Final Update on PT_ÆVUS 2

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PT_AEVUS 2 Introduction

The   PT AEVUS2 (Version 3.0, 12/03/2021) has been officially approved during on September 2019 during the COSMO GM:

-Task Leader: CIRA and CMCC (from March 2020)

-COSMO Participants: CIRA, CMCC, Arpa Piemonte, DWD, RHM

-External partners: Flemish Institute for Technological Research (VITO), Ruhr University of Bochum, Polytechnic of Torino, IMS

-Total of 1.22 FTE (COSMO) + 0.54 External partners (VITO + POLITO)

PT_AEVUS 2 Goal

- Consolidate the implementation of the TERRA_URB, the urban scheme available in the COSMO model.

- draft a new PT or PP aiming at transferring these developments into the ICON model.

This PT should be considered as a second part of the work started in PT AEVUS, aiming at having a robust and well documented representation of urban effects in the final unified COSMO release.

The main outcomes of PT_AEVUS are reported in the technical report:
http://www.cosmo-model.org/content/model/documentation/techReports/docs/techReport40.pdf

PT_AEVUS 2 GANNT

COSMO Priority Task:

Analysis and Evaluation of TERRA_URB Scheme 2 (ÆVUS 2)

Version 3.0, 12/03/2021

Task \ Time	09/19	10/19	11/19	12/19	01/20	02/20	03/20	04/20	05/20	06/20	07/20	08/20	9/20	10/20	11/20	12/20	01/21	02/21	03/21	04/21	05/21	06/21
1	X	X	X	X	X	X	X	X	X													
2		X	X	X	X	X	X	X	X	X												
3			X	X	X	X	X	X	X	X	X	X										
4											X	X	X									
5														X	X	X						
6																			X	X	X	X
7												X	X	X	X	X	X	X	X	X	X	X

SubTask6: TESTING TERRA URB with COSMO 6.0

SubTask 7: production of the final report and paper publication

Is it necessary To prepare the final report of the PT_AEVUS 2 (if necessary because the publication of 2021 already covers the main outcomes achieved in PT_AEVUS?)??

Article
Evaluating the Urban Canopy Scheme TERRA_URB in the COSMO Model for Selected European Cities

Valeria Garbero [1,*], Massimo Milelli [1,2], Edoardo Bucchignani [3,4], Paola Mercogliano [4], Mikhail Varentsov [5,6,7,8], Inna Rozinkina [5,6], Gdaliy Rivin [5,6], Denis Blinov [6], Hendrik Wouters [9], Jan-Peter Schulz [10], Ulrich Schättler [10], Francesca Bassani [11], Matthias Demuzere [12] and Francesco Repola [4]

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The paper was the opportunity to evaluate in a systematic way the results obtained in the PT_AEVUS2 and to show the added value of urban parameterization in different (climate, morphology) urban areas (Moscow, Turin Naples)

Activities related to the last task are still on going.
How can we manage this?

Introduction to the new PP CITTA'

Jan-Peter Schulz

Deutscher Wetterdienst, Offenbach, Germany

and the PP CITTA' team

COSMO General Meeting, 6 - 17 Sep. 2021, Video Conference

COSMO Priority Project CITTA':

City Induced Temperature change Through A'dvanced modelling

Project leader: Jan-Peter Schulz (DWD)

Project duration: Jul. 2021 – Aug. 2024

The COSMO PP CITTA' team

ARPAP: Valeria Garbero, Massimo Milelli

CIRA: Edoardo Bucchignani

CMCC: Paola Mercogliano, Carmela Apreda, Carmine De Lucia,
               Alfredo Reder, Francesco Repola

DWD: Jan-Peter Schulz

IMGW-PIB: Adam Jaczewski, Andrzej Wyszogrodzki, Witold Interewicz,
               Alan Mandal

IMS: Itsik Carmona, Pavel Khain, Yoav Levi

KIT: Julia Fuchs

NMA: Rodica Dumitrache, Amalia Iriza-Burca, Bogdan Maco

PoliTo: Francesca Bassani

RHM: Mikhail Varentsov, Denis Blinov, Vladimir Kopeykin,
               Timofey Samsonov, Gdaly Rivin

VITO: Hendrik Wouters

Task C: Project coordination

The COSMO Priority Project CITTA' coordinates activities aimed at the development of an urban surface parameterisation in ICON. A coordination task is activated, dealing with the organisation of virtual and physical meetings, writing of reports, and frequent e-mail exchange. A final report will be provided.

Deliverables: Meetings, reports, Final Report.

Involved scientist: Jan-Peter Schulz (DWD) 0.1 FTE/year, Paola Mercogliano (CMCC) 0.05 FTE/year

FTEs: 0.15 FTE/year (Jul. 2021 – Aug. 2024)

Task 1: Implementation of TERRA_URB in ICON

During the COSMO Priority Tasks AEVUS and AEVUS2 the TERRA_URB urban parameterisation in the COSMO model was demonstrated to be able to reproduce the key urban meteorological features. In the framework of the transition of the COSMO Consortium to the ICON model TERRA_URB needs to be implemented in ICON.

Deliverables: TERRA_URB in ICON.

Involved scientists: Jan-Peter Schulz (DWD) 0.4 FTE, Mikhail Varentsov (RHM) 0.1 FTE, Carmine De Lucia (CMCC) 0.1 FTE

FTEs: 0.6 FTE (Jul. 2021 – Jun. 2022)

Task 2: External parameters

Subtask 2.1: Consistency of urban external parameters

A method should be designed and implemented in order to avoid inconsistencies due to the differences between the URBAN (based on land use classes) and ISA (Impervious Surface Area, based on independent data sources) fields.

Deliverables: Consistent way to derive urban external parameters in EXTPAR.

Involved scientists: Valeria Garbero (ARPAP) 0.1 FTE, Mikhail Varentsov (RHM) 0.1 FTE, Alfredo Reder (CMCC) 0.1 FTE

FTEs: 0.3 FTE (Jul. 2021 – Jun. 2022)

Task 2: External parameters

Subtask 2.2: New urban external parameters in EXTPAR for ICON(-LAM)

Meanwhile, two raw EXTPAR datasets for TERRA_URB are outdated and should be replaced. Furthermore, several internal parameters describing the urban geometry and the urban thermal and radiative properties, which were hardcoded in TERRA_URB as global constants, will be replaced by 2-dimensional fields from EXTPAR.

Deliverables: New urban external parameters in EXTPAR for ICON-LAM.

Involved scientists: Carmela Apreda (CMCC) 0.2 FTE, Adam Jaczewski (IMGW-PIB) 0.35 FTE, Andrzej Wyszogrodzki (IMGW-PIB) 0.15 FTE, Mikhail Varentsov (RHM) 0.2 FTE, Timofey Samsonov (RHM) 0.2 FTE, Valeria Garbero (ARPAP) 0.15 FTE, Massimo Milelli (ARPAP) 0.05 FTE, Francesca Bassani (PoliTo) 0.2 FTE, Jan-Peter Schulz (DWD) 0.2 FTE

FTEs: 1.7 FTE (Jul. 2021 – Jun. 2022)

Task 3: Numerical experiments

The numerical experiments will be carried out in a coordinated way in the different model domains of the project partners involved.

Subtask 3.1: Moscow

Deliverables: Assessment of the new scheme in the Moscow mega-city domain.

Involved scientists: Mikhail Varentsov (RHM), Denis Blinov (RHM), Vladimir Kopeykin (RHM), Gdaly Rivin (RHM)

FTEs: 1.0 FTE (Jul. 2022 – Aug. 2024)

Task 3: Numerical experiments

The numerical experiments will be carried out in a coordinated way in the different model domains of the project partners involved.

Subtask 3.2: Turin

Deliverables: Assessment of the new scheme in the Turin domain.

Involved scientists: Valeria Garbero (ARPAP) 0.4 FTE, Massimo Milelli (ARPAP) 0.25 FTE, Francesca Bassani (PoliTo) 0.35 FTE

FTEs: 1.0 FTE (Jul. 2022 – Aug. 2024)

Task 3: Numerical experiments

The numerical experiments will be carried out in a coordinated way in the different model domains of the project partners involved.

Subtask 3.3: Naples

Deliverables: Assessment of the new scheme in the Naples domain.

Involved scientists: Edoardo Bucchignani (CIRA) 0.3 FTE, Paola Mercogliano (CMCC), Francesco Repola (CMCC), Alfredo Reder (CMCC), Carmela Apreda (CMCC)

FTEs: 1.0 FTE (Jul. 2022 – Aug. 2024)

Task 3: Numerical experiments

The numerical experiments will be carried out in a coordinated way in the different model domains of the project partners involved.

Subtask 3.4: Bucharest

Deliverables: Assessment of the new scheme in the Bucharest domain.

Involved scientists: Rodica Dumitrache (NMA), Amalia Iriza-Burca (NMA), Bogdan Maco (NMA)

FTEs: 1.0 FTE (Jul. 2022 – Aug. 2024)

Task 3: Numerical experiments

The numerical experiments will be carried out in a coordinated way in the different model domains of the project partners involved.

Subtask 3.5: Jerusalem and Tel Aviv

Deliverables: Assessment of the new scheme and generally the urban effects on temperature and wind profiles in Jerusalem and Tel Aviv.

Involved scientists: Itsik Carmona (IMS), Pavel Khain (IMS), Yoav Levi (IMS)

FTEs: 1.0 FTE (Jul. 2022 – Aug. 2024)

Task 3: Numerical experiments

The numerical experiments will be carried out in a coordinated way in the different model domains of the project partners involved.

Subtask 3.6: Warsaw

Deliverables: Assessment of the new scheme and the urban effects in Warsaw.

Involved scientists: Adam Jaczewski (IMGW-PIB), Andrzej Wyszogrodzki (IMGW-PIB), Witold Interewicz (IMGW-PIB), Alan Mandal (IMGW-PIB)

FTEs: 1.0 FTE (Jul. 2022 – Aug. 2024)

Task 4: Further developments and applications of TERRA_URB

Once the model is successfully implemented and tested, further scientific developments and applications of TERRA_URB will be carried out.

Subtask 4.1: Improved representation of vegetated urban areas in TERRA_URB

Deliverables: Vegetated urban areas implemented in TERRA_URB. Assessment of the impact of this new development in the Moscow domain.

Involved scientists: Mikhail Varentsov (RHM) 1.0 FTE, Hendrik Wouters (VITO) 0.05 FTE

FTEs: 1.05 FTE (Jul. 2022 – Aug. 2024)

Task 4: Further developments and applications of TERRA_URB

Once the model is successfully implemented and tested, further scientific developments and applications of TERRA_URB will be carried out.

Subtask 4.2: Boundary layer clouds over urban areas in ICON-LAM-ART

Deliverables: Assessment of the new scheme in ICON-LAM-ART.

Involved scientist: Julia Fuchs (KIT)

FTEs: 1.0 FTE (Jul. 2022 – Aug. 2024)