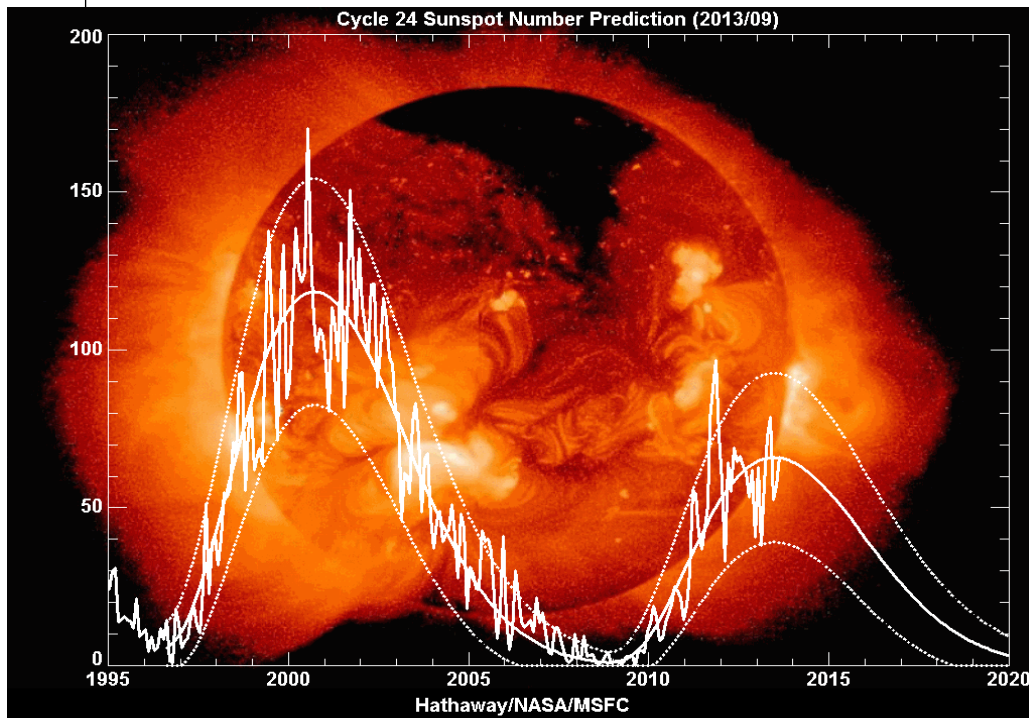




# Sova-Picard Scientific Results

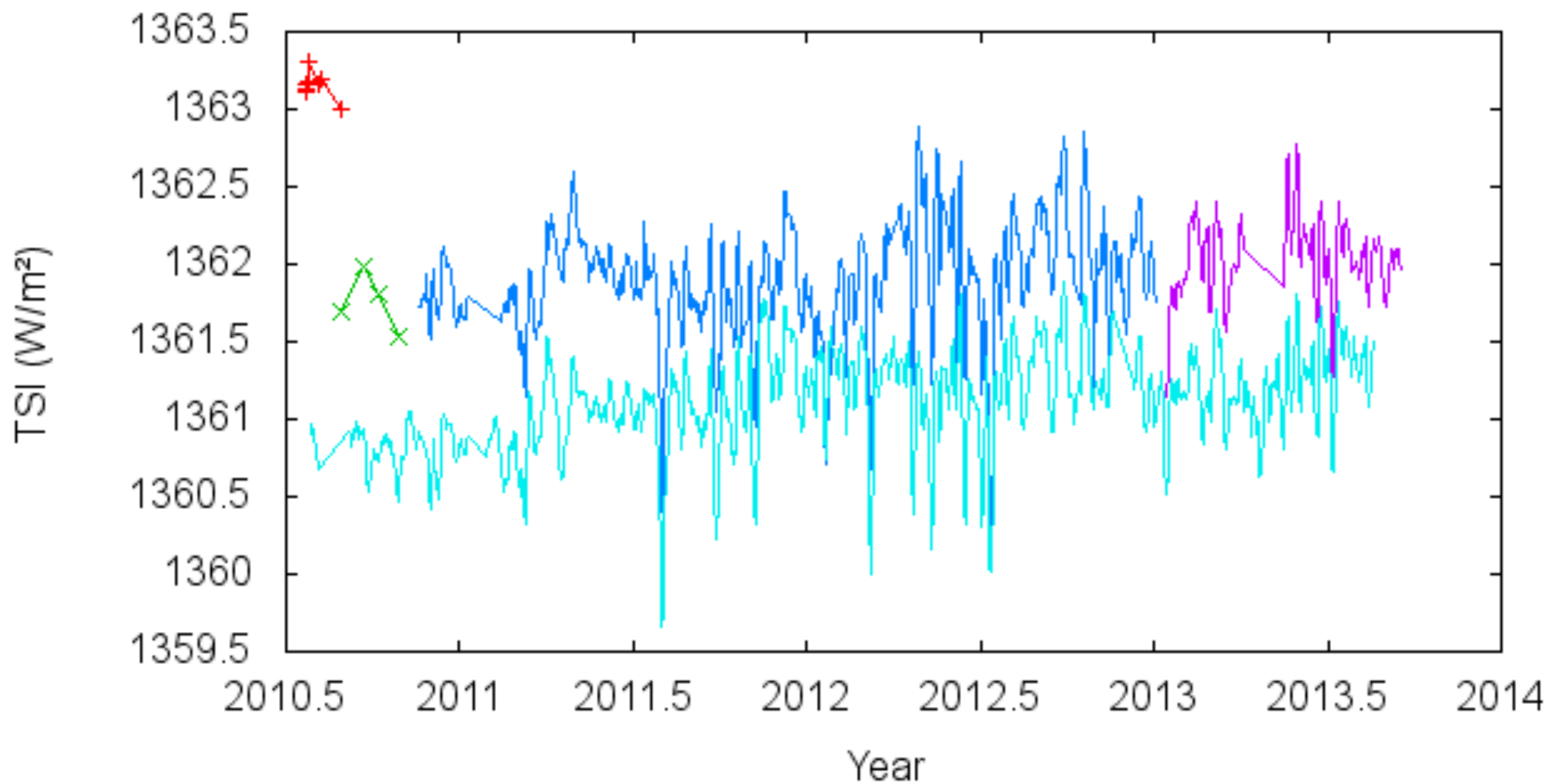
Steven Dewitte & The Sovap Team

# Gleissberg minimum cycle



- Lowest cycle since 1906
- Smoothed maximum in summer 2013

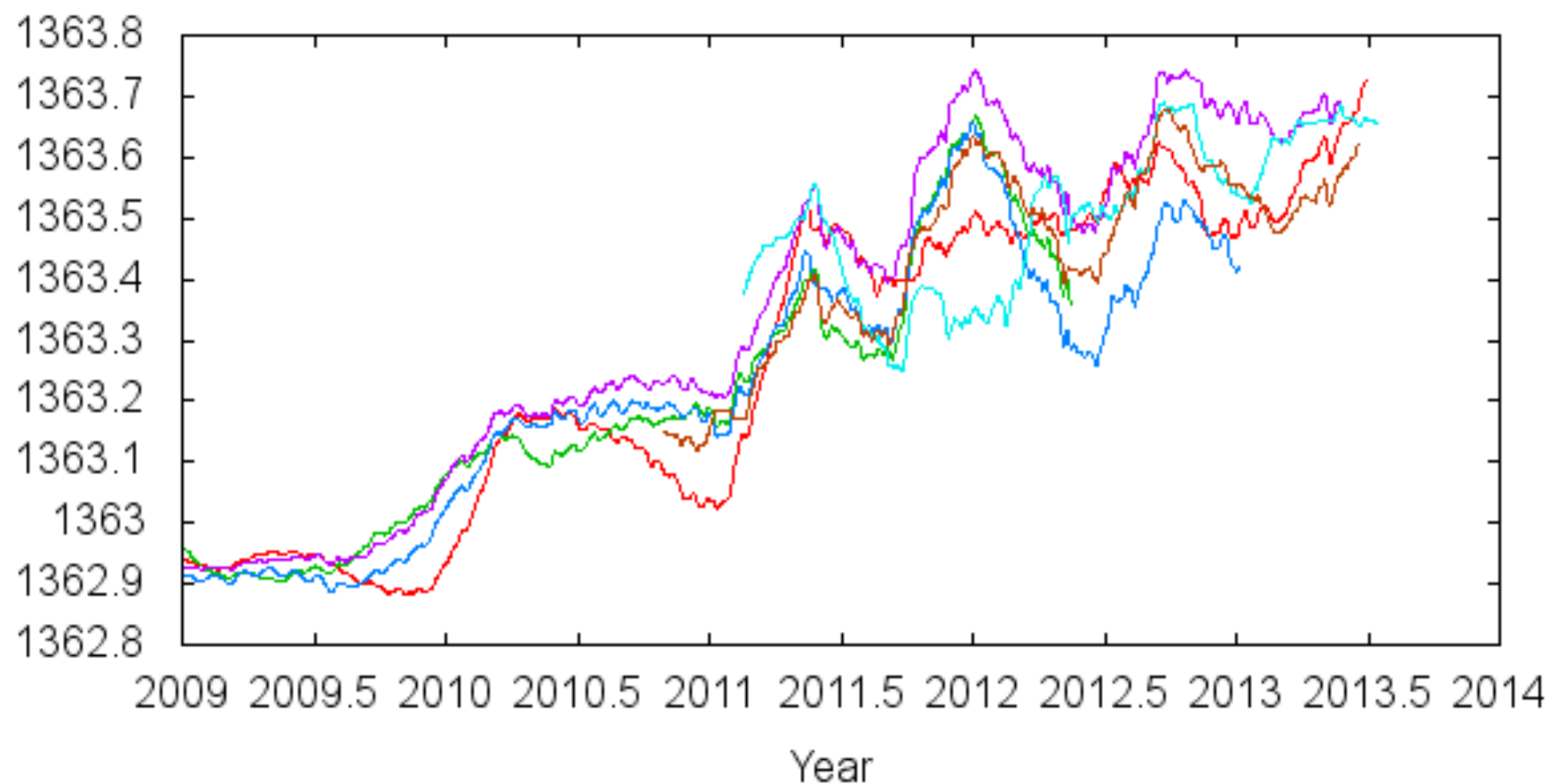
Daily mean Picard Total Solar Irradiance



- SOVAP nominal Right —+—
- SOVAP nominal Left —x—
- Sovap new Left interpolated with Right — —
- SOVAP nominal Left — —
- PREMOS — —

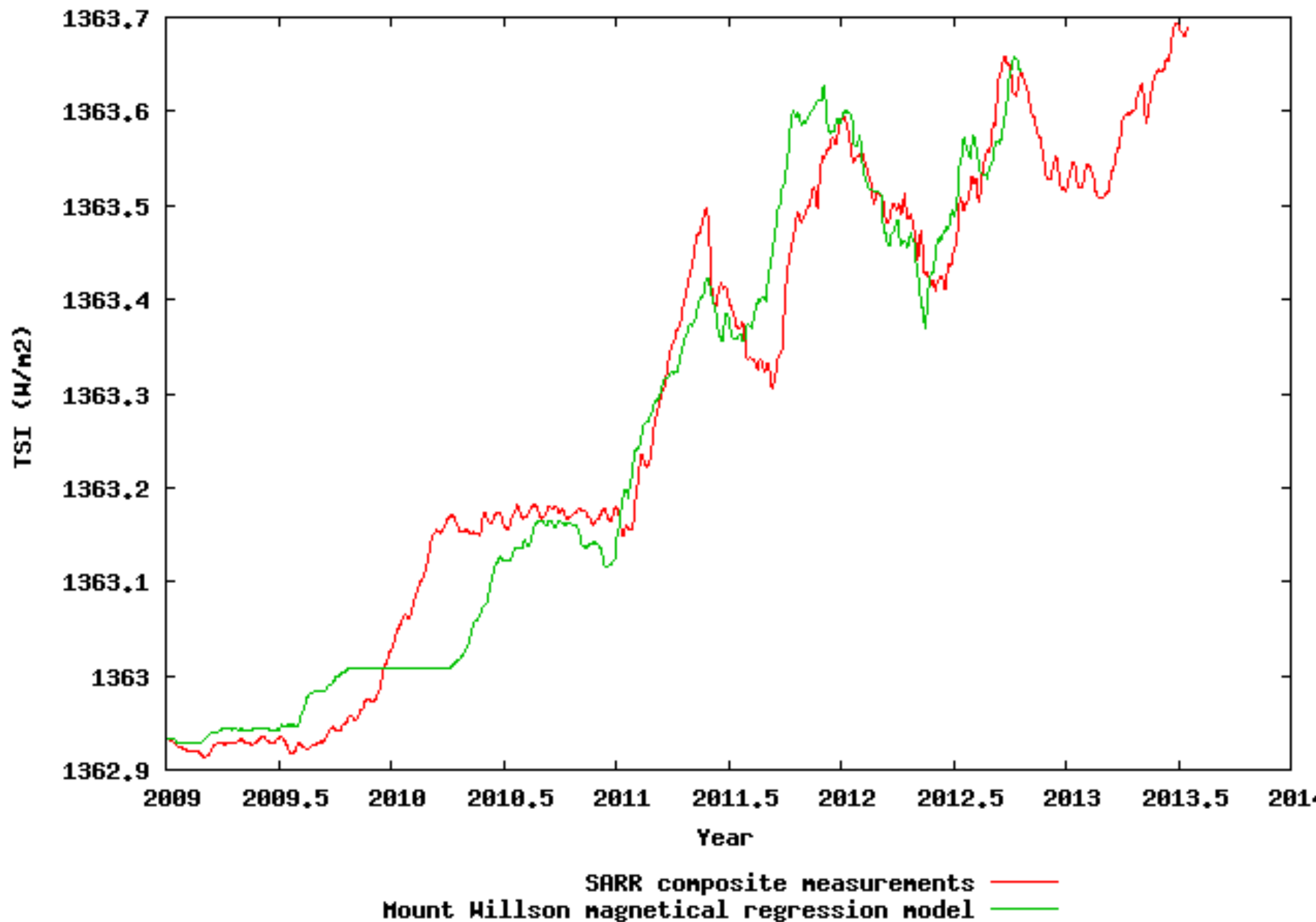
Reference = Diarad/Sovim Left +271ppm = Right -271ppm

121 day running mean TSI (W/m<sup>2</sup>)

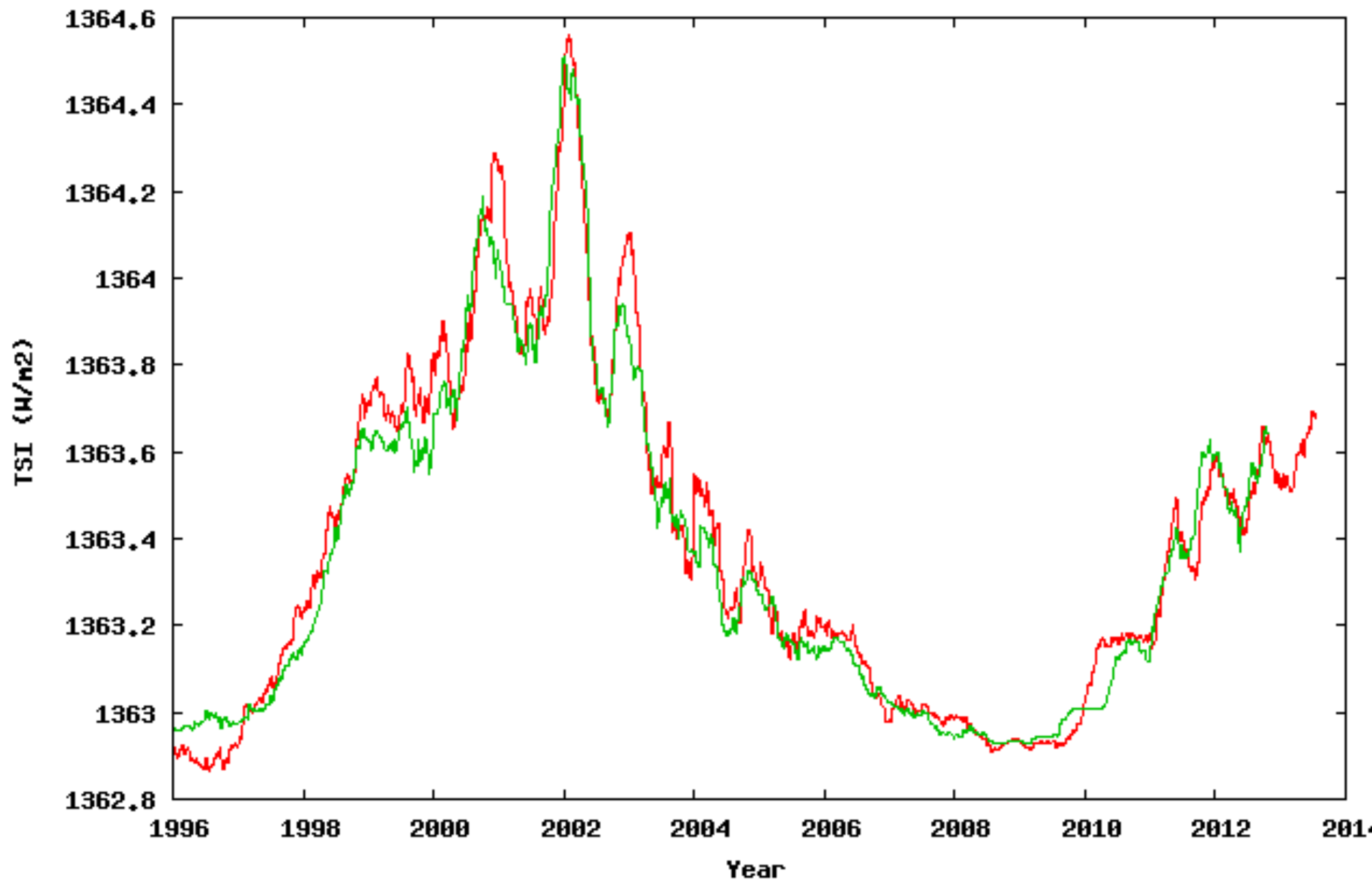


DIARAD Left +2451ppm = Right -220ppm  
PMO6B -1759ppm  
ACRIM3 +1572ppm  
TIM +1756ppm  
SOVAP Left +1152ppm= Right +105ppm  
PREMOS +1719ppm

121 day running mean Total Solar Irradiance



121 day running mean Total Solar Irradiance



SARR composite measurements ———  
Mount Willson magnetical regression model ———

# Comparison campaign at LASP TRF with Sovar radiometer



KMI

- Sovar: DIARAD type radiometer that flew on Eureka in 1992, brought back to ground by space shuttle.
- Comparison campaign with LASP TRF Crogenic radiometer in May-June 2013.

# DIARAD & TIM type geometry



Front aperture

Diffraction and scattering

Precision aperture

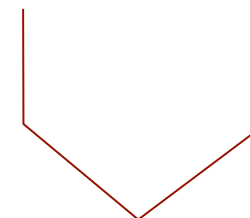


cavity

Precision aperture

Diffraction and scattering

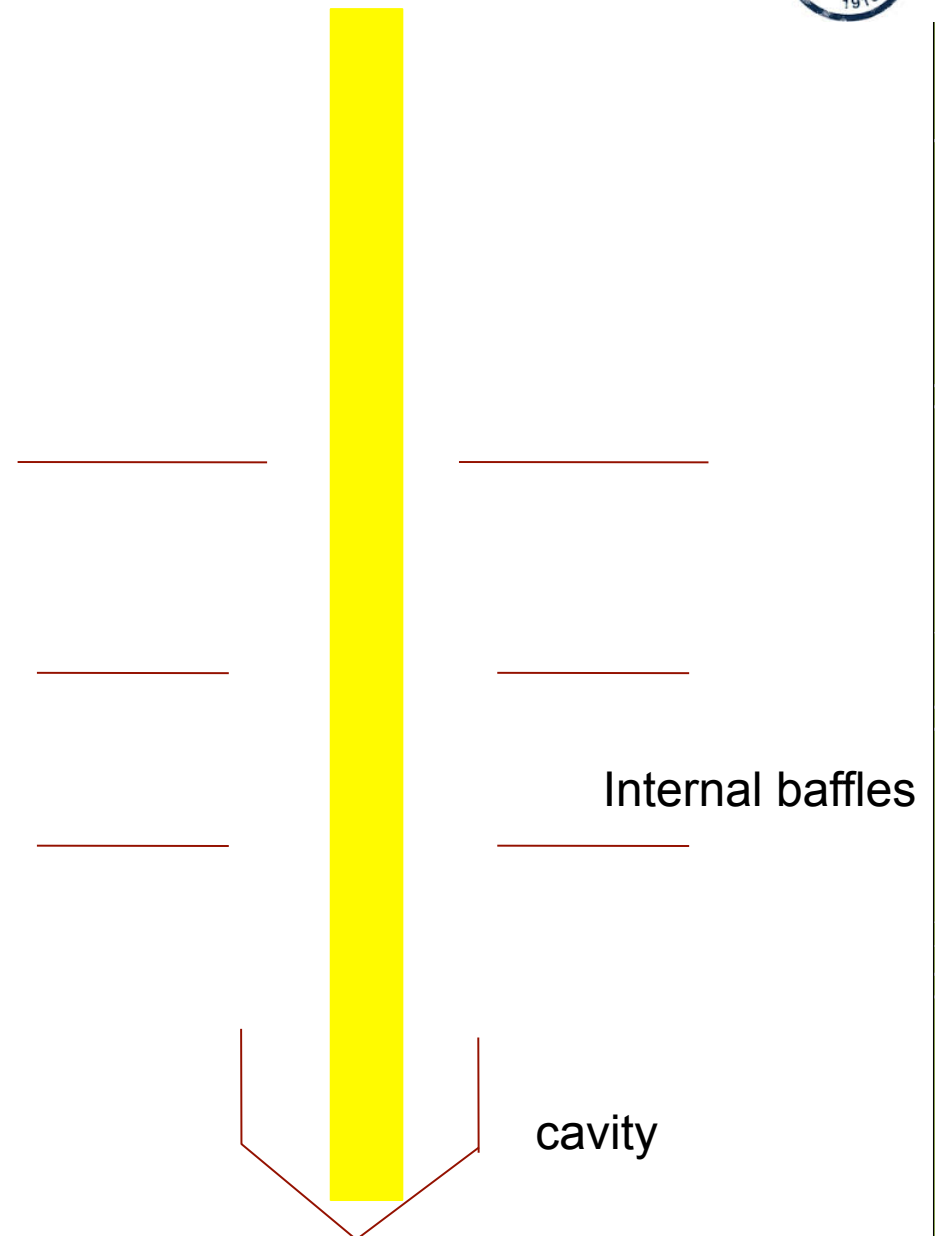
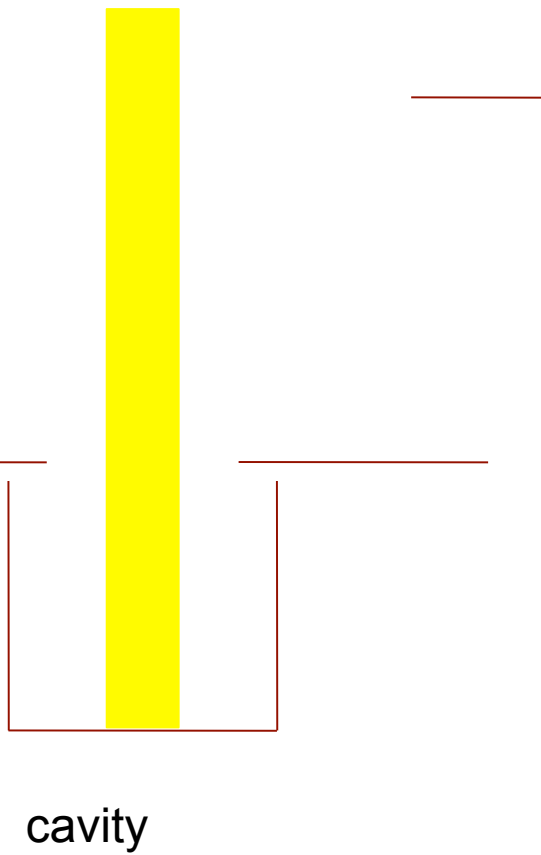
Internal baffles



cavity

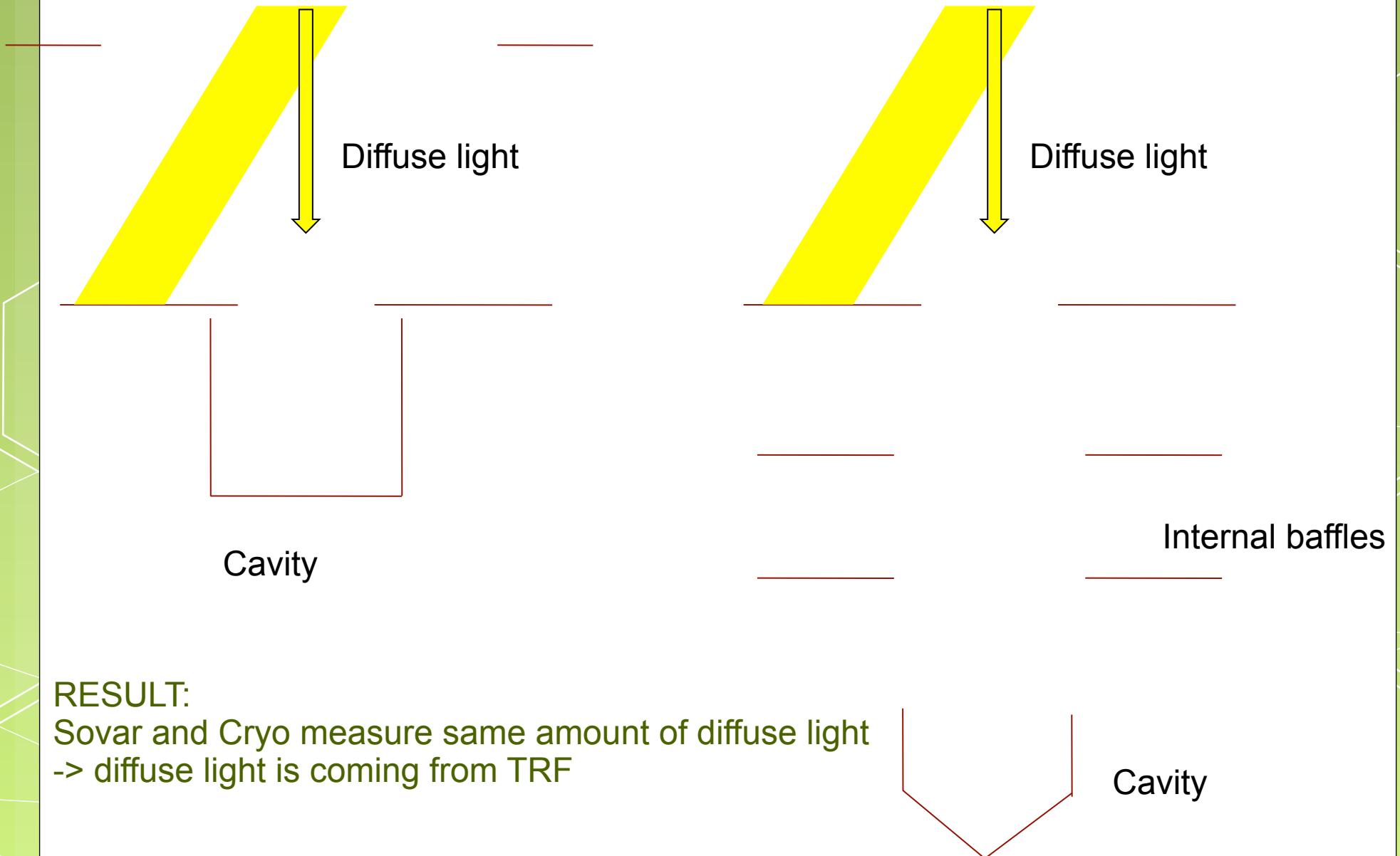


# Power comparison

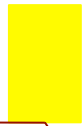


RESULT:  
Sovar and Cryo power agree within 3 ppm !

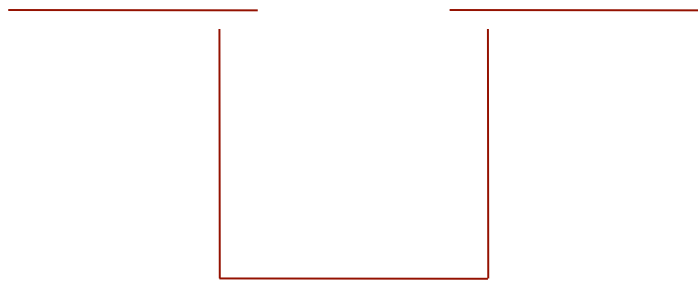
# Diffuse light characterisation



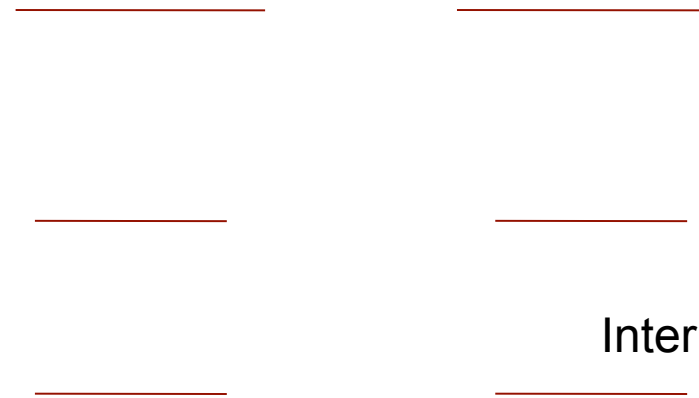
# Sovar diffraction characterisation



Diffraction and scattering



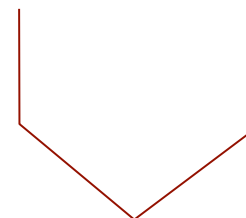
cavity



Internal baffles

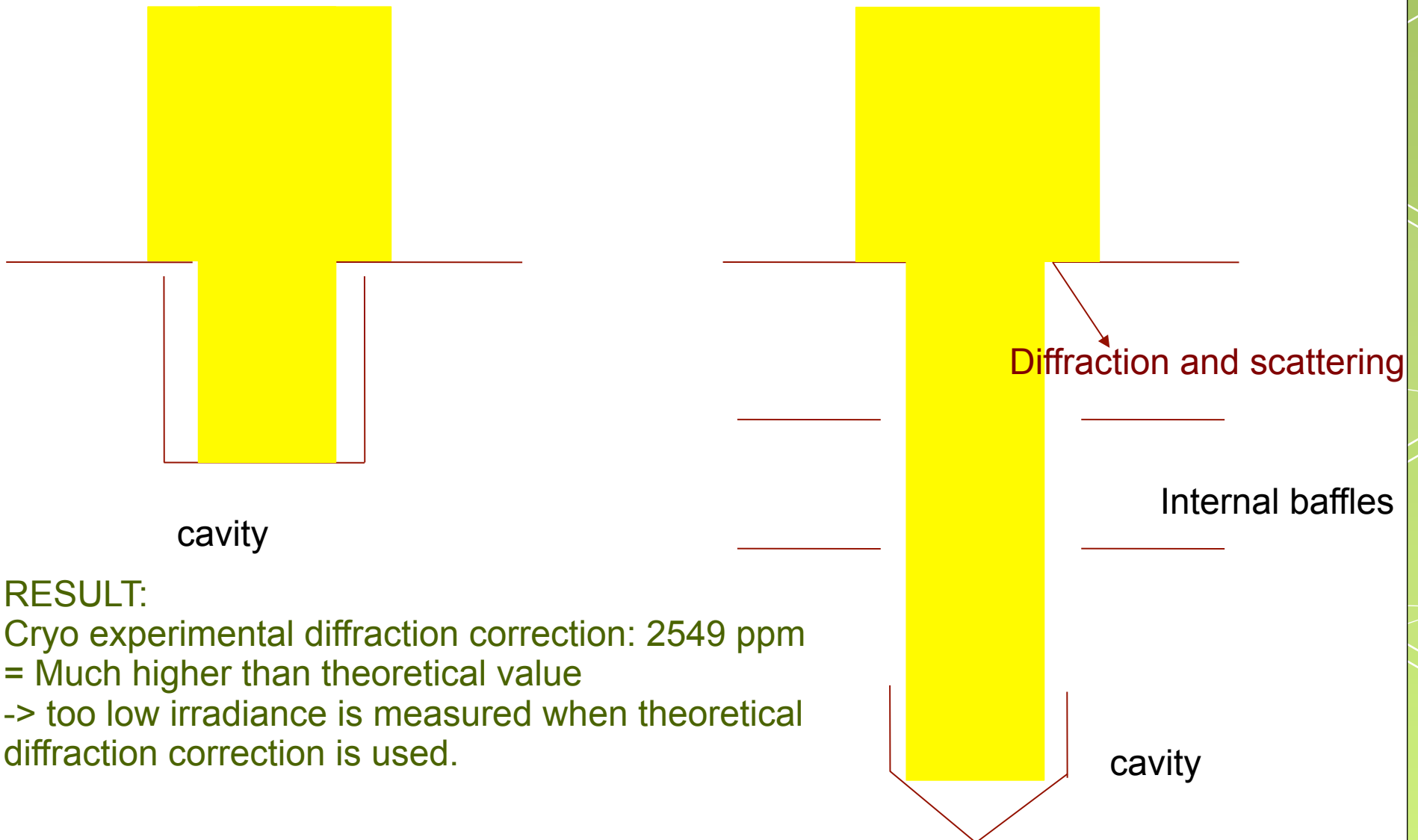
RESULT:

Sovar experimental diffraction correction: 558 ppm  
to be compared with theoretical value of 717 ppm



cavity

# Irradiance comparison = TRF diffraction characterisation



## RESULT:

Cryo experimental diffraction correction: 2549 ppm  
= Much higher than theoretical value  
-> too low irradiance is measured when theoretical  
diffraction correction is used.

# Conclusions



- ❖ Picard provides important contribution to TSI variation monitoring during **historical cycle 24**.
- ❖ DIARAD type radiometer absolute value has been revised using a new non equivalence calculation between optical and electrical power.
- ❖ Sovar/TRF campaign validates new DIARAD values.
- ❖ DIARAD/SOVIM is most accurate of DIARAD type radiometers, solar minimum TSI value  $\approx 1362.9 \text{ W/m}^2$ .