Regional Cooperation for Limited Area Modeling in Central Europe

LACE
nwp central europe

BATOR practicals & solution

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Preparation

```
# login to cca/ccb
ssh -Y cca

#
cd $PERM # or $SCRATCH
tar xf /perm/ms/spsehlam/hlam/daTraining/Day_1/sample_bator.tar
vi sample_bator/README
```

Exercises

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- **explore BATOR scripts & run & check output listing**

- **Hints: qsub bator, vi bator.o***

- **Solution:**

```
*** INFO - BATOR :
...
LAMFLAG: OBSERVATION LISTING
  ----------------------------------------
  OBSTYPE        STATUS      TOTAL       SELECTED
  ----------------------------------------
  SYNOP          T           4259        1196
  AIREP          T           0           0
...
observations : synop        1196
     synop de surface           1149
     synop ship                   47
...
     autres                        0
Nb total d'observations :      1196
```

Exercises 2 - LAMFLAG

- **switch off LAMFLAG & check again number of selected observations**
- **Hints & solution:** `export BATOR LAMFLAG=`
  `$> grep "observations :" bator*.o*`

```
LAMFLAG=1
bator.o1582634:observations : synop         1196
bator.o1582634:Nb total d'observations :        1196
bator.o1582634:observations : temp           42
bator.o1582634:Nb total d'observations :          42
bator.o1582634:observations : airep          255
bator.o1582634:Nb total d'observations :         255
bator.o1582634:observations : satob          395
bator.o1582634:Nb total d'observations :         395
# LAMFLAG=0
bator_v2.o1626355:observations : synop         4259
bator_v2.o1626355:Nb total d'observations :        4259
bator_v2.o1626355:observations : temp          122
bator_v2.o1626355:Nb total d'observations :         122
bator_v2.o1626355:observations : airep         1246
bator_v2.o1626355:Nb total d'observations :        1246
bator_v2.o1626355:observations : satob        27008
bator_v2.o1626355:Nb total d'observations :        27008
```

Exercises 2 - LAMFLAG

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- **try to remove TEMP data via LAMFLAG**
- **Hints:** `&NAMFOBS` `LTEMP=.FALSE.`
- **Solution:**

```
$> diff bator bator_v22
112c112,113
< cp -f $DIR/namelist/namel_lamflag NAM_lamflag
---
> #cp -f $DIR/namelist/namel_lamflag NAM_lamflag
> sed "s/LTEMP=.TRUE/LTEMP=.FALSE./" $DIR/namelist/namel_lamflag > NAM_lamflag

# listing
$>grep "observations :" bator_v22.o1626829

observations : synop        1196
Nb total d'observations :        1196
observations : airep         255
Nb total d'observations :         255
observations : satob         395
Nb total d'observations :         395

=> no temp data in the ouput listing
```

- **reduce assimilation window of AMDAR observation to +/-30 min**
- **Hints:**

```
export BATOR WINDOW LEN=width of the assimilation window (in minutes)
export BATOR WINDOW SHIFT=shift of the window relative (must be negative)
```

- **Solution:**

```
# edit script
$> vi bator_v3
...
  elif [ "${base}" = "amdar" ] ; then
    export BATOR_WINDOW_LEN=60
    export BATOR_WINDOW_SHIFT=-30
    cp $DIR/data/input/${YYYY}${MM}${DD}${NT}_obsoul_2_xxxxxx_merged_xx  OBSOUL.am
...

# check outputs with 6h and 1h timewindow
$> grep "observations : airep" bator.o1582634 bator_v3.o1627343
bator.o1582634:observations : airep        255
bator_v3.o1627343:observations : airep         25
```

Exercises 4 - OBSOUL

- **create single TEMP observation of temperature at 850hPa**
- **Hints:** `see presentation or doc/obsoul.ps`
- **Solution:**

```
$> cd data/input
#
$> cat << END > obsoul_single
    20190107          00
        17            5    10003035    50.00000    14.45000  '11520    '
    20190107      000000   303.0000               177         11111              0
         2    85000.00       1.7000000E+38   266.5000                  2560
END
```

Exercises 5 - BUFR & param.cfg

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- **adapt script to read TEMP data in BUFR format**
- **explore listing & try to add missing BUFR templates**
- **Hints: - follow processing of "geowind"**
  - **- use input file is data/input/*GTS_TEMP_BUFR_merged,**
  - **- check templates in the input file using** `bufr_filter` **or** `Guessparamcfg`
  - **- update param.cfg (codage)**
- **Solution:**

```
# adapt script
$> cp bator bator_v4
$> vi bator_v4
$> diff bator bator_v4
150,152c150,152
<    cp $DIR/data/input/${YYYY}${MM}${DD}${NT}_obsoul_5_xxxxxx_xx OBSOUL.temp || \
<    { echo "Missing file obsoul temp for assimilation " ; exit 1 ; }
<    echo "conv temp OBSOUL temp" > batormap
---
>    cp $DIR/data/input/${YYYY}${MM}${DD}${NT}_GTS_TEMP_BUFR_merged BUFR.temp || \
>    { echo "Missing file BUFR temp for assimilation " ; exit 1 ; }
>    echo "temp temp BUFR temp" > batormap
```

Exercises 5 - BUFR & param.cfg

- **adapt script to read TEMP data in BUFR format**
- **explore listing & try to add missing BUFR templates**
- **Hints: - follow processing of "geowind"**
  - **- use input file is data/input/*GTS_TEMP_BUFR_merged,**
  - **- check templates in the input file using** `bufr_filter` **or** `Guessparamcfg`
  - **- update param.cfg (codage)**
- **Solution:**

```
# explore listing
$> grep "observations :" bator_v4.o1628520
observations : temp            1
Nb total d'observations :            1


$> grep "inconnu" bator_v4.o1628520
* WARNING - BATOR : template inconnu pour fichier N.      1
* WARNING - BATOR : template inconnu pour fichier N.      2
* WARNING - BATOR : template inconnu pour fichier N.      3
...
* WARNING - BATOR : template inconnu pour fichier N.     80
```

```
# check templates (unexpanded BUFR descriptors
$> module load eccodes

# create a BUFR filter rule to print it
$> cat << END > rule
print "unexpandedDescriptors [unexpandedDescriptors]";
END
$> bufr_filter rule 2019010700_GTS_TEMP_BUFR_merged >  tmp

# remove newline character from lines starting with "unexpandedDecriptor" lines
$> awk '$1 == "unexpandedDescriptors" {printf "%s", $0; next} 1' tmp > f
# sort to get unique list of templates
$> cat f | sort -u

# fix manually the last line and you should get 7 templates:
unexpandedDescriptors 301128 7007 2102 201133 25065 25066 201000 309052 205011
unexpandedDescriptors 309052 1081 1082 2017 2067 2081 2082 2084 2095 2096 2097 2191 25
unexpandedDescriptors 309052 1081 1082 2017 2067 2095 2096 2097 2191 25061
unexpandedDescriptors 309052 1081 1082 2017 2067 2095 2096 2097 2191 25061 205060
unexpandedDescriptors 309052 1081 1082 2067 2095 2096 2097 25061 205060
unexpandedDescriptors 309052
unexpandedDescriptors 309052 1081 1082 2067 2095 2096 2097 25061
```

```
# templates are relevant for the "codage" part of param.cfg, e.g.  the last template
# unexpandedDescriptors 309052 1081 1082 2067 2095 2096 2097 25061
BEGIN temp
8 0 1 21
codage      1  309052
codage      2  -001081
codage      3  -001082
codage      4  -002067
codage      5  -002095
codage      6  -002096
codage      7  -002097
codage      8  -025061
...
END temp

# other templates have to be added to param.cfg, in the reverse order
# unexpandedDescriptors 309052
BEGIN temp
1 0 1 21
codage      1  309052
...
END.temp
```

```
# complete param.cfg can be found on
# cca: /perm/ms/cz/cza/sample_bator/namelist/param.cfg

# rerun with updates param.cfg
$> qsub bator_v4

# explore listing
$> grep "observations :" bator_v4.o1633105
observations : temp            38
Nb total d'observations :            38

# check unknown templates
$> grep "inconnu" bator_v4.o1633105
```