Minutes of the PT AEVUS2 Meeting in Napoli (Italy) on December 12-13th, 2019,

Participants: P. Mercogliano (CIRA), E. Bucchignani (CIRA), M. Milelli (ArpaP), J.-P. Schulz (DWD), M. Varentsov (RHM), V. Garbero (ArpaP), F. Bassani (PoliTO).

Day 1

TOP 1. Introduction

- Paola welcomes the participants, illustrates the main topics of the PT and gives overview of the agenda.

TOP 2. Final Report AEVUS

- Edoardo gives a short overview about the current version of the document, which is almost in its final version. All participants agree on the addition of a further chapter about a technical description of TERRA_URB, possibly written by Hendrik. The conclusion will be drafted by CIRA people in the next few days, in order to have the document ready before Christmas holidays.

TOP 3. Presentations

- MIkhail discusses about the different canopy schemes, with comparisons between TEB and TERRA_URB. Then he gives an overview about the development of model versions: currently there are two parallel versions, a first one by Uli (after fixing small bugs) and one by Mikhail himself (urb5up, including the possibility of setting several canopy parameters, instead of using fixed default values). Mikhail will try to merge the two versions soon. Then, he explains the motivations that lead to the introduction of these new parameters, in particular the fact that cities are very different one another. The mechanism of usage of these parameters is then explained, they have different effects according with their sign. The first sensitivity tests at the parameter *building_height* show a temperature variation higher during the night. Finally, thermal parameters could be introduced considering the Local Climate zones.

- Valeria presents simulations by ARPA Piemonte obtained with the latest version urb5up. A sensitivity study was performed with respect to the parameters *building_height, building fraction and canyon aspect ratio.* Moreover, a different set of external parameters has built in order to avoid the double-counting effect.

- Francesca Bassani introduces herself as a PhD student at Politecnico di Torino, she will support ARPAP for the study of Urban Heat Island effects and for the implementation of TERRA-URB in ICON.

- Jan-Peter presents some results about a comparison between simulations performed with COSMO-DE, COSMO_DE (modified namelist) and ICON, in terms of T2M, TD2M diurnal cycles, for selected days.

TOP 4. Open discussion

- New canopy parameters. The ranges of plausible values reported in Wouters et al, 2016 are still valid or need to be updated? We agree to use the following values: for *roof fraction*, the minimum value could be set equal 0.2, the maximum at 2; for *building_fraction* the range is 0.2 - 0.7 (default 0.67 is too high and must be modified, as is too close to the maximum one); for *building heigth* it is 3-30.
- In the current model version, it is possible to use both parameters ISA/FR_PAVED and URBAN fraction (based on Globcover LU classes). They are quite different, as URBAN includes urban vegetation. We have to decide which one must be used. In the opinion of Mikhail, ISA is better for Europe, as the ISA data source for Europe is different from the rest of the world. All participants agree in executing further tests with both parameters. In any case, it would be better to have in Webpep the possibility to download ISA/FR_PAVED and URBAN fraction. This issue will be discussed with EXTPAR developers.
- As a rule, all the participants agree that we have to provide guidelines for the external parameter protocol. We have to provide results for a limited number of test cases and general rules to be applied to other test cases, once that we have verified that they work well on our test cases.
- All participants agree that a next important step would be to download data from Copernicus and to prepare external parameter files. This operation must be performed in a GIS environment. Original data at 100 *m* resolution must be interpolated at the desired resolution.

Day 2

TOP 5. Presentations

- Edoardo shows his results obtained with the new version urb5up. A preliminary sensitivity study was performed with respect to the parameters *building_height, building fraction.* A good suggestion of Mikhail is to choose a rural station with characteristic more similar to Napoli (close to the sea). Grazzanise is not a good choice in this sense.

TOP 6. Open discussion

- Next AEVUS2 meeting. Edoardo/Paola will send an email to Daniel Rieger and Jean Marie, asking for a meeting room at ICCARUS 2020, and inviting some people from EXTPAR and ICON developers. A good solution will be to have a room on Wednesday evening (2 hours) and Thursday morning (2 hours).
- Joint paper about AEVUS. All participants agree that it is useless to submit a paper based on the results included in the report. They are too different one another. Different namelists, versions, periods… It is better to repeat the simulations using a common protocol, over the test cases Torino, Napoli and Moscow. These results will be used as basis for the common paper and will be shown at ICCARUS (oral AEVUS2 presentation), too. We will ask Hendrik to write the general part about TERRA_URB. Massimo proposes Urban Climate as possible Journal for submission. Mikhail proposes Geoscientific Model Development. Edoardo proposes a MDPI journal (e.g. Atmosphere), but in this last case there is a fee to be paid, and it is quite impossible to split the fee among participants.
- Common protocol for new simulations. To use ICON forcing data (Edoardo will ask Uli the data for CIRA domain). Simulations will last two weeks, in order to reduce spin up effects. Concerning the common namelists, after a wide discussion, we agree that Jan Peter will provide a “best” reference namelist before Christmas and the following simulations will be performed:

REF: terraurb F, itype canopy = 2, oldtur T

REF1: terraurb F, itype canopy = 1, oldtur T

TEST1: terraurb F, itype canopy = 2, oldtur F

TEST2: terraurb T, itype canopy = 2, oldtur T

TEST3: terraurb T, itype canopy = 2, oldtur F

- Again about the usage of URBAN or ISA. It is better to leave both options in EXTPAR, since in some areas it is better ISA, in other ones URBAN. It is too early to make a final decision. The current version of TERRA_URB uses ISA. In order to use URBAN, it is necessary to remove ISA from the external parameter file and rename URBAN as ISA with CDO.
- NTILES: we will ask Uli to remove it from the list of namelist parameter, as for TERRA_URB true it must be necessarily equal 2. It can be hard coded.
- Preparation of urban and vegetation data in a GIS environment. CIRA will try to investigate in the next months this issue and in positive case will also provide suitable external parameter files even for the Torino test case (ARPAP).
- Jan Peter informs the participants that from March to September 2020 he will implement TERRA_URB into ICON. Then, it will be a good idea to submit a Priority Project about ICON including TERRA_URB before next COSMO GM. Details, in particular concerning PP coordination, will be discussed during the next meeting at ICCARUS.