# Troubleshooting for the COSMO-Model

Bogdan Alexandru MACO

Cosmin Danut BARBU

Amalia IRIZA

*National Meteorological Administration*

*Romania*

*COSMO / CLM / ART Training Course 2015. Theory and Application, Langen,* ***23.03 - 27.03.2015***

***Problems that can occur during the single phases you are going through when installing and running the model***

**Compiling and Linking**

- Find some proper compiler and linker options, if there are no example Fopts-files given in the delivered version

- Try a moderate optimization first! Many compiler problems come from very high optimizations.

- Error message like Unable to access module symbol file for module netcdf

  When you have a library for NetCDF available and add that to the LIB-definition in the Makefile, you also have to give a compiler option: -I xxx/include, indicating the path, where the compiled module files for NetCDF are lying.

- In the linking process, you can get error messages like:

  Unsatisfied external references: . __netcdf_NMOD_nf90_def_dim or
  Undefined symbol .rttov7_rttvi

  Then you forgot to link a certain library, to activate a certain dummy xxx module in the file ObjFiles or you unintentionally specified a preprocessor directive

You can get these messages, even if you put all libraries to the LIB Variable, e.g.

```
#LIB =  /rhome/routarz/libdwd/lib/libgrib1.a   \
LIB=    /uhome/trngxyz/lib/libgrib1.a      \
        /uhome/trngxyz/lib/libnetcdf.a
```

*Note:* Some systems treat all these lines as a comment, because the first line has the comment-sign and a continuation-sign at the end.

# Running INT2LM

The most common mistakes, when running INT2LM, are the treatment of bitmaps (if necessary) and the specification of the COSMO-Model domain. Unfortunately, the error messages are sometimes misleading.

```
&DATA
---------------------------
  ie_ext=961, je_ext=769,
  ylmext_lfn='lm_d1_07000_961x769_new.g1',
  ylmext_cat='$LM_EXT'
---------------------------
  yin_cat='$IN_DIR',
  ybitmap_cat='$IN_DIR',
  ybitmap_lfn='bitmp410',
  nbitmap=48000,
---------------------------
&LMGRID
-----------------------------
startlat_tot  = -16.5, startlon_tot  = 4.0,
 pollat=32.5,        pollon=-170.0,
 dlon=0.0625,         dlat=0.0625,
 ielm_tot=201,         jelm_tot=177,        kelm_tot=40,
-----------------------------
```

The COSMO domain must be inside the COSMO constant file provided by DWD.

ylmext_lfn='lm_d1_07000_961x769_new.g1'

# Possible errors that may occur

*OPEN: grb1-file:*
*/export/home/cosmo/COSMO_5.0_Bogdan/RUN/CONST/lm_d1_07000_961x769_new.g1*
*CLOSING grb1 FILE*
*OPEN: grb1-file:*
*/export/home/cosmo/COSMO_5.0_Bogdan/RUN/CONST/invar.i384a*
*CLOSING grb1 FILE*
*----------*
** PROGRAM TERMINATED BECAUSE OF ERRORS DETECTED*
** IN ROUTINE: int2lm_org*
***
** ERROR CODE is 10*
** Not all necessary fields could be read or interpolated*
*----------*

# Solution

Please check in **&CONTRL**

**If the following parameters are set properly**

itype_albedo=3
lprog_qi=.TRUE., lprog_qr_qs=.TRUE.,
lsso=.FALSE., lforest=.TRUE.,
lseaice=.TRUE., lprog_rho_snow=.TRUE.,

# Running **INT2LM** using the DWD GRIB1 library

•All programs that are doing GRIB I/O, have to be linked with the library libgrib1.a
•There are two additional issues that have to be considered when running programs using this GRIB library:

- DWD still uses a GRIB file format, where all records are starting and ending with additional bytes, the so-called control words
- An implementation of the GRIB library is prepared that also deals with pure GRIB files, that do not have these control words. But still we guarantee correct execution only, if these control words are used. To ensure this you have to set the environment variable.

**export LIBDWD FORCE CONTROLWORDS=1.**

in all your run-scripts.

• Another environment variable has to be set, if INT2LM is interpolating GME data that are using ASCII bitmap files:

**export LIBDWD BITMAP TYPE=ASCII.**

(because this library can also deal with binary bitmap files, which is the default).

# Running **INT2LM** using the DWD GRIB1 library

```
OPEN: grb1-file: /export/home/cosmo/COSMO_5.0_Bogdan/RUN/CONST/lm_d1_07000_961x769_new.g1
CLOSING grb1 FILE

OPEN: apix-file: /export/home/cosmo/COSMO_5.0_Bogdan/RUN/CONST/invar.i384a
CLOSING apix FILE


 *** WARNING: isolated points cannot be calculated due to missing land-sea-mask
 *** WARNING: isolated points cannot be calculated due to missing land-sea-mask
*-----------------------------------------------------------*
*    PROGRAM TERMINATED BECAUSE OF ERRORS DETECTED
*             IN ROUTINE:   int2lm_org
*
*    ERROR CODE is          10
*    Not all necessary fields could be read or interpolated
*-----------------------------------------------------------*
 *** WARNING: isolated points cannot be calculated due to missing land-sea-mask
```

# Solution

&DATA

---

yinext_lfn='invar.i384a',
yinext_form_read='apix',

---

yinext_form_read='grb1',

# Running **INT2LM** using the DWD GRIB1 library

```
 OPEN: grb1-file: /export/home/cosmo/COSMO_5.0_Bogdan/RUN/CONST/lm_d1_07000_961x769_new.g1
 CLOSING grb1 FILE
 OPEN: grb1-file: /export/home/cosmo/COSMO_5.0_Bogdan/RUN/CONST/invar.i384a
 CLOSING grb1 FILE
 OPEN: apix-file: /export/home/cosmo/COSMO_5.0_Bogdan/RUN/DATA00/giff00000000
 CLOSING apix FILE
       Not all data necessary could be read!!!
        Level    U      V      T     QV     QC     QI     QR     QS
        1      F      F      F      F      F      F      F      F
        2      F      F      F      F      F      F      F      F
  ------------------------------------------------------------------------------
PS:        F
   FIC:       F
   T_SNOW:    F
   W_SNOW:    F
   W_I:       F
   QV_S:      F
      Level    T_SO    W_SO
        0      F
        1      F      F
        2      F      F
----------------------------------------------------
   FRESHSNW:   F
   RHO_SNOW:   F
   T_ICE:      F
   H_ICE:      F
 *-----------------------------------------------------------*
 *    PROGRAM TERMINATED BECAUSE OF ERRORS DETECTED
 *             IN ROUTINE:   org_gme_interpol
 *
 *    ERROR CODE is         5051
 *     *** ERROR:  Not all data available ***
 *-----------------------------------------------------------*
```

# Solution

&DATA

---

yin_form_read='apix',

---

yin_form_read='grb1',

# Running **INT2LM** using the DWD GRIB1 library

```
Current start time : 2014-02-06 08:58
 Running on nodes ..:
 Data decomposition :
 ==== End of code information ====

 *-----------------------------------------------------------*
 *    PROGRAM TERMINATED BECAUSE OF ERRORS DETECTED
 *             IN ROUTINE:   int2lm_org
 *
 *    ERROR CODE is         1113
 *     ERROR    *** Error while opening file YUDEBUG ***
 *-----------------------------------------------------------*
```

# Solution

Please remove the YU* files before running the int2lm

# Running **COSMO** model

## ERROR 1

```
   INPUT OF THE NAMELISTS FOR DYNAMICS
  DOMAIN SIZE (approx.) in m: L_x =    1300680.5140631699
                              L_y =    1188438.4943563333
   INPUT OF THE NAMELISTS FOR PHYSICS
  *** Default specifications of soil main levels are used ***
   INPUT OF THE NAMELISTS FOR DIAGNOSTICS
   INPUT OF THE NAMELISTS FOR GRIB-IO
   INPUT OF THE NAMELISTS FOR RTTOV SYNSAT
 ERROR    *** itype_rttov = 9, but RTTOV9 is not defined for compilation
***
 *------------------------------------------------------------*
 *    PROGRAM TERMINATED BECAUSE OF ERRORS DETECTED
 *             IN ROUTINE:   organize_satellites: input
 *
 *    ERROR CODE is         9103
 *     ERROR *** Wrong values occured in NAMELIST INPUT_SAT ***
 *------------------------------------------------------------*
```

# Solution 1.

Please set in &RUNCTL :

luse_rttov = .TRUE.

luse_rttov = .FALSE.

# ERROR 2

```
          H_ICE     , level:           1     F
            FR_LAKE   , level:           1     F
            DEPTH_LK  , level:           1     F
            T_MNW_LK  , level:           1     F
            T_WML_LK  , level:           1     F
            T_BOT_LK  , level:           1     F
            C_T_LK    , level:           1     F
            H_ML_LK   , level:           1     F
 *-------------------------------------------------------*
 *    PROGRAM TERMINATED BECAUSE OF ERRORS
DETECTED
 *            IN ROUTINE:   organize_input
 *
 *    ERROR CODE is         2004
 *    Not all data available
 *-------------------------------------------------------*
```

# Solution 2.

**Please set in &GRIBIN**

&GRIBIN

---

lan_t_so0=.TRUE., lan_t_cl=.TRUE., lan_w_cl=.TRUE., lan_vio3=.TRUE.,
lan_hmo3=.TRUE., lan_plcov=.TRUE., lan_lai=.TRUE., lan_rootdp=.TRUE.,
lan_t_snow=.TRUE., lan_w_i=.TRUE., lan_w_snow=.TRUE., lan_rho_snow=.TRUE.,
lan_w_so=.TRUE.,

For using GME analysis file (soil parameters)

! lan_t_so0=.FALSE., lan_t_cl=.FALSE., lan_w_cl=.FALSE., lan_vio3=.FALSE.,
! lan_hmo3=.FALSE., lan_plcov=.FALSE., lan_lai=.FALSE., lan_rootdp=.FALSE.,
! lan_t_snow=.TRUE., lan_w_i=.TRUE., lan_w_snow=.TRUE., lan_rho_snow=.TRUE.,
! lan_w_so=.FALSE.,

For using COSMO analysis file (soil parameters)

---

# ERROR 3

```
CLOSING grb1 FILE
  *** Not all variables / levels could be read for initial data   ***
  *** The following levels are missing:    ***
         SSO_STDH  , level:            1     F
         SSO_GAMMA , level:              1     F
         SSO_THETA , level:            1     F
         SSO_SIGMA , level:            1     F
         FR_LAKE   , level:          1     F
         DEPTH_LK  , level:            1     F
         T_MNW_LK  , level:            1     F
         T_WML_LK  , level:            1     F
         T_BOT_LK  , level:          1     F
         C_T_LK    , level:        1     F
         H_ML_LK   , level:            1     F
 *----------------------------------------------------------*
 *    PROGRAM TERMINATED BECAUSE OF ERRORS DETECTED
 *            IN ROUTINE:   organize_input
 *
 *    ERROR CODE is         2004
 *    Not all data available
 *----------------------------------------------------------*
```

# Solution 3.

Please set in **&PHYCTL**

itype_albedo=3 to itype_albedo=1

ltkesso=.TRUE. to ltkesso=.FALSE.