

Description of data for Heat and Moisture Simulation in Sweden.

Climate data for 4 cities (Lund, Stockholm, Borlänge ,Luleå) in Sweden are provided.

The data is adapted for the WUFI *.wac format and as Excel files and includes

The data is free to use. Lund University and Building Physics takes no responsibility for the results of calculations based on the data.

Temperature (C)

Relative humidity (0 – 1)

Global solar radiation on horizontal surface (W/m²)

Diffuse solar radiation on horizontal surface (W/m²)

Longwave (sky) radiation on horizontal surface (W/m²)

Precipitation (mm/h)

Wind direction (0-360)

Wind speed (m/s)

The data is based on 9 consecutive years of measured data (90-98). When this raw data was analyzed it was noted that:

There were periods of completely missing data

The precipitation was measured on 12 or 24 hour basis

There were periods of missing longwave (sky) radiation data

The relative humidity was clearly erroneous due to sensors being stuck in states where 95% relative humidity was never reached or sudden leaps in sensor behavior. (Perhaps due to adjustment or battery change.)

In order to create data suitable for heat and moisture calculations several corrections had to be made. The aim was not to create data which matched the original situation as much as possible. It was to create realistic but relatively tough data, i.e. be sure to create data with a high rather than low moisture load.

The steps taken to create the data were:

1. Sanitize the data to remove obvious strange values.
2. Complement missing days of data by using full periods before and after.

3. Complement missing hours by interpolating between hours before and after.
4. Calculate missing longwave radiation data by formulas according to Wallentén (2010).
5. Distribute precipitation to hourly values according to Wallentén (2010).
6. Adjust the relative humidity by scaling so that there was 100% at least once every 3 month (12 weeks). This was done using a 12 week moving average as base for the scaling.

Figure 1 shows some of the parameters for all the locations and all the 9 years. Figure 2-3 show the data for Lund.

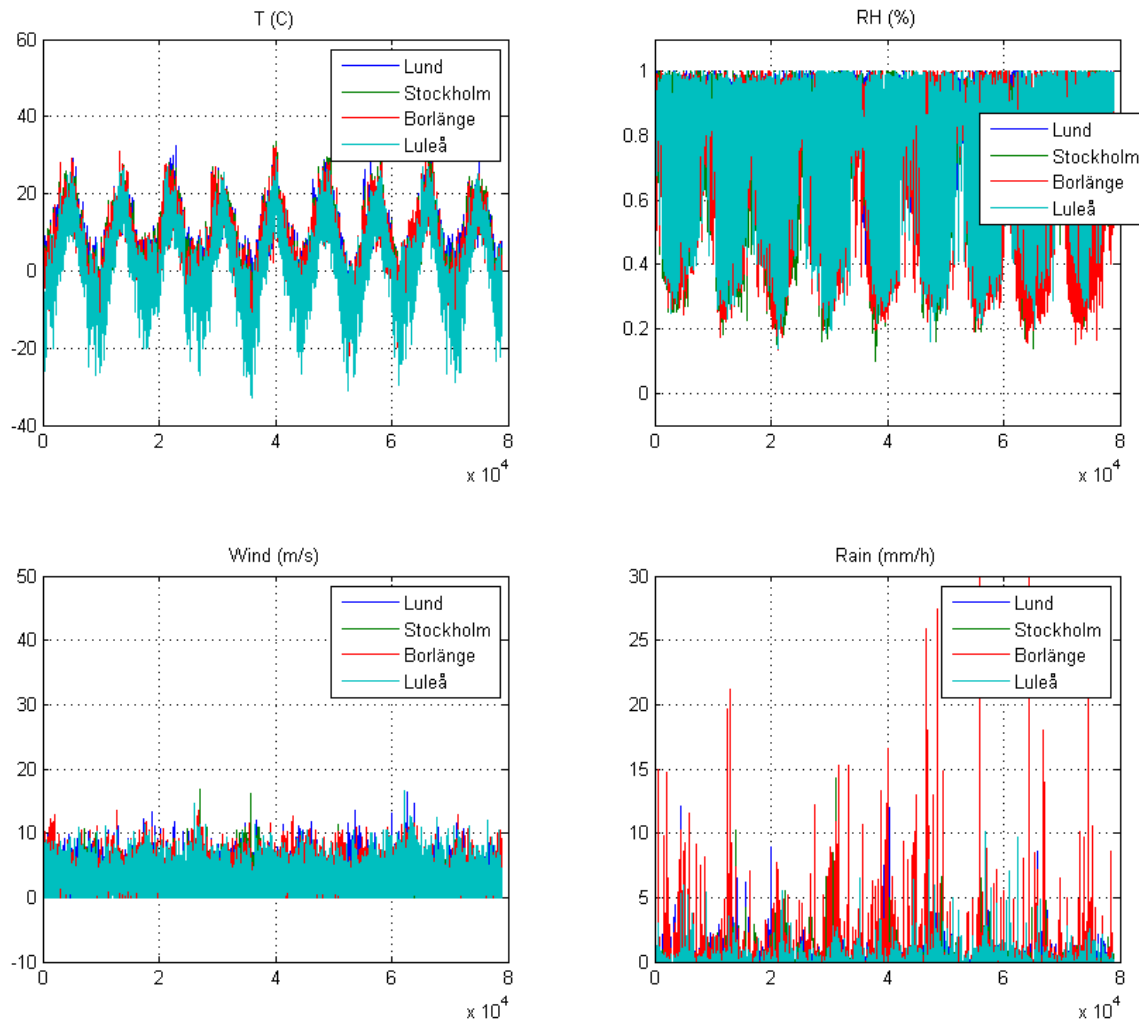


Figure 1: The climate for all years and all positions.

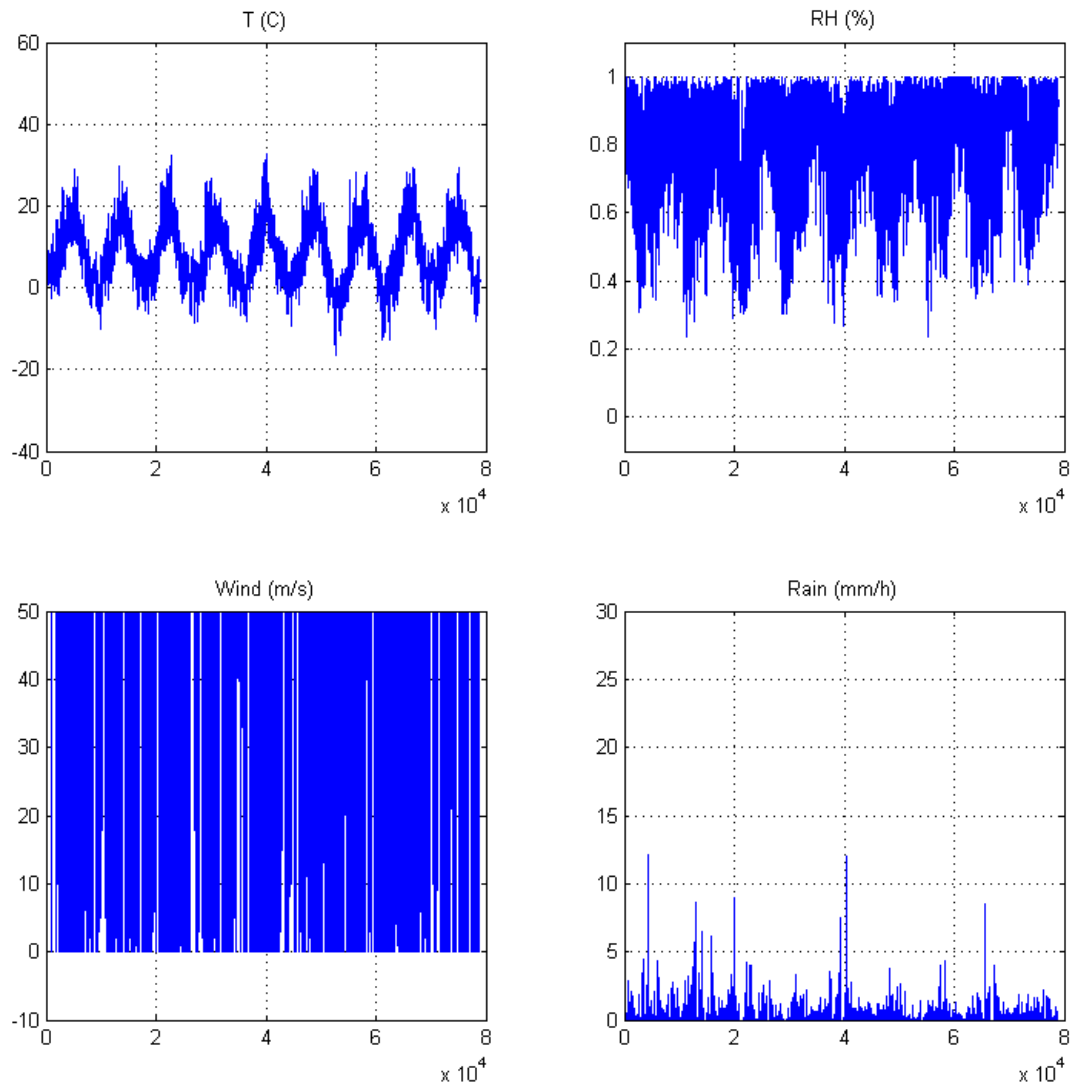


Figure 2: Temperature, relative humidity, wind speed and precipitation in Lund.

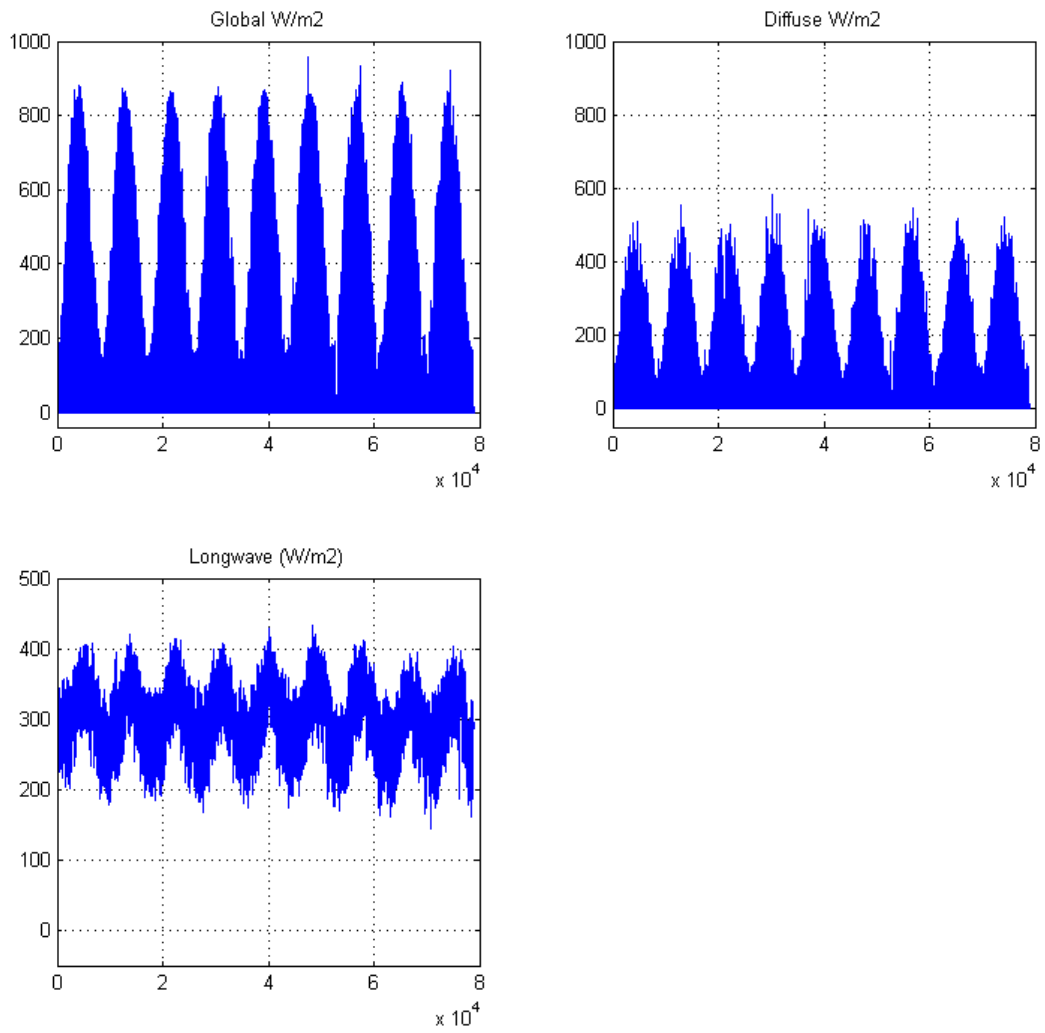


Figure 3: Global, diffuse and longwave radiation for Lund.

Reference

Wallenten, P. (2010), The treatment of long-wave radiation and precipitation in climate files for building physics simulations, *Proceedings of the 11th International Conference on Thermal Performance of the Exterior Envelopes of Whole Buildings* (Clearwater)