1. Model used: [SURFEX - TEB](#)
(SURFEX - TEB: Surface externalisee, Town Energy Balance model)
2. Teachers: Laura Rontu and Andres Luhamaa
3. Teacher Assistants:
4. Groups: (will be finalized after evaluation and approval of school applicants)
5. General Info on exercise:
- Introduction Background
- Main Goal
- Specific Objectives
- Literature List

General info on exercise

During the exercise we will get to know the framework of surface parametrizations for NWP models and stand-alone use of the framework of SURFace EXternalisee (SURFEX) from Meteo France. We will focus on the Town Energy Balance (TEB) parametrizations. Our aim is to understand how different atmospheric forcing and different definition of the town properties, compared with the properties of natural landscape, influence in the forecast results, mainly in terms of the surface energy balance and radiation fluxes.

We will aim at cooperation and comparisons with the URBAN groups running Enviro-HIRLAM for selected towns. The details of intercomparisons and cooperation will be defined during preparation of the group work. More information to help participants to prepare for the course will be made available in May-June.

For the TEB group we will have at our disposal
- SURFEX stand-alone model v.6.1 installed in laptops and all related documentation
- observational data and surface definitions from the town Helsinki, Finland, with dokumentation
- (grads) tools to analyse the SURFEX results

REQUIRED READINGS: (will be required to complete minimum requirements + tasks during the school);

http://www.cnrm.meteo.fr/surfex/training_course/01_2009_Surfex_general.pdf (in English) or http://www.cnrm.meteo.fr/surfex/training_course/2010/presentations/2010_Surfex_general.pdf (in French)

http://www.cnrm.meteo.fr/surfex/training_course/12_TEB_v1.pdf (in English) or http://www.cnrm.meteo.fr/surfex/training_course/2010/presentations/2010_Surfex_teb.pdf (in French)

SURFEX is written in Fortran-90, thus basic knowledge of Fortran is useful although we may not modify the model code so much as the namelist definitions. Guidance for the use of the Grid Analysis and Display System (GrADS), used for the display and analysis of the results can be found at the web site

http://grads.iges.org/grads

ADDITIONAL READINGS: (will be required to complete a small-scale research project during the school);

relevant parts of the Scientific documentation and User guide of SURFEX*:*

http://www.cnrm.meteo.fr/surfex/doc_exter/surfex_scidoc.pdf
http://www.cnrm.meteo.fr/surfex/doc_exter/surf.v5.pdf

EXTRA ADDITIONAL READINGS: (for interested/advanced students whom might be already interested in joining Enviro-HIRLAM research and development activities)

articles from the list:
http://www.cnrm.meteo.fr/surfex/doc_exter/Biblio_surfex.htm

material from the page of Helsinki university NumLab09 course on SURFEX:
http://www.atm.helsinki.fi/~jaraisan/numlab2009/NumLab09.html

For those interested in SURFEX chemistry:

http://www.cnrm.meteo.fr/gmapdoc/IMG/pdf_14_Surfex_chimie_stage.pdf
http://www.aemet.es/documentos/es/divulgacion/conferencias/prediccion/Ewglam/PHY_VMasson.pdf