Minutes of the PT AEVUS2 Meeting at ICCARUS 2021

Virtual meeting 16th March 2021 h 10-12

<u>Participants: P. Mercogliano (CMCC), E. Bucchignani (CIRA), M. Milelli (ArpaP), J.-P. Schulz (DWD), M. Varentsov (RHM), V. Garbero (ArpaP), F. Bassani (PoliTO), F. Repola (CMCC), U. Schattler (DWD), J.M. Bettems (Meteoswiss), P. Khain (IMS) plus others</u>

Introduction

- Paola welcomes the participants, illustrates the main topics of the PT and gives overview of the agenda, which is approved by all the participants. She illustrates the new changes and modification requested from SMC to submit the extension of PT_AEVUS2 up to June 2021 to STC. This new version of the PT already has the general support of SMC and STC, but a formal approval is still missing.

Presentations

- Uli provides updates about modifications to the last version of COSMO with terra_urb, and the issues still existing.Gpu implementation is not yet working. He explains the differences between versions 5.05 and 5.09. He informed that there are some issues to be investigated in the next week and people involved in PT_AEVUS2 can support this investigation. It is recommended to run verifications on additional cities e.g. Vienna and Varsaw. Possibility to include additional validation tests in PP_CITTA but not using the FTEs already agreed in PP_CITTA.

- Mikhail provides updates from RHM about terra_urb developments and external parameters. Several 2d external fields have been added to replace hard coded values of previous versions. Default values from extpar have been compared with universal LCZ based approach and with advanced Gis based approach (based on combined used of global different datasets). He shows results of comparison for UHI spatial patterns. He shows result about joint terra_urb evaluation for three cities (Moskow, Turin and Naples) for the choice of the most advanced setup. This work has been published (Garbero et al 2021). Regarding the testing of the beta version, he remembers the typical problem of the rural heating. Test based on TUnew2 configuration, with zero ISA and AHF (Terraurb empty), or no Terraurb, there are no systematic differences, but only stochastically fluctuations. Basically, the new version works, but additional tests are needed. Other issues: Current extpar defaults are too coarse and outdated, but who will take care about it? It is a pity that we missed Matthias. Problems of Terraurb and snow: snow cover is assumed everywhere over buildings, but is evidently not true.

- Valeria said that grib are not properly implemented to use the 2D urban parameters, and in their context cosmo using netcdf crashes. Massimo performed some modifications to the code, in order to take into account the new variables coded in the grib (in order to use grib), but unfortunately they got strange results. Then, they performed analysis with the last version by Uli, but when they use the urban parameters, cosmo crashes, with lots of Nan. Double counting problem has been solved: there are 2 different scripts developed by Matthias and Valeria to remove this problem. It is an external script to be applied to external file and it is recommended to use this tool. The script of Matthias is available on github among the COSMO tools in phyton language

- Francesca presents some results from the previous version and the new one:
  REF: isa and ahf taken from extpar
  LCZ: isa and ahf taken from LCZ
  LMV: 2d urban external parameters taken from LCZ
  REF_TUF: as REF but terraurb off
  The very strange behaviour is given by LMV, especially in the sensible heat flux and long wave radiation. Looking at the 2D maps of these values, the problem is in the night on the mountain the pattern is strange. In particular, it is strange that terraurb treats mountains as urban area. (isa and ahf from LCZ are not zero). Finally, they tested the last version of COSMO with quite similar results. Overall, yhis last version is better than the previous one.

- Edoardo describes the activities performed at CIRA-CMCC: two runs with the last version of COSMO sent by Uli. In particular: CRTL (terraurb = false, oldtur = true, itype_canopy=1) and SM5 (terraurb = true, oldtur = true, itype_canopy=1). Preliminary evaluation performed for 2-meter temperature over urban, rural and Naples area, and considering different altitude areas (low, medium and high). Analysis for both configurations in terms of 95th percentile (to have the order of the magnitude of the maximum difference) of the difference between CTRL_new and CTRL_old and SM5_new and SM5_old. Francesco shows the results in details: in urban areas (ISA>0.8) remarkable differences are observed when Terra_urb is activated. Differences are recorded also in rural areas (ISA<0.2), but of lower intensity. Differences are increasing with altitude even if environment is almost rural, but further analysis are needed about precipitation and other variables.

Discussion

There was only little time for discussion, so Paola suggests to organize another meeting during the next week to establish the set of simulations to be performed by the end of the project. She will send a doodle soon to fix the date. It is important to have a protocol to make a comparison. It is very important the next week to consider the topic of the sensitivity to the urban canopy parameters for different cities in order to compare the results in different geographical contexts.