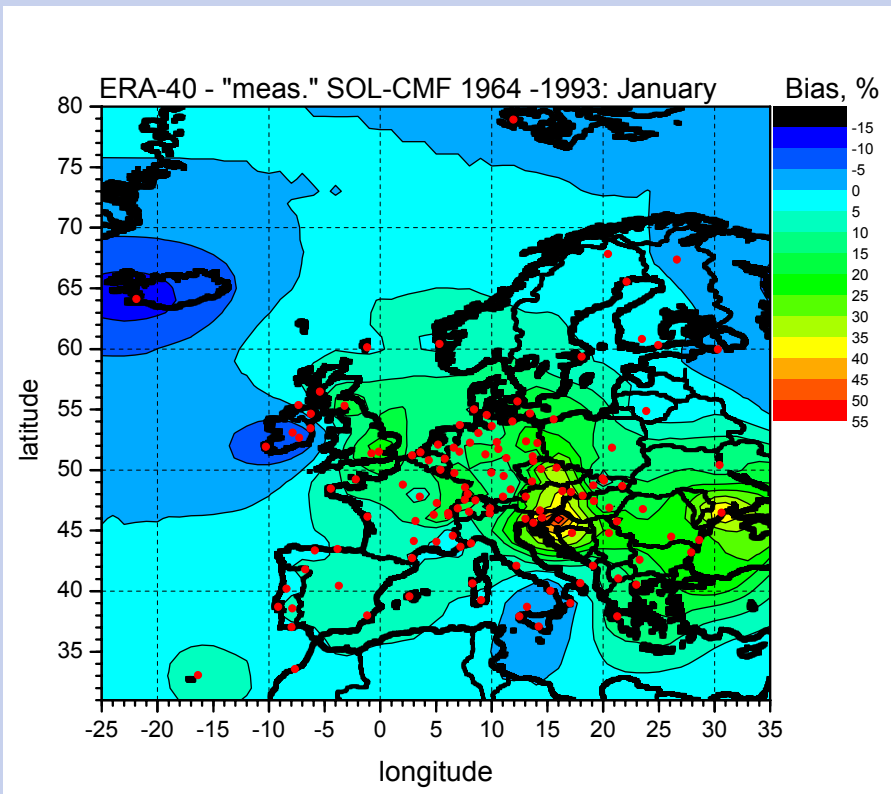


COST-726: 1958 - 2004 gridded daily Solar Cloud Modification Factors (SOL-CMF)

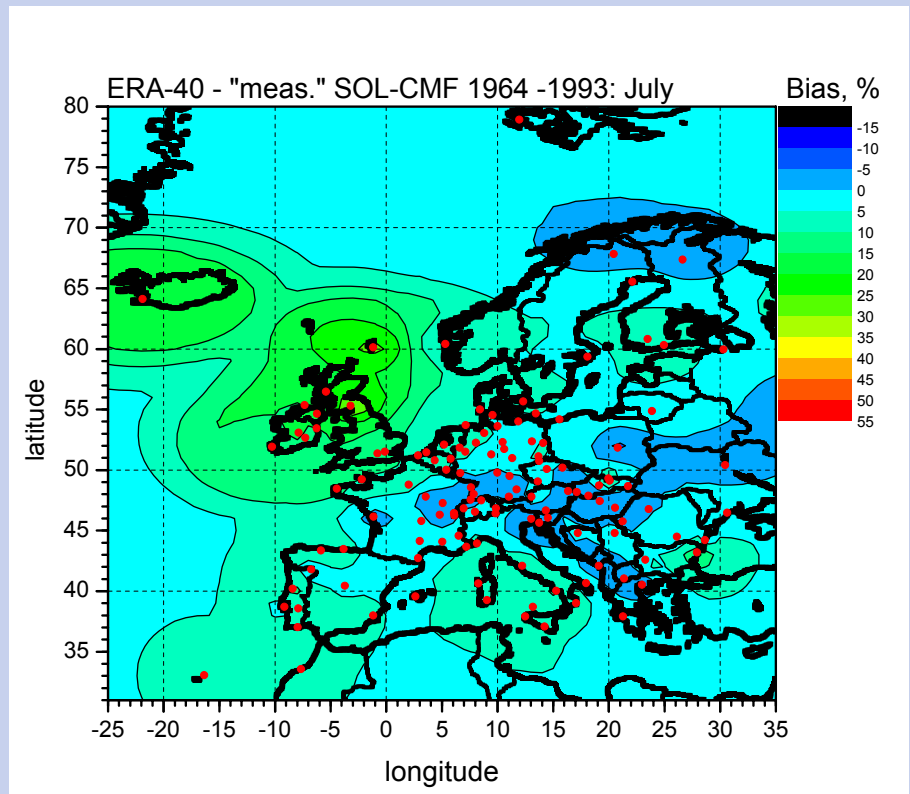
- ERA-40 bias and RMSE
- bias correction and ERA-40 accuracy
- spatial dependencies in interpolated measured SOL-CMF
- gridded products
- accuracy of gridded products derived by independent measurements

ERA-40 bias (ERA-40 minus "measured" SOL-CMF)



January

1964 - 1993



July

ERA-40 bias correction and RMSE

Objective: bias free results of known quality

ERA-40 bias correction aims, to reduce bias effects in merging measurements and ERA-40 in areas without measurements. Method:

- determine the bias at locations with measurements (base one month),
- extrapolate to COST-726 grid, however,
- reduce bias correction for distances > 431 km

ERA-40 RMSE (bias corrected) is extrapolated to the COST-726 grid to provide information on accuracy for areas lacking in measurements.

Specifics:

- monthly bias 1958 – 1963 set at mean monthly bias 1968 – 1972.
- no Mediterranean measurements 1994 – 2002: Apply 1981 – 1993 mean.

Spatial dependencies in interpolated measured SOL-CMF

Structural analysis for ordinary Kriging:

- semi-variance $\gamma(h)$:

$$\gamma(h) = \frac{1}{2} \cdot \frac{1}{n(h)} \cdot \sum_{k=1}^{n(h)} \left[\text{CMF}_{\text{sol}}(x_k + h) - \text{CMF}_{\text{sol}}(x_k) \right]^2$$

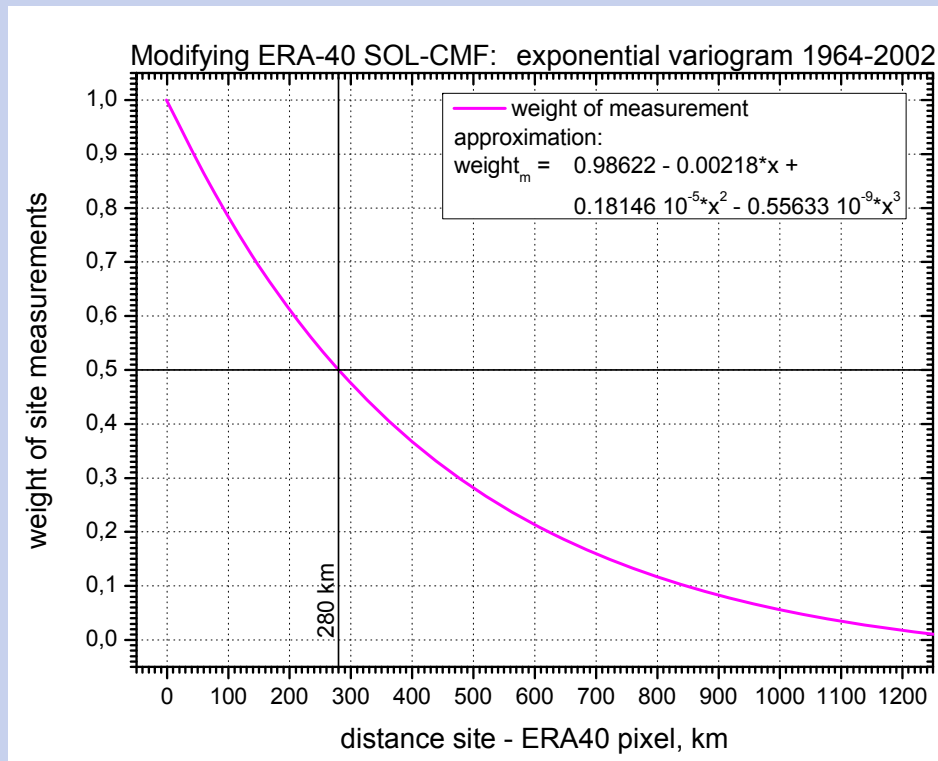
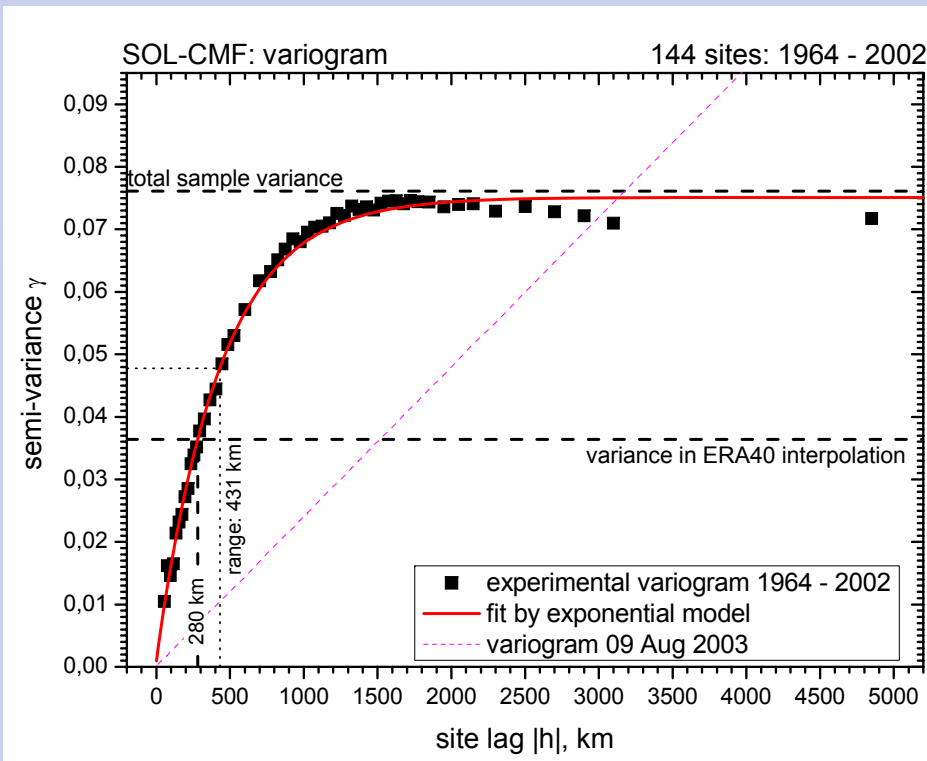
$|h|$ = distance lag, km

- exponential variogram model:

$$\gamma(h) = N + C \cdot \left[1 - e^{-\frac{|h|}{a}} \right]$$

N = nugget
C = sill
a = range

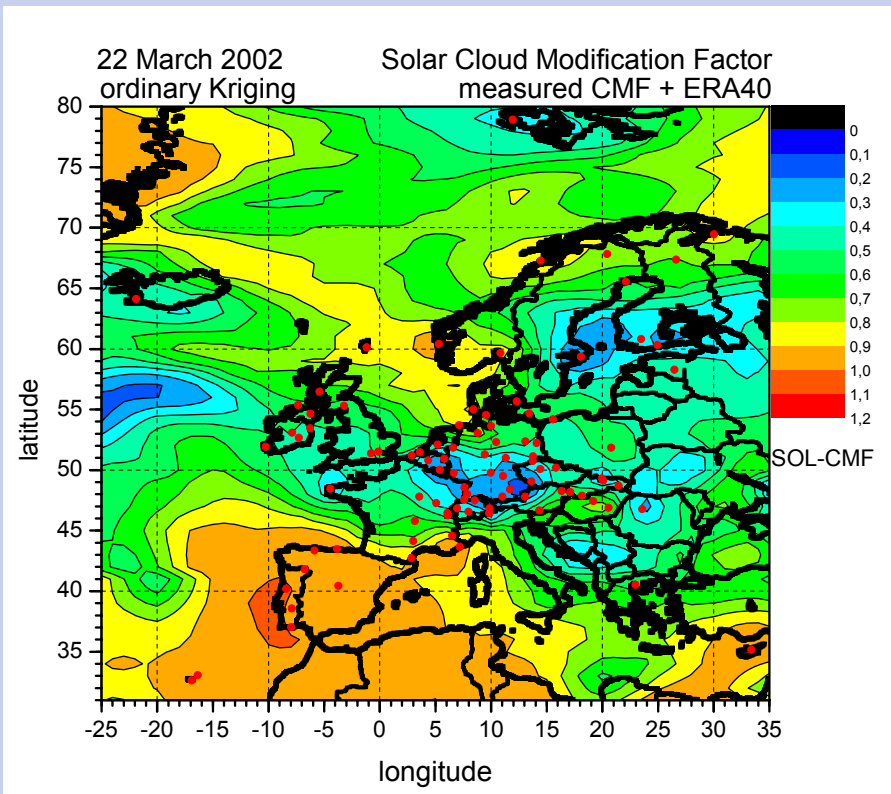
Semi-variance and derived weight of measurements



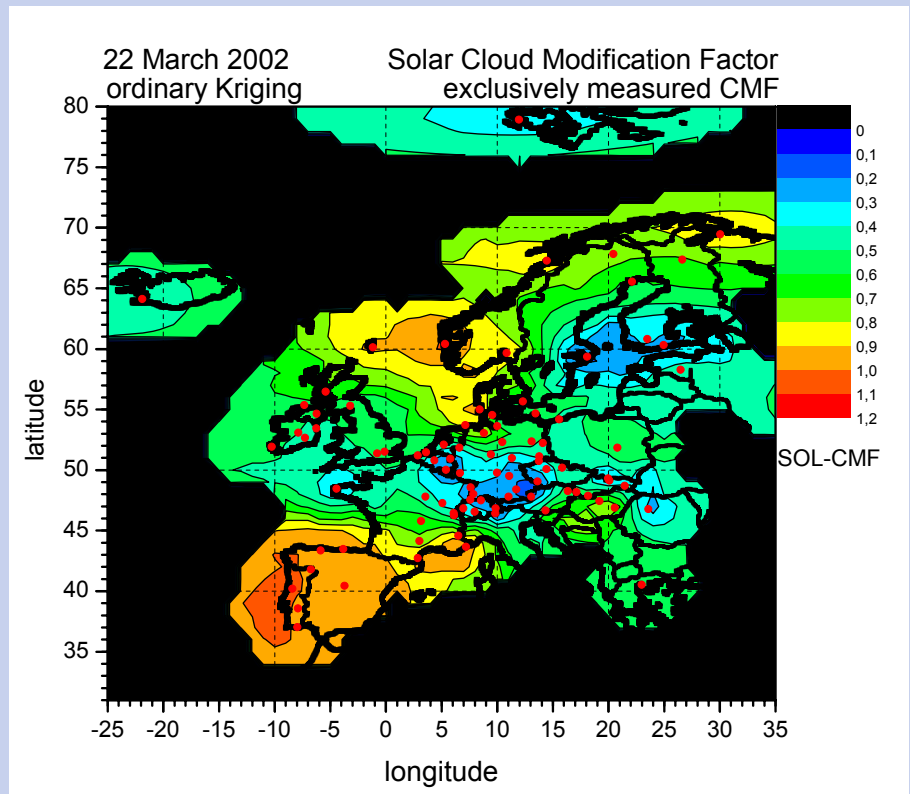
exponential variogram

weight of measurements

22 Mar 2002

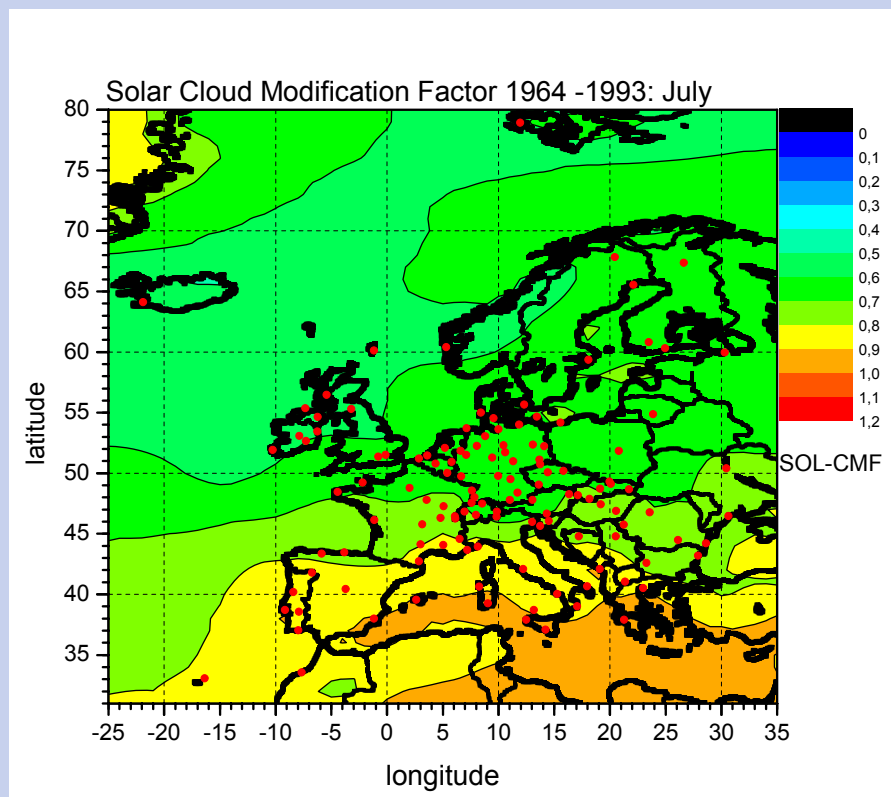
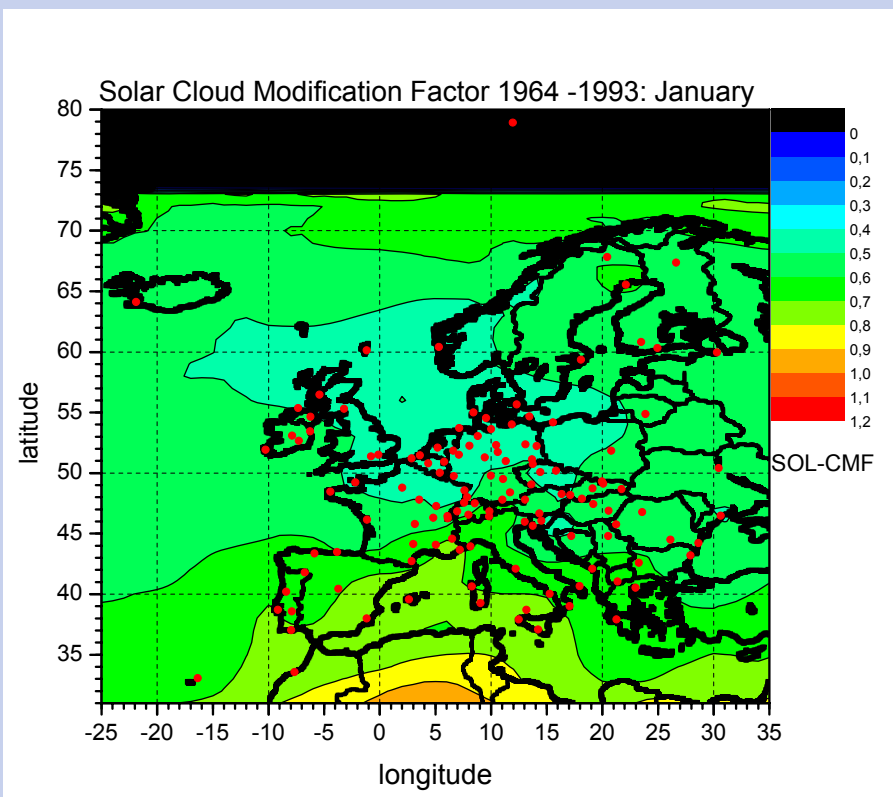


measurements + ERA-40



exclusively measurements

Average of COST-726 gridded SOL-CMF

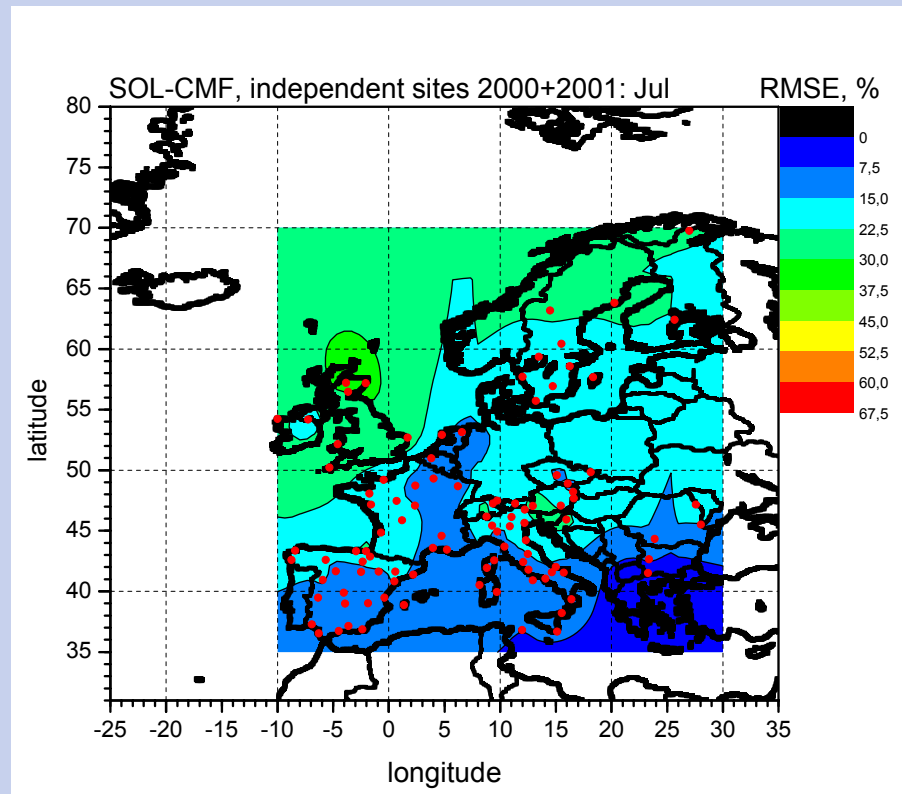
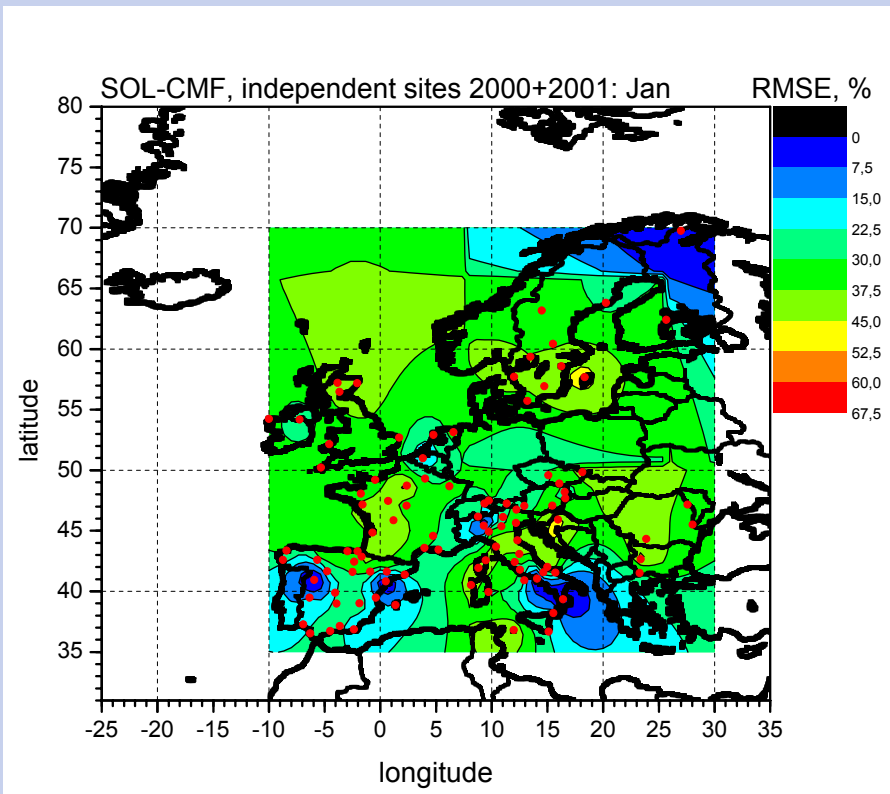


January

1964 - 1993

July

Accuracy of interpolated versus independently meas. CMF

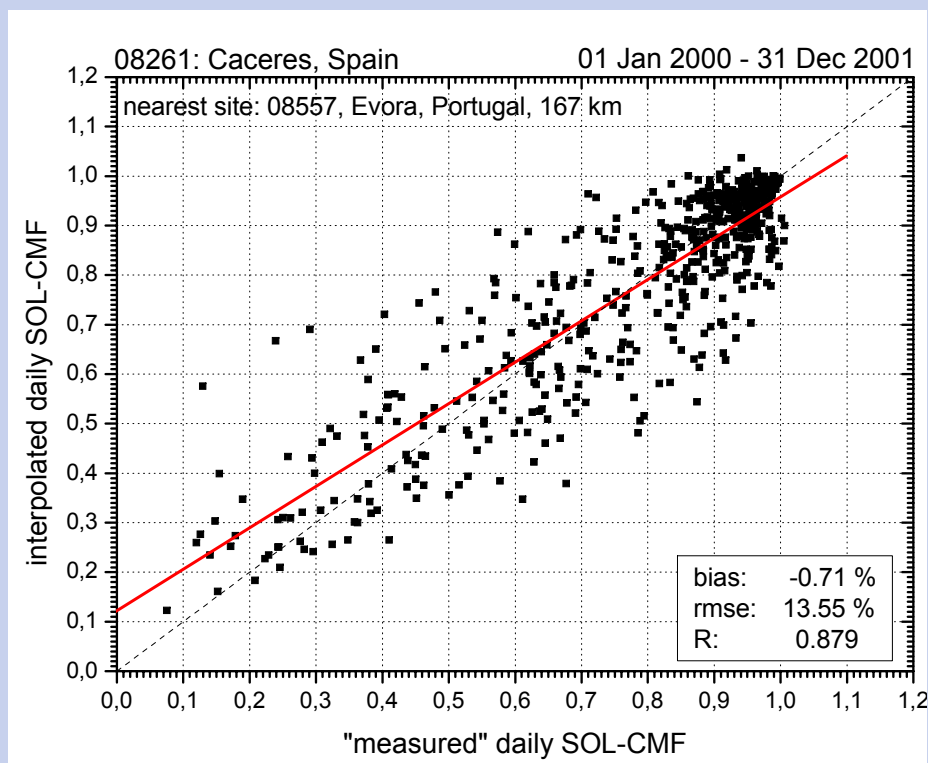
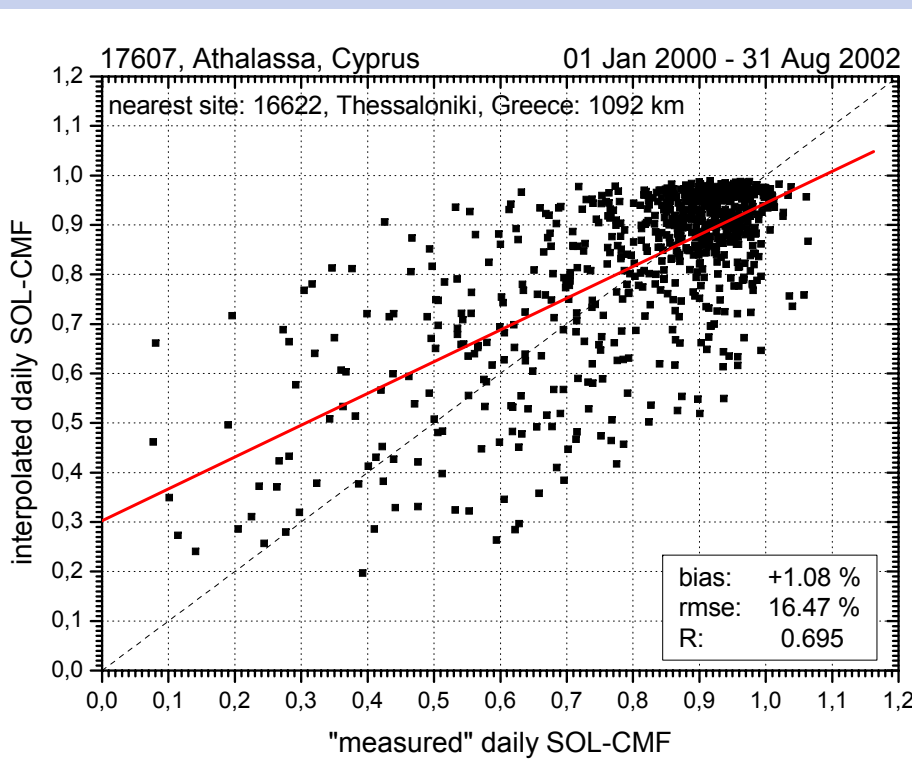


January

2000 + 2001: 101 independent sites

July

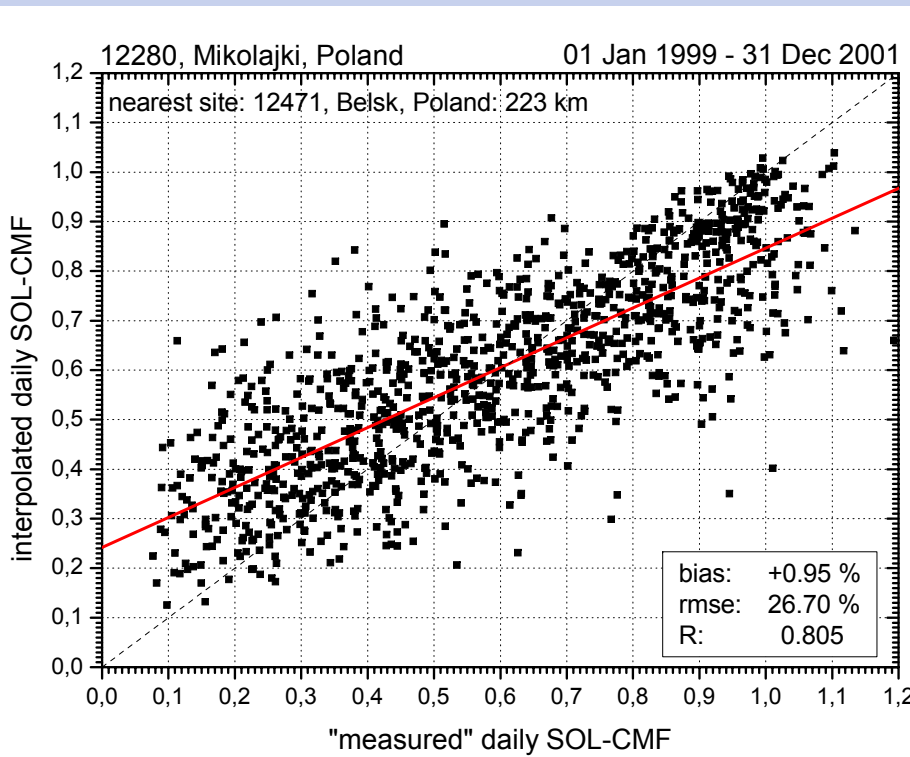
COST-726 interpolated and independent measured CMF



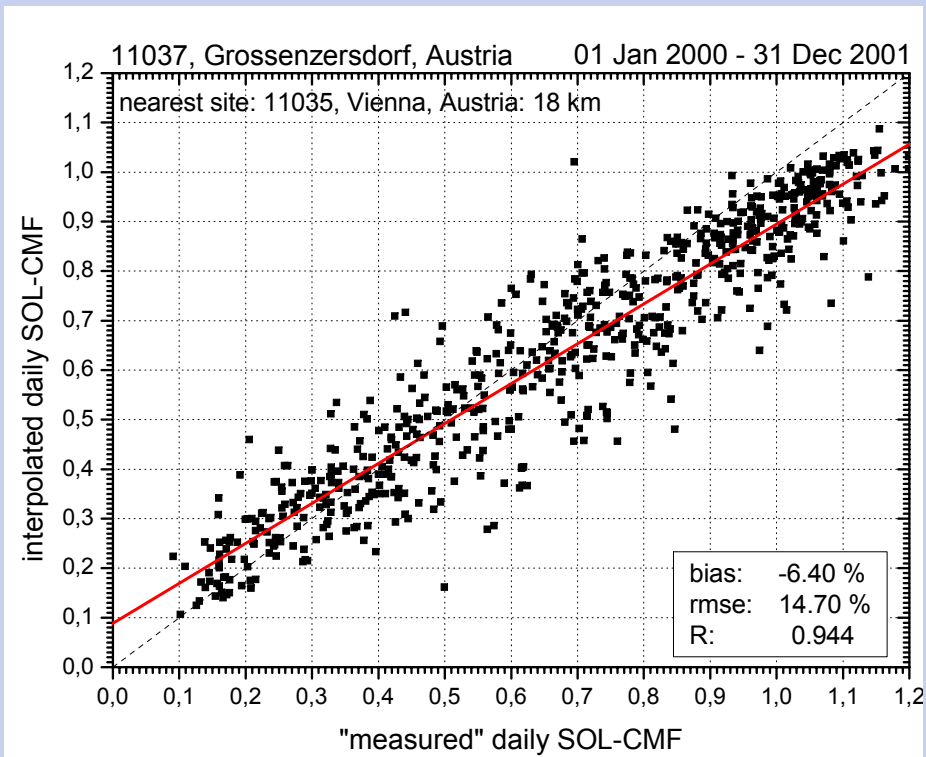
Athalassa, Cyprus

Caceres, Spain

COST-726 interpolated and independent measured CMF



Mikolajki, Poland



Grossenzersdorf, Austria

COST-726 area: Available gridded SOL-CMF

Product (BSCW, path: "cost726/cost/SOL-CMF_Albedo/")	MB
<i>Gridded measured SOL-CMF + ERA-40 SOL-CMF</i>	
• cost_sol-cmf_wrdc_era40_1958-1970.zip	25.4
• cost_sol-cmf_wrdc_era40_1971-1980.zip	19.6
• cost_sol-cmf_wrdc_era40_1981-1993.zip	25.4
• cost_sol-cmf_wrdc_era40_1994-2002.zip	16.9
<i>Exclusively gridded measured SOL-CMF</i>	
• cost_sol-cmf_wrdc_2002-2004.zip	3.6
<i>Monthly mean and accuracy of gridded SOL-CMF: 1958 - 2004</i>	
• cost_sol-cmf_monthly_avg_accuracy.zip	4.6
<i>Gridded UV surface albedo at 360 nm: 01 Jan 1958 – 31 Aug 2002</i>	
• era40_UValbedo_cost726.zip	20.4



Thank you for your attention