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Forecasting the weather
- ensemble techniques
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A method to assess the vulnerability of city residents based on the perceived temperature

G. Halbig (1) and W. Straub (2)

(1) Deutscher Wetterdienst, Offenbach / Main, Germany (guido.halbig@dwd.de), (2) North Rhine-Westfalia State Agency for Nature, Environment, and Consumer Protection, Recklinghausen, Germany (Winfried.Straub@lanuv.nrw.de)

The last decades show in a global scale and in Germany an increasing air temperature. All global climate models in the framework of the recent IPCC reports indicate that this trend will continue by the end of this century. As one consequence the number of days with heat stress will increase especially in towns. This will provoke enhanced discomfort and at worst an increase in mortality.

The city administration and the city planners must be enabled to take these risks into account with the objective of a climate change compatible adaptation.

We present a method to assess the vulnerability of city residents. The main components are GIS based maps of population data (such as aging and population density) or the local distribution of facilities (such as hospitals) and the perceived temperature.

Heat load is not only an effect of air temperature but it is influenced by other factors such as wind speed, humidity and solar and thermal radiation, too. The effect of all these meteorological factors on the human thermal perception is denoted as the perceived temperature which is an equivalent temperature based on a complete heat budget model of the human body. We calculate the perceived temperature using the “Klima-Michel” model of the Deutscher Wetterdienst.

We start out with a vulnerability map of the present state. For this purpose we use measured meteorological data of temporary stations at several sites in Cologne.

Next step will be an approach of a map of vulnerability for the future (middle of the century) based on regional climate model projections in combination with the urban climate model MUKLIMO_3 of the Deutscher Wetterdienst.