CERES CoI report

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CERES-GERB meeting, Boulder, 3/2004

Overview

- υ **GERB-CERES comparisons**
  - Plans
  - Results: Unfiltered radiance comparison
    - » Reflected solar radiance
    - » Emitted thermal radiance - Night
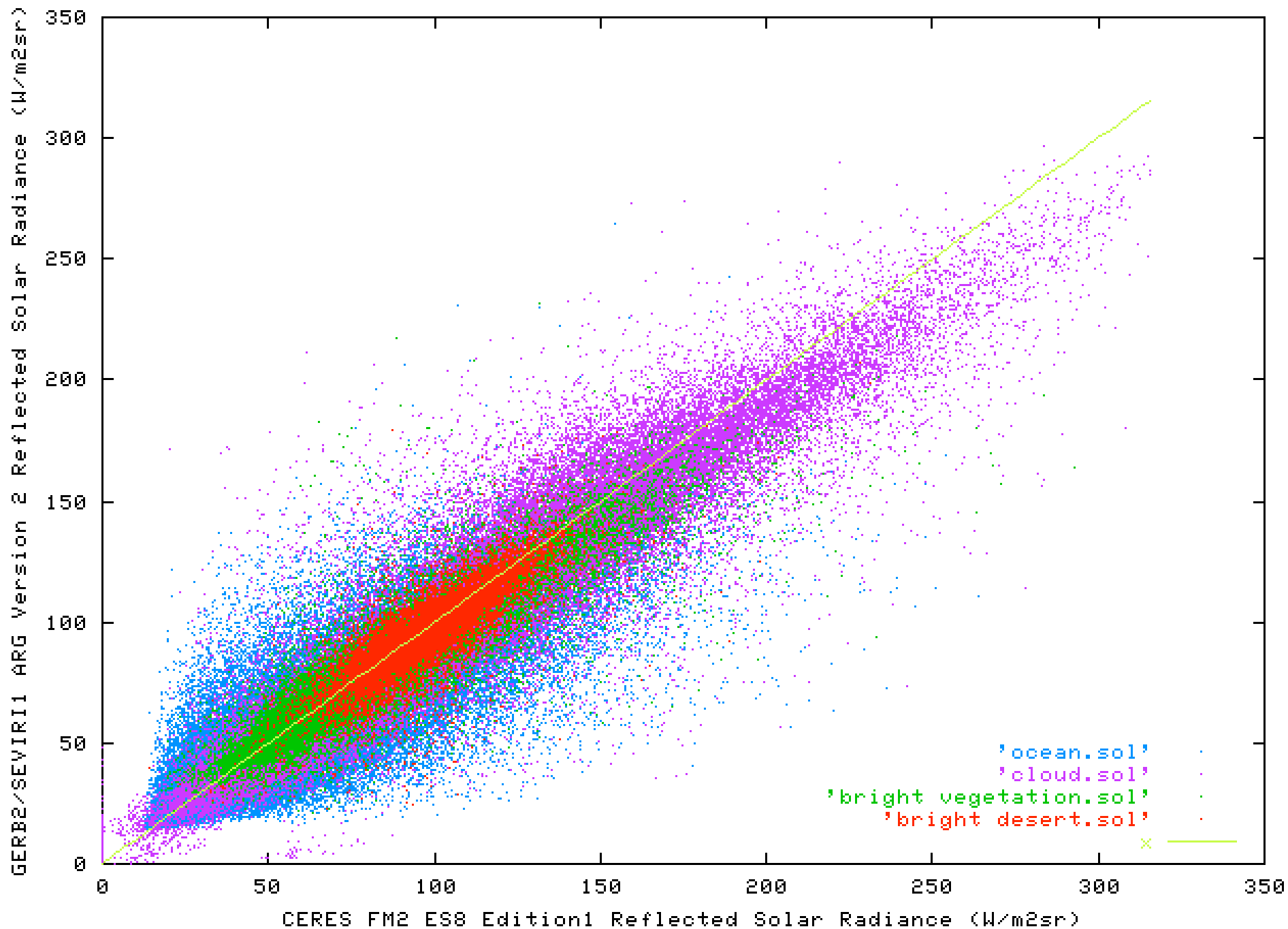- υ **Total solar irradiance**
  - Results: DIARAD/VIRGO

CERES GERB synergy

- υ Radiometers that measure broad band radiance filtered by spectral responses
  - Total: 0.3-50 micron
  - Shortwave: 0.3-4 micron
  - CERES: 1x2 detectors, GERB: 256x1 detectors
- υ Derived quantity: unfiltered radiance
  - Reflected solar: 0.3-4 micron   1% accuracy
  - Emitted thermal: 4-50 micron   0.5% accuracy

Unfiltered radiance comparison

- υ Method: colocate co-angular GERB-CERES pairs

- υ Necessary condition for correctness GERB and CERES calibration and unfiltering: agreement within sum accuracies

- υ Splitting results according to scene type allows partial separation calibration/unfiltering

12/03-2/04

GERB2/SEVIRI1 ARG Version 2 Reflected Solar Radiance (W/m2sr)

CERES FM2 ES8 Edition1 Reflected Solar Radiance (W/m2sr)

'ocean.sol'
'cloud.sol'
'bright vegetation.sol'
'bright desert.sol'

95% confidence intervals

υ GERB /CERES reflected solar radiance=

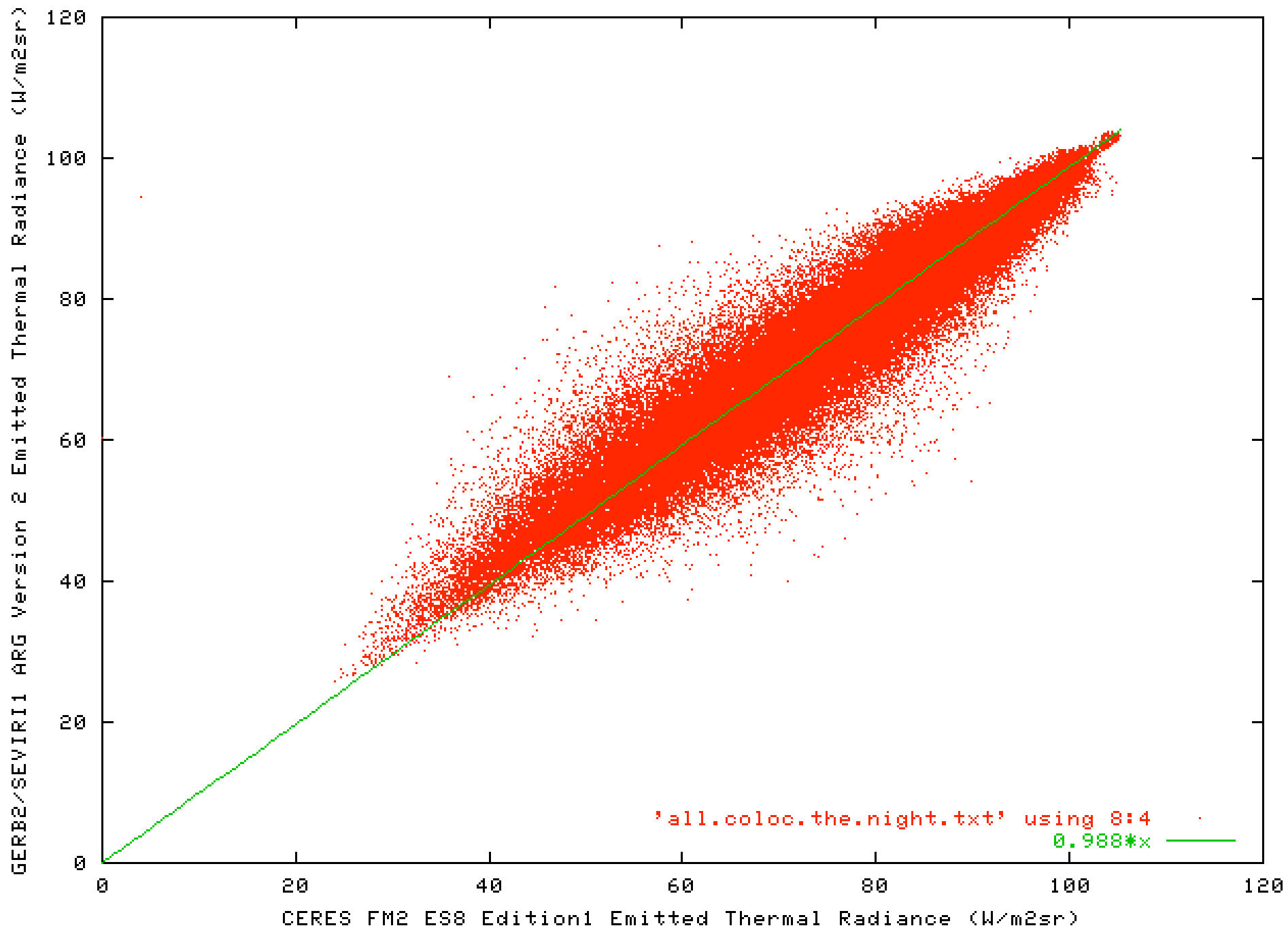|	
Ocean:	0.931+/-0.009=[0.922-0.941]
Dark veg.:	0.951+/-0.006=[0.944-0.957]
Bright veg.:	0.969+/-0.011=[0.958-0.980]
Dark desert:	1.001+/-0.010=[0.991-1.011]
Bright desert:	0.980+/-0.006=[0.974-0.986]
Clouds:	0.959+/-0.009=[0.950-0.968]

95% confidence interval

- GERB/(ed. 1 CERES) emitted thermal radiance=
  0.988+/-0.007=[0.982-0.995]
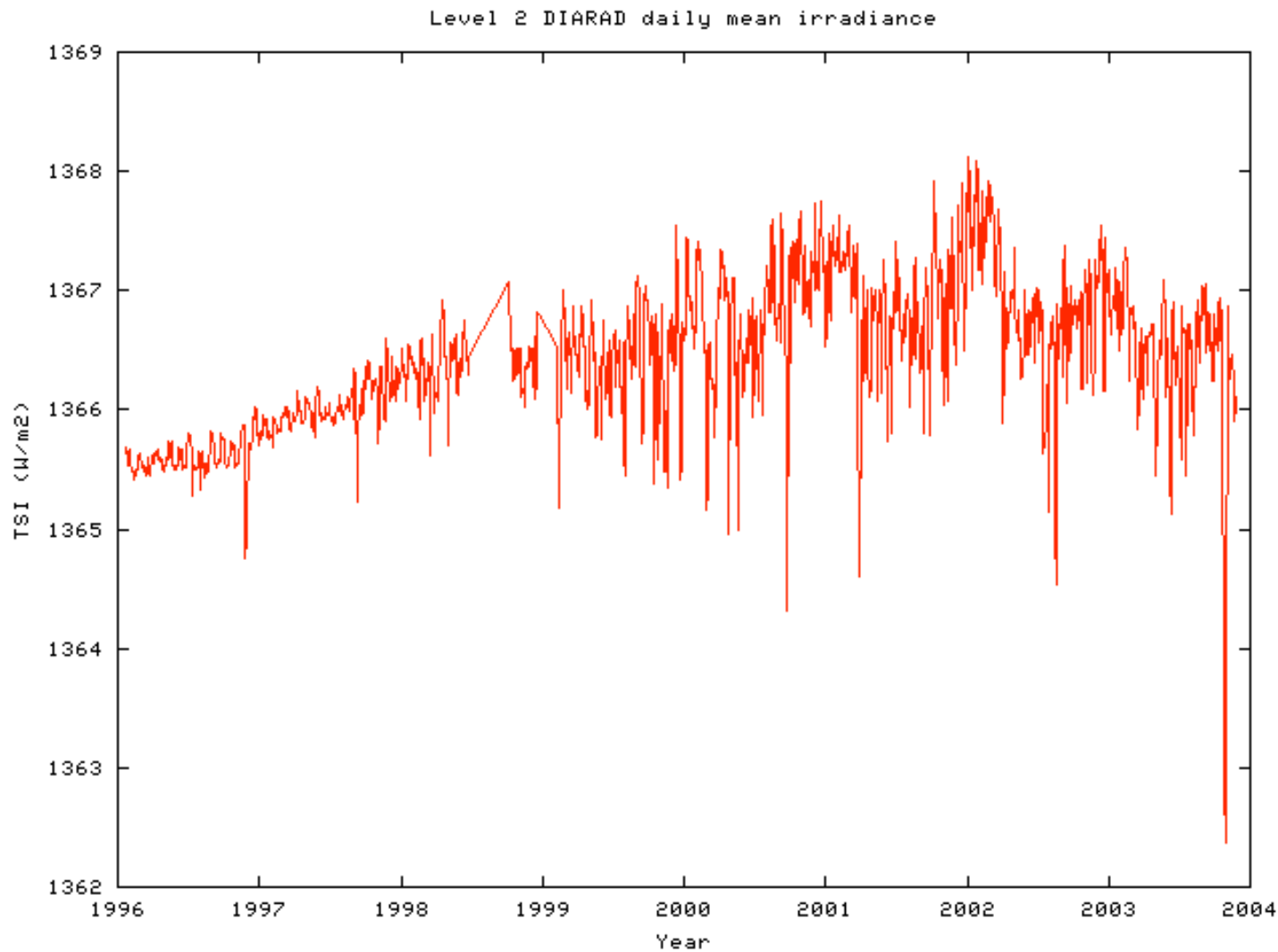- After in-flight correction CERES=
  0.917+/-0.007=[0.991-1.002]

Radiance to flux conversion

- υ F=ADM x L

- υ CERES: variable viewing conditions (RAPS)

- υ GERB: fixed viewing conditions (geostationary)

- ¬ Comparison can detect systematic regional errors GERB

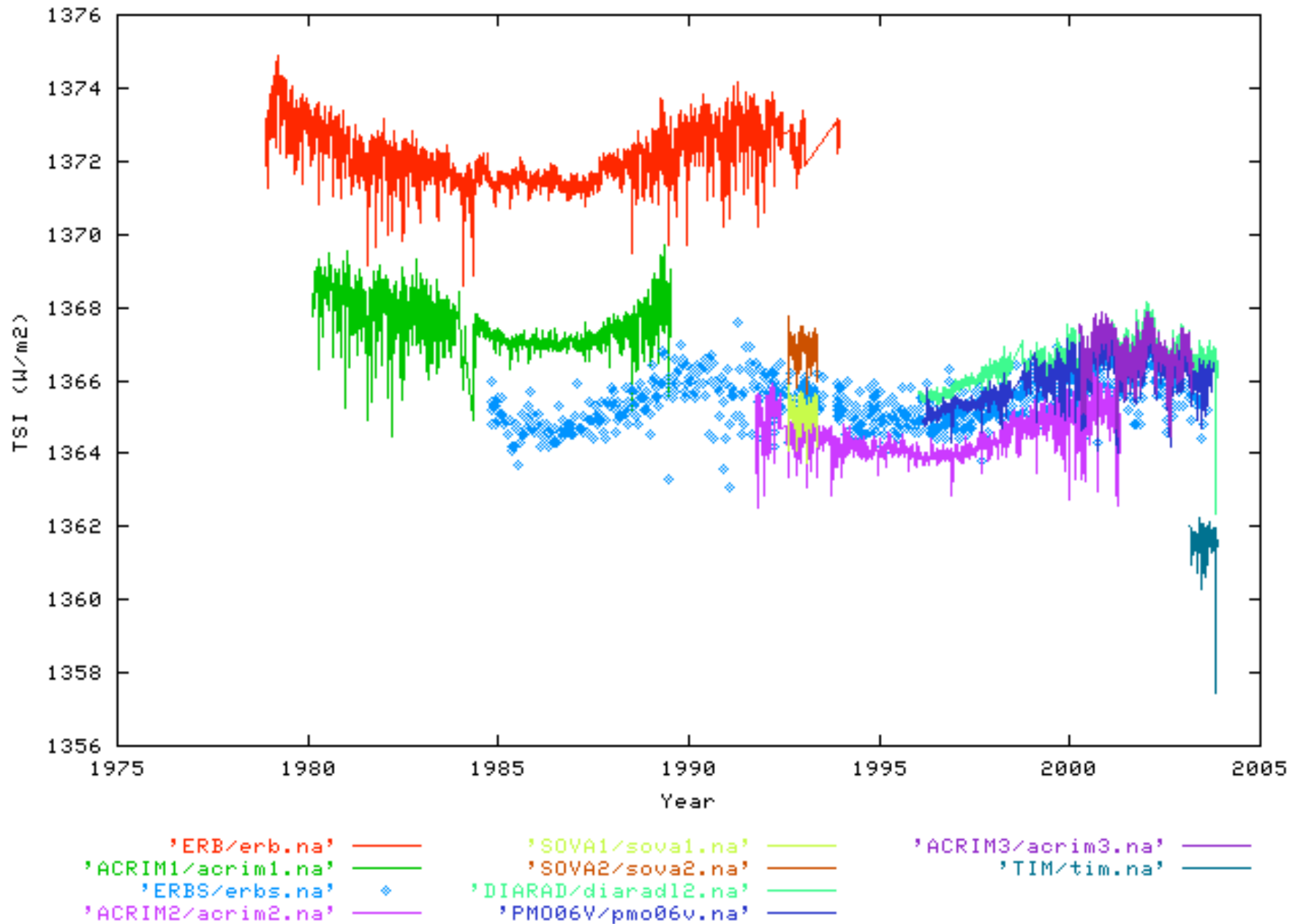- υ First results: see GERB meeting

Diurnal variation

- υ GERB: continuous measurements
- υ CERES: 2 samples per day + (geo) model
- ¬ Comparison can validate CERES diurnal modelling.

Total solar irradiance

Level 2 DIARAD daily mean irradiance

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Long term Total Solar Irradiance measurements

Legend:
- 'ERB/erb.na'
- 'ACRIM1/acrim1.na'
- 'ERBS/erbs.na'
- 'ACRIM2/acrim2.na'
- 'SOVA1/sova1.na'
- 'SOVA2/sova2.na'
- 'DIARAD/diarad12.na'
- 'PMO06V/pmo06v.na'
- 'ACRIM3/acrim3.na'
- 'TIM/tim.na'

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Conclusions

- υ **GERB/CERES**
  - unfiltered radiance comparison give best validation basic calibration.
    - » Emitted thermal radiance: OK
    - » Reflected solar radiance: 5% difference, to be improved with updated GERB spectral response
  - flux comparison give best validation GERB fluxes.
  - Time variation comparison give best validation CERES diurnal models
- υ Total solar irradiance available from DIARAD/VIRGO since 1996.
  - 4 W/m^2 difference: to be investigated.