IMPROVING RESOLUTION OF MESOSCALE DATABASE USING WRF: APPLICATION OVER BELGIUM

Marta Vázquez Álvarez, Spain
Supervisors: J.P.A.J. van Beeck, J. Sanz, P. Rambaud

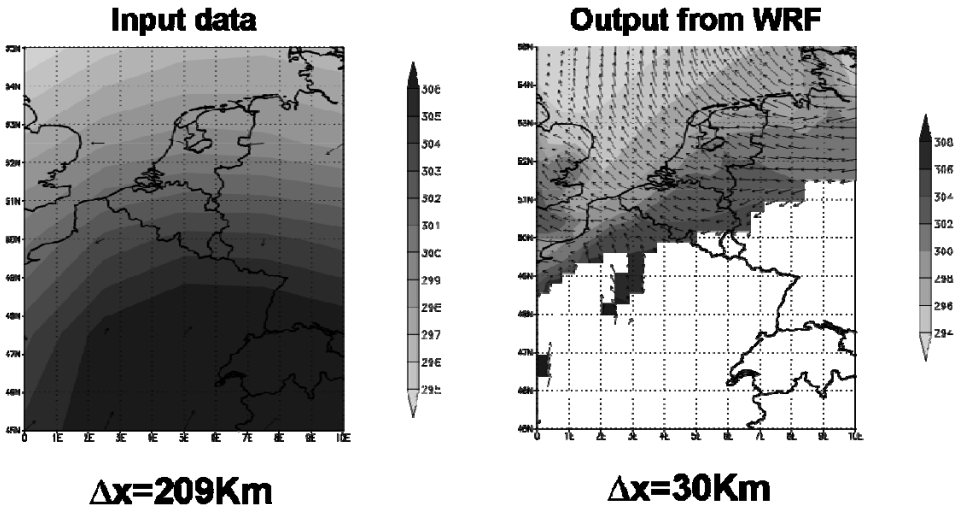
The objective of this project is to build a methodology to obtain meteorological data with a high spatial and temporal resolution. This implies the use of a specific code for mesoscale weather forecasting. It should include not only the terrain topology of the region considered (at mesoscale it will play an important role in weather prediction) but also the transport between the different layers of the atmosphere.

In order to achieve these objectives, an open code, known as WRF, has been implemented at the VKI cluster. This code provides the weather prediction for a user defined limited area.

Since WRF is a regional model, it requires initial conditions as well as boundary conditions obtained from the global database NCEP/NCAR Reanalysis[1]. Specific graphic package has been used to post-process the output form WRF (GrADS) and to obtain maps of the different variables as temperature, wind speed, pressure, etc.

As an alternative objective, a preliminary analysis of the world low resolution database has been done in order to study the wind conditions. Then, this analysis has been applied to Belgium. The Weibull distribution in different places (Belgium, Germany and The Netherlands) has been computed to estimate the sensitivity of the wind distribution due to the location, but also to the distance to the ground. To obtain these distributions, data from 1995-2004 from the database NCEP/NCAR Reanalysis has been used. For the same period, wind roses of Brussels at different altitude have been obtained to extract the main wind direction and compare it with the main wind direction provided by the NCEP/NCAR Reanalysis database, as well as with the European Wind Atlas.

The higher resolution in time and space provided by WRF, has been applied to study the European heat wave during summer 2003 and the hurricane Katrina (August 2005).



[1] National Centers for Enviromental Prediction/National Center for Atmospherical Research