TSA – INFORMATION

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→ Background

- Uli is COSMO source code administrator
- Dörte is responsible for GRIB in DWD research department, never used TSA before

→ History of TSA changes

- Main developers (with documentations)
  - Felix Ament (MeteoSwiss, now Uni Hamburg) –> initial release
  - Julian Tödter (GUF) –> poor mans parallelizition (with subregions)
  - Yiftach Ziv (IMS) –> revision and new COSMO version
- Last status
  - COSMO version 5.3
  - Input/output via libgrib1 (only GRIB1)

→ Mean features of TSA

- Preparation of data to run terra module over time
  - Input of constant data (external parameters)
  - Input of initial conditions (soil variables, snow parameter)
  - Input of meteorological forcing data every hour (wind, moisture, temperature, pressure, precipitation, radiation)
- Possibility to use subregions in parallel (not tested)
- Output in GRIB (3 possibilities: only W_SO, W_SO + T_SO, „all“ data; tested), Binary or ASCII output (not tested)

→ What is done?

→ What is missing?

What is done?

- Migration to GRIB2: Add eccodes (GRIB1/2) for input and output
  - **yform_read** = {grb1, apix} for input, **yform_write** = {grb1, api1, api2} for output
  - New SR for reading, writing and checking in gribio.f90 and terra_io.f90 (read_grib_eccodes, grbout_eccodes, …)
  - Old and new GRIB libraries have to be loaded, implementation without #ifdef at the moment
- Detected „problems“
  - Minor checks concerning grid, time stamps, availability of variables (only some with defaults)
  - Grid: desired grid can be different to input data (cropping or interpolation is implemented, only tested for cropping of constant data, initial and forcing data match in our tests); it is assumed that all the fields have the same grid like the first.
  - Time: The time stamp in the file name is taken for granted; NL lhourly =.true. is not checked
  - Missing fields: only warning
- Additional checks / modifications
  - Preset precipitation with zero, if missing
  - Take instantaneous values of radiation, if averaged is missing; if no radiation, preset with zero?
  - Use SR tgcom to compute T_G if missing
  - If fields without default are missing: STOP
  - Check for lhourly=.true. (testing not finished)

What is done? (II)

- New output features
  - Only land points are defined, water/sea points get „undefined“ value:
    - GRIB packing with these undefined points is unexact
    - Use bitmap (min, max is correct, reduced data volume)
- Migration to COSMO version 5.06b-4
  - Introduction of block structure
  - New main program terra_TSA.f90, new SR for interface to TERRA (tsa_sfc_interface.f90)
  - SR parturs_new adapted for block structure (parturs_newblock)
  - **NEW**: Uli starts implementation of version 5.07 with some streamlining !!
- Possibility to use ICON fields (ymodel =‚ICON‘)
  - Unstructured grid
  - New reading routines, writing is adapted for ICON
  - No possibility of cropping or interpolation
  - Only functional test
- Documentation (all from December 2019)
  - Short summary, Migration to block structure / eccodes, Info: Meteorological forcing

What is missing ?

- Status of modifications is „test mode“, not „cleaned“ and fully tested
- Experts have to check modification of input data (radiation)
- It has to be decided, if additional checks are necessary (grid?)
- Although all the variables/NL parameter needed for the new COSMO version are introduced, there is no modification of eventually needed new external, initial or forcing data
- Output is as is, no additions for variables coming with the new parameterizations
- Only functional tests (one hour forecast with reduced area on workstation)
- Subregions / cropping / interpolation not tested