Introduction to the new PP CITTA'

Jan-Peter Schulz

Deutscher Wetterdienst, Offenbach, Germany

and the PP CITTA' team

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COSMO Priority Project CITTA':

City Induced Temperature change Through A'dvanced modelling

Project leader: Jan-Peter Schulz (DWD)

Project duration: Jan. 2021 – Dec. 2023 (3 years)

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

KIT: Julia Fuchs

NMA: Rodica Dumitrache, Amalia Iriza, Bogdan Maco

PoliTo: Francesca Bassani

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

RUB: Matthias Demuzere

VITO: Hendrik Wouters

Task C: Project coordination

The COSMO PP CITTA' aims at the development of an urban surface parameterisation in ICON(-LAM). 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)

FTEs: 0.1 FTE/year (Jan. 2021 – Dec. 2023)

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-LAM, the limited-area version of the global ICON model for NWP applications.

Deliverables: TERRA_URB in ICON(-LAM).

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 (Jan. 2021 – Sep. 2021)

Task 2: External parameters

Subtask 2.1: Urban land use class: URBAN or ISA?

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 source) fields.

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

Involved scientists: Matthias Demuzere (RUB) 0.1 FTE, Valeria Garbero (ARPAP) 0.1 FTE, Mikhail Varentsov (RHM) 0.05 FTE, Carmela Apreda (CMCC) 0.05 FTE, Alfredo Reder (CMCC) 0.05 FTE

FTEs: 0.35 FTE (Jan. 2021 – Sep. 2021)

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: Matthias Demuzere (RUB) 0.8 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) 0.3 FTE

FTEs: 1.9 FTE (Jan. 2021 – Dec. 2021)

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)

FTEs: 0.4 FTE (Jan. 2022 – Dec. 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 3.2: Turin

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

Involved scientists: Valeria Garbero (ARPAP), Massimo Milelli (ARPAP), Francesca Bassani (PoliTo)

FTEs: 0.4 FTE (Jan. 2022 – Dec. 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 3.3: Naples

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

Involved scientists: Edoardo Bucchignani (CIRA), Paola Mercogliano (CMCC), Francesco Repola (CMCC)

FTEs: 0.4 FTE (Jan. 2022 – Dec. 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 3.4: Bucharest

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

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

FTEs: 0.4 FTE (Jan. 2022 – Dec. 2022)

Task 4: Further development of the TERRA-URB scheme

Once the model is successfully implemented and tested, further scientific development 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) 0.5 FTE, Hendrik Wouters (VITO) 0.05 FTE

FTEs: 0.55 FTE (Jul. 2022 – Jun. 2023)

Task 4: Further development of the TERRA-URB scheme

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

Subtask 4.2: New development in Turin

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

Involved scientists: Francesca Bassani (PoliTo) 0.4 FTE, Valeria Garbero (ARPAP) 0.05 FTE, Massimo Milelli (ARPAP) 0.05 FTE, Jan-Peter Schulz (DWD) 0.05 FTE

FTEs: 0.55 FTE (Jul. 2022 – Jun. 2023)

Task 4: Further development of the TERRA-URB scheme

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

Subtask 4.3: 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: 0.4 FTE (Oct. 2021 – Dec. 2023)