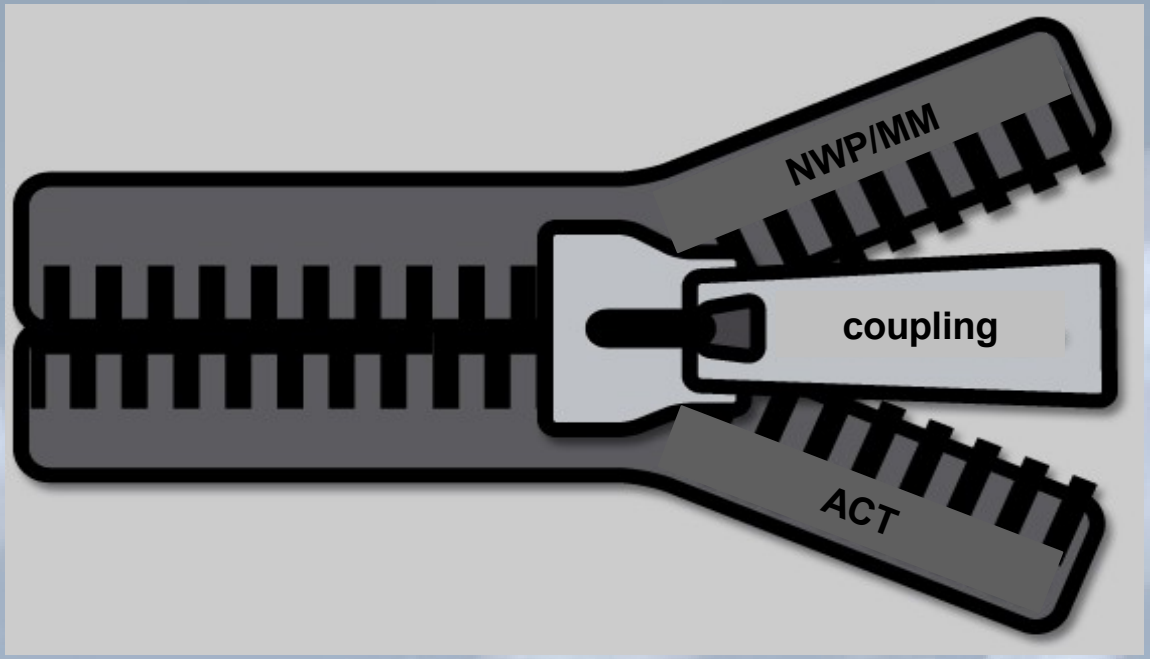

The aim of the workshop session on "coupling" was to discuss and if possible make recommendations on the best practice and strategy for further developments and applications of integrated modelling systems concerning Numerical Weather Prediction and/or Meso-meteorology (NWP/MM) and Atmospheric Chemical Transport (ACT)

Notes by Valentin Foltescu and Jacek Kaminski
30 May 2007
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Types of coupling - subject of the discussions:

- **off-line**
- **on-line access (with availability of meteorological data at each time step)**
- **on-line integrated (with feedbacks possible to consider from ACT to NWP/MM)**

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Feedback mechanisms – especially from aerosols – are considered to be important for a coupling strategy. Aerosol forcing mechanisms influence radiative and optical properties as well as cloud processes, leading for instance to changes of precipitation and circulation.

The strategy recommendations proposed during the "feedback" session of the workshop can be supplemented by:

- **Need to single out the examples of significant feedbacks that were identified so far in sensitivity studies performed with on-line systems**

- **Communicate a list with significant feedbacks and their magnitudes to the NWP/MM modelling community**

Model interfaces include many aspects of the interoperability of NWP/MM and ACT models. Modular coding is advocated in order to ease implementation of different algorithms/routines serving the same purpose. Standards for data exchange is also important.

The strategy recommendations proposed during the "model interface" session of the workshop can be supplemented by:

- **Important to make the modules available on request**
- **Further study of the dislocation problem in coupling interfaces dealing with chemical-data assimilation**
- **Investigate computational efficiency when using different couplers**
- **Prepare a list of variables and parameters used in interfacing**
- **Recommend when a choice should be made between time averaged values vs. instantaneous values of meteorological variables driving the ACT routines**
- **Communicate a list of requirements for interfacing ACT models with NWP/MM to the NWP/MM community (based on experience from off-line modelling)**
- **Acknowledge the potential problems when interfacing NWP/MM and ACT**

Other points which need more attention in respect to "coupling":

- **Inclusion of the sea breeze process is crucial for chemical weather modelling in coastal regions. The meteorological driver needs to describe properly the process of sea breeze.**

- **It is important to parameterize the urban effects on the atmospheric boundary layer (BL). NWP/MM models despite their increased resolution, still have shortcomings. For instance, the description of sub-surface, surface and urban BL for urban areas is similar to that of rural areas. Thus, the urban dynamics and energetics are not properly described. NWP/MM models are not primarily developed for air pollution modeling, and their outputs have to be made suitable input for urban-scale ACT models.**