IEA SHC Task 46

The International Energy Agency (IEA) Solar Heating and Cooling (SHC) Task 46: “Solar Resource Assessment and Forecasting” addresses four basic objectives in improving our understanding of solar resources:

A) Evaluating solar resource variability that impacts large penetrations of solar technologies;
B) Improving procedures for short-term solar resource forecasting; and
C) Improving procedures for source bankability;
D) Standardizing and integrating procedures for solar resource modeling procedures based on physical principles to provide improved evaluation of large-scale solar systems using both solar thermal as well as PV and solar concentrating technologies.

The task runs from 2011 to 2016.

Why is this important for NWP?

1) The variability of solar irradiances are caused primarily by clouds. New methods of resource assessment give us better methods for verifying cloud physics that cannot be obtained from “cloud cover” observations alone and are more precise than remotely sensed data.
2) High temporal resolution measurements of global irradiances (GHI) and direct irradiances also give information about the sub-grid scale cloud variability (Skartveit et al. 1998) as illustrated in Fig. 1.

The results in Figs. 3 and 4 (Sengupta et al. 2015) show that the IFS model has very good GHI forecasts in average but that these do not accurately model extreme clear sky or cloudy sky situations. This is likely to be due to the temporal, spatial and statistical smoothing inherent in the current (cy40) IFS model.

HIRLAM tends to have too thick clouds in cloudy situations. By using the error matrix this error can, however, be corrected when forecasting.

Conclusions

• Verification of solar irradiances gives very useful information about the NWP cloud modelling performance.
• High temporal resolution irradiance data gives information about sub-grid scale cloud variability.

References
