

Report on Porting TERRA_URB Developments to COSMO-Model 6.0

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Latest TERRA_URB Modifications

- Last TERRA_URB version distributed is cosmo_191213_5.05_urb6
- Latest modifications by Mikhail have been integrated (additional variables); (cosmo_200707_5.05_urb7)
- TERRA_URB version is based on COSMO-Model 5.05
- All modifications now have to be integrated in the last COSMO version
- This will be done by implementing branches in the github.com/COSMO-ORG repository

Modifications to 5.05 for implementing TERRA_URB

- Several variables are now declared as „tile variables“, which have one additional dimension
 - Makes organization (esp. I/O) a bit more difficult
 - Needs adaptations in all parts of the code, which use these variables
- New variables, namelist switches and additional code
 - sfc_ahf.f90, sfc_tile_approach.f90
- Modifications to existing code (e.g. sfc_terra.f90)

COSMO Developments since Version 5.05

Only the ones, that might be interesting for TERRA_URB:

- ➔ New advection scheme `y_scalar_advect=BOTT_DC2` (as stable as `BOTT2_STRANG`, but cheaper)
- ➔ The model can now run in single precision (but surface schemes should stay in double precision)
- ➔ Fix in the graupel scheme (`itype_gscp=4`): limitation of terminal fall velocity for rain/snow/graupel (modifies results!)
- ➔ Fix in shallow convection interface (`itype_conv=3`): when computing the final tendencies, a loop index „k“ was used outside the loop for the lowest model level (potential to modify the results)
- ➔ Most parts of the model can now run on GPUs: is this a goal for TERRA_URB?

Timeline

- ➔ During September, two more COSMO Versions will be implemented:
 - ➔ 5.08: containing all the developments from the CLM community
 - ➔ 5.09: containing new multi-layer snow module (from PT SAINT)
- ➔ At the same time we can start to implement the branches for TERRA_URB
 - ➔ For these branches we need a timely testing and reviewing
 - ➔ Who can do that?



Thank you
very much
for your
attention!