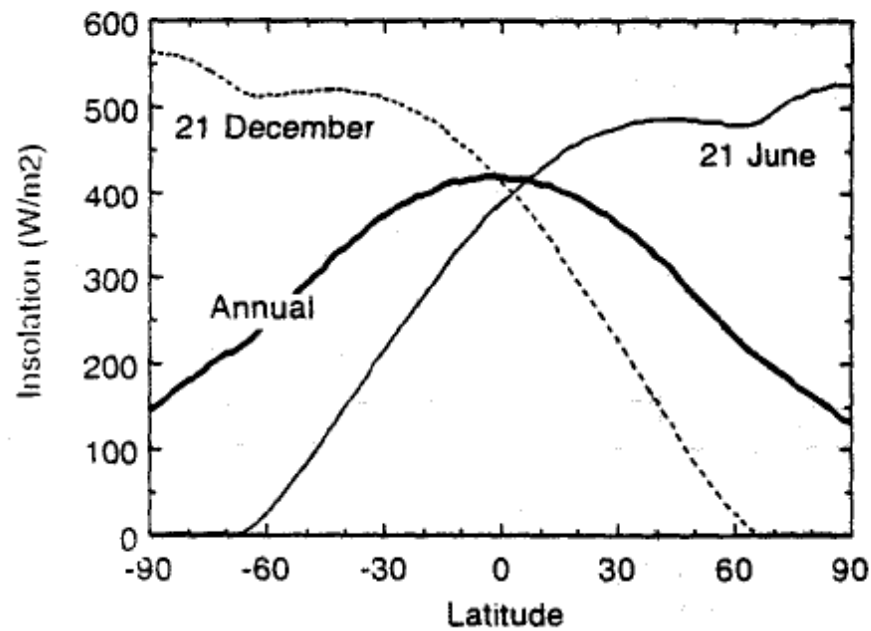
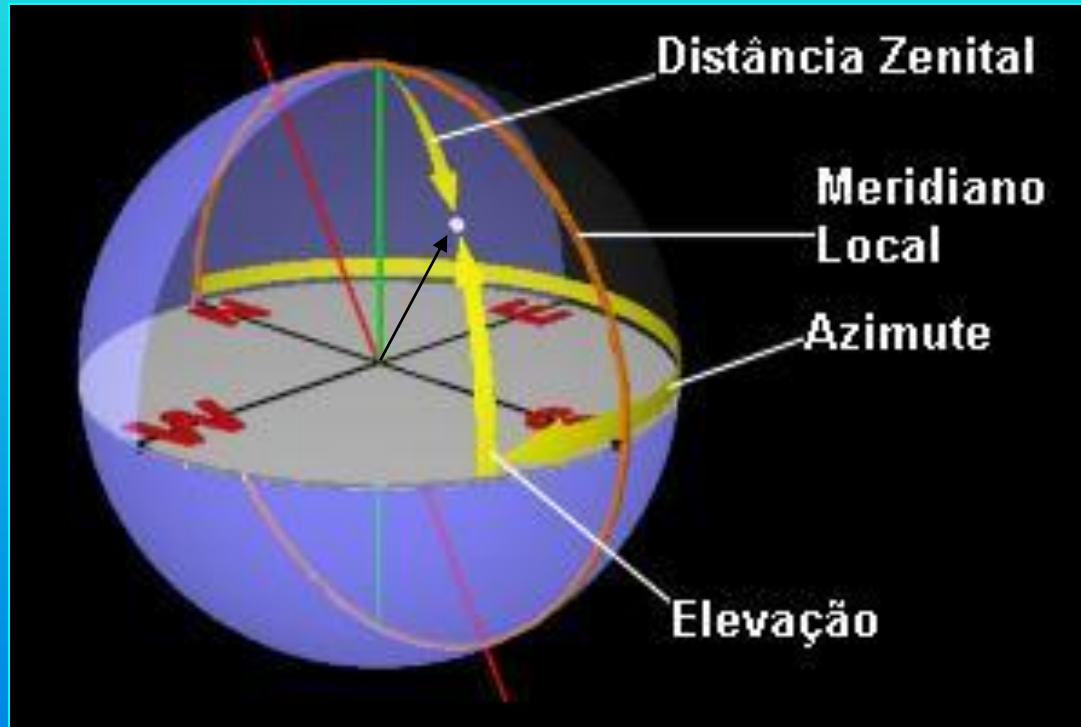


Fig. 5.6 The daily variation of the solar radiation at the top of the atmosphere as a function of latitude. The units are Wm^{-2} .

Sistema de Coordenadas Horizontal



Sistema horizontal e suas coordenadas: Azimute (A) e Distância Zenital (z). Também mostrada a elevação (h) - ângulo complementar à distância zenital. (adaptado de: <http://library.thinkquest.org/29033/begin/coordinate.htm>).