Analysis diagnostics

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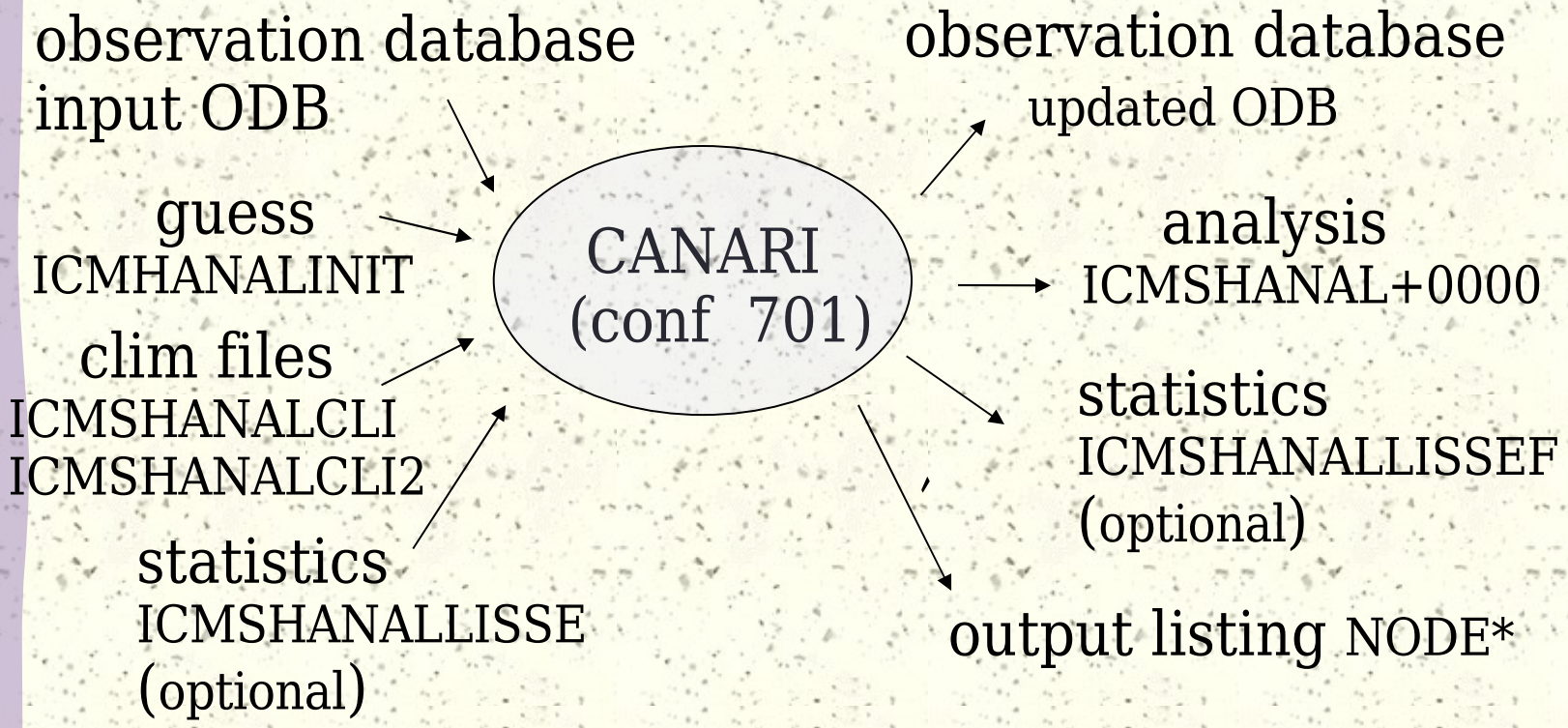
Content

- Analysis diagnostics
  - Output listing
  - Observational database
  - Analysis file
- Namelist parameters
- Some LAM aspects and tuning on example of ALADIN/CE

Analysis diagnostics – why ?

- validation of new model release (cycle)
  - gridpoint and spectral norms
  - plots of increments
  - parallel suite / objective verification scores
- monitoring of observations and analysis
  - important component of DA system
  - number and quality of observation
  - departures O-G, O-A

Input/Output summary



Let's try command: ls ~/workdir/rundir

Output listing (NODE* file)

- dedicated to given model configuration
- enables checking of various parameters
  - number observation of given type (SYNOP,TEMP,..)
  - number of used observation parameters (T2m, RH2m. T, geop., ...)
  - some namelist variables
  - various control prints (O-G and O-A statistics, ...)
  - gridpoint and spectral norms

Output listing (NODE* file)

Let's try command: vi NODE.001_01

- list of key strings:
  - “diverses” ... namelist prints
  - “SUGRIDF” ... norms
  - “lues” ... number of reports
  - “CAVIAR” ... number of used parameters
  - “TERMINEE” ... successful end

“diverses” … namelist prints

```
 *********************************************************
 *  Impression des diverses NAMELIST  ( s/p CANALI )  *
 *********************************************************

Impression de QALORI
--------------------
RCALPH = alpha                                    :   0.00
LCORRF = nouvelle fonction correlation pour T2m/H2m : .T.

Impression de QACTEX
--------------------
LAEINC  = lecture 3 fichiers modele (incremental):   .F.
LAEOMF  = calcul des residus NCMFGE              :   .T.
LAEOMN  = calcul des residus NCMOMN              :   .T.
LAECHK  = controle qualite des observations      :   .T.
LAEPDS  = analyse pression de surface            :   .F.
LAEUVT  = analyse vent/temperature               :   .F.
LAEHUM  = analyse humidite                       :   .F.
LAET2M  = analyse temperature a 2 metres         :   .T.
LAEH2M  = analyse humidite a 2 metres            :   .T.
LAEV1M  = analyse vent a 10 metres               :   .F.
LAESNM  = analyse hauteur de neige               :   .F.
LAESST  = analyse temperature surface mer        :   .F.
LAEICS  = initialisation champs de surface       :   .T.
LAECDS  = calcul champs diagnostics surface      :   .F.
LAESTU  = utilisation de stat. assimilees        :   .F.
LAESTA  = assimilation des statistiques          :   .F.
LAEWIO  = ecriture du fichier resultat           :   .T.
LAERFO  = recopie du fichier CMAFOC              :   .T.
LVERAL  = aucune action sur flags de qualite     :   .F.
NAEINC  = 0-->OMF, 1-->OMF+FC1, 2-->OMN          :    0
RCLIMCA = rappel clim. champs de surface         :   0.04500
RCLISST = rappel clim. pour la SST               :   0.05000
NSSTLIS = rappel vers la SST americaine          :    0
NSEAICE = limite banquise actualisee (SSMICE)    :    0

Impression de QACOBS
--------------------
altitude maximale d'utilisation des obs de surface :    10000.00
difference maximale altitude obs/relief modele     :    10000.00
NBODLA = longueur d'une boite sur un meridien      :      5
NBODLO = longueur d'une boite sur un parallele     :      5

Impression de QACTAN
--------------------
reduction du domaine horizontal d'analyse   :     .F.
latitude nord du domaine d'analyse          :    55.36
latitude sud du domaine d'analyse           :    34.00
longitude ouest du domaine d'analyse        :     2.20
longitude est du domaine d'analyse          :    38.90

Contenu de QAIMPO apres controle
                                                3440,19       58%
```

“SUGRIDF” … gridpoint norms

```
 SUGRIDF: STATISTICS FOR ALL GPPBUF FIELDS
 PROGNOSTIC VARIABLES
    GPNORM OUTPUT
 FIELD     AVERAGE                 MINIMUM                 MAXIMUM
     1 0.284068468980796E+03 0.253519009283141E+03 0.299731473600845E+03
     2 0.312021927883269E+04 0.244339744140549E+01 0.800000000000000E+04
     3 0.198896265126170E+00 0.000000000000000E+00 0.790368707770096E+02
     4 0.155598095669978E+00 0.000000000000000E+00 0.233246937513363E+02
     5 0.286027628008706E+03 0.257170128682790E+03 0.305885978636546E+03
     6 0.496941073551666E+01 0.496375164470275E-21 0.100000000000000E+02
     7 0.576831647094244E-01 0.000000000000000E+00 0.722540911762153E+00
     8 0.314339409306004E-01 0.000000000000000E+00 0.359430709010019E+01
     9 0.297086530382404E+00 -.476456032830544E-19 0.306358464753826E+02
    10 0.299642565798254E+00 0.000000000000000E+00 0.531153090256840E+02
    11 0.515416057759669E-02 -.214609444655063E-19 0.184671351993661E+01
    12 0.186570914356756E-01 0.000000000000000E+00 0.106788802746648E+02
    13 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
    14 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
    15 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
    16 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
    17 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
    18 0.936119791666667E+00 0.000000000000000E+00 0.100000000000000E+01
    19 0.275013018953300E+03 0.000000000000000E+00 0.300549940923640E+03
    20 0.756349446304136E+00 0.000000000000000E+00 0.100000000000000E+01
    21 0.817328520411249E+00 -.930697250252975E+01 0.118125207519908E+02
    22 -.158968207568085E+01 -.131402211334449E+02 0.110174544654133E+02
    23 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
    24 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
    25 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
    26 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
    27 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
    28 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
 VARSF
    GPNORM OUTPUT
 FIELD     AVERAGE                 MINIMUM                 MAXIMUM
     1 0.670074284138043E+01 0.130152971907347E-03 0.167602255008796E+03
     2 0.127265401657092E+00 0.500000000000000E-01 0.376282280382754E+00
     3 0.963287261790390E+00 0.946547920293412E+00 0.973333299223351E+00
     4 0.477673857312691E+03 0.000000000000000E+00 0.843272902671747E+04
     5 0.653454861111111E+00 0.000000000000000E+00 0.100000000000000E+01
     6 0.476709758568389E+00 0.000000000000000E+00 0.100000000000000E+01
     7 0.612013943593545E+00 0.000000000000000E+00 0.100000000000000E+01
     8 -.201769693896239E-03 -.157071007750220E+01 0.157073856120269E+01
 VCLIV
    GPNORM OUTPUT
 FIELD     AVERAGE                 MINIMUM                 MAXIMUM
     1 0.183914030154044E+02 0.300000000000000E+01 0.580000000000000E+02
     2 0.192240122156933E+02 0.600000000000000E+01 0.920000000000000E+02
     3 0.432026407851387E+01 0.100000000000000E+00 0.800000000000000E+01
     4 0.266322916666667E+01 0.100000000000000E+01 0.400000000000000E+01
     5 0.180888996445761E+04 0.100000000000000E+01 0.500000000000000E+04
     6 0.177626556355732E+01 0.000000000000000E+00 0.625744248491174E+01
```

```
 IN HOUR         :          12
TYPE D IDENTIFICATEUR NON PREVU : CLIDEN  : ALD
FILE DOES NOT CONTAIN POLES
 PROFTEMPERATURE  READ FROM ARPEGE FILE INTO SOILB 01 01 001
 PROFRESERV.EAU   READ FROM ARPEGE FILE INTO SOILB 01 02 002
 PROFRESERV.GLACE READ FROM ARPEGE FILE INTO SOILB 01 03 003
 SURFRESERV.NEIGE READ FROM ARPEGE FILE INTO SNOWG 01 004
 SURFTEMPERATURE  READ FROM ARPEGE FILE INTO RESVR 01 005
 SURFRESERV.EAU   READ FROM ARPEGE FILE INTO RESVR 02 006
 SURFRESERV.INTER READ FROM ARPEGE FILE INTO RESVR 03 007
 SURFRESERV.GLACE READ FROM ARPEGE FILE INTO RESVR 04 008
 SURFPREC.EAU.CON READ FROM ARPEGE FILE INTO XTRP2 01 009
 SURFPREC.EAU.GEC READ FROM ARPEGE FILE INTO XTRP2 02 010
 SURFPREC.NEI.CON READ FROM ARPEGE FILE INTO XTRP2 03 011
 SURFPREC.NEI.GEC READ FROM ARPEGE FILE INTO XTRP2 04 012
 ATMONEBUL.BASSE  MISSING FROM ARPEGE FILE => SET TO 0. INTO XTRP2 05 013
 SURFXFLU.MEVAP.E MISSING FROM ARPEGE FILE => SET TO 0. INTO XTRP2 06 014
 SURFXEVAPOTRANSP MISSING FROM ARPEGE FILE => SET TO 0. INTO XTRP2 07 015
 SURFETP.GEOPOTEN MISSING FROM ARPEGE FILE => SET TO 0. INTO CANRI 01 016
 SURFETA.GEOPOTEN MISSING FROM ARPEGE FILE => SET TO 0. INTO CANRI 02 017
 SURFANALYSISMASK MISSING FROM ARPEGE FILE => SET TO 0. INTO CANRI 03 018
        changed to 1.
 CLSTEMPERATURE   READ FROM ARPEGE FILE INTO CANRI 04 019
 CLSHUMI.RELATIVE READ FROM ARPEGE FILE INTO CANRI 05 020
 CLSVENT.ZONAL    READ FROM ARPEGE FILE INTO CANRI 06 021
 CLSVENT.MERIDIEN READ FROM ARPEGE FILE INTO CANRI 07 022
 SURFSST.CLIM.    MISSING FROM ARPEGE FILE => SET TO 0. INTO CANRI 08 023
 PROFINC.RESERV.1 MISSING FROM ARPEGE FILE => SET TO 0. INTO CANRI 09 024
 PROFINC.RESERV.2 MISSING FROM ARPEGE FILE => SET TO 0. INTO CANRI 10 025
 PROFINC.RESERV.3 MISSING FROM ARPEGE FILE => SET TO 0. INTO CANRI 11 026
 SURFINC.TEMPERAT MISSING FROM ARPEGE FILE => SET TO 0. INTO CANRI 12 027
 SURFINC.HUMIDITE MISSING FROM ARPEGE FILE => SET TO 0. INTO CANRI 13 028
 SURFZO.FOIS.G    READ FROM ARPEGE FILE INTO VARSF 01 029
 SURFALBEDO       READ FROM ARPEGE FILE INTO VARSF 02 030
 SURFEMISSIVITE   READ FROM ARPEGE FILE INTO VARSF 03 031
 SURFET.GEOPOTENT READ FROM ARPEGE FILE INTO VARSF 04 032
 SURFIND.TERREMER READ FROM ARPEGE FILE INTO VARSF 05 033
 SURFPROP.VEGETAT READ FROM ARPEGE FILE INTO VARSF 06 034
 SURFVAR.GEOP.ANI READ FROM ARPEGE FILE INTO VARSF 07 035
 SURFVAR.GEOP.DIR READ FROM ARPEGE FILE INTO VARSF 08 036
 SURFPROP.ARGILE  READ FROM ARPEGE FILE INTO VCLIV 01 037
 SURFPROP.SABLE   READ FROM ARPEGE FILE INTO VCLIV 02 038
 SURFEPAIS.SOL    READ FROM ARPEGE FILE INTO VCLIV 03 039
 SURFIND.VEG.DOMI READ FROM ARPEGE FILE INTO VCLIV 04 040
 SURFRESI.STO.MIN READ FROM ARPEGE FILE INTO VCLIV 05 041
 SURFIND.FOLIAIRE READ FROM ARPEGE FILE INTO VCLIV 06 042
 SURFRES.EVAPOTRA READ FROM ARPEGE FILE INTO VCLIV 07 043
 SURFGZO.THERM    READ FROM ARPEGE FILE INTO VCLIV 08 044
 SURFA.OF.OZONE   MISSING FROM ARPEGE FILE => SET TO 0. INTO VO3ABC 01 045
 SURFB.OF.OZONE   MISSING FROM ARPEGE FILE => SET TO 0. INTO VO3ABC 02 046
 SURFC.OF.OZONE   MISSING FROM ARPEGE FILE => SET TO 0. INTO VO3ABC 03 047

 DEBUT LECTURE CLIMATOLOGIES DE SURFACE

                                                4004,72       68%
```

“lues” … number of reports

```
*******************************************************************************************
*                                                                                         *
*     C H A R G E M E N T   D E S   O B S   E N   M E M O I R E   C E N T R A L E       *
*                                                                                         *
*******************************************************************************************


    ********************************************************************
    *   LECTURE DU FICHIER D'OBSERVATIONS DU  4/11/2007 A 12H 0 UTC    *
    ********************************************************************

Date fichier  :    2007110412

                    SY-SH     AIREP     SATOB     DRIBU      TEMP     PILOT     SATEM     PAOB      SCAT.     RAD.

Nombre d'obs. lues      1279         0         0         0       118         0         0         0         0         0
        0         0         0         0         0


Nombre maximum de types d'observations                          NMXOTP          15      JPNOTP          15
Nombre maximum de sous-types d'observations                     NMXSOBT          3      JPXSOBT          3
Nombre maximum de variables                                     NMXVAR          35      JPXVAR          35
Nombre maximum de zones                                         NMXAREA         20      JPXAREA         20
Nombre maximum de paquets d'observations                        NMXSET          82
Longueur maximale d'un paquet d'observations                    NMXLEN         511

Nombre global d'observations                                    NOBTOTG       1397

Nombre effectif d'observations par processeur                   NOBTOT
      1397
Nombre effectif de TOVS par processeur                          NOBTOV
         0
Nombre effectif de SCATT par processeur                         NOBSCA
         0
Nombre effectif d'observations non TOVS/SCATT par proc.         NOBNTV
      1397


                                 ******************************************************
                                 *   ECARTS-TYPES D'ERREURS D'OBSERVATION UTILISES    *
                                 ******************************************************


 Unites :   niveaux pression       en hPa
 ------     geopotentiel           en m
            temperature            en degres
            vent                   en m/s
            humidite relative      de 0 a 1
            epaisseur de couche    en m
            SST                    en degres
            quantite de neige      en kg/m**2

                                                                                4179,0-1      71%
```

HIRLAM/AAA wksp on surface DA

“CAVIAR”… number of used parameters per observation

```
    ************************************************************************
    *  Impression des diagnostics d'utilisation pour CANARI  (s/r CAVIAR)  *
    ************************************************************************


    Analyse complete                              nombre de parametres
   ==================                 utilises    controles corrects  presents

tous messages confondus         :  1540 ( 12.7 %)   12140 ( 94.4 %)    12856


   Type d'observations : SYNOP                    nombre de parametres
   ------------------                 utilises    controles corrects  presents

tous parametres confondus       :  1452 ( 34.1 %)    4256 ( 86.5 %)     4921

geopotentiel                    :     0 (  0.0 %)     605 (100.0 %)      605
       superieure a 1000 hPa    :     0 (  0.0 %)     605 (100.0 %)      605
            zone  20 / 60 dg    :     0 (  0.0 %)     605 (100.0 %)      605
humidite relative a 2 metres    :   725 (100.0 %)     725 ( 95.9 %)      756
       superieure a 1000 hPa    :   257 (100.0 %)     257 ( 90.2 %)      285
            zone  20 / 60 dg    :   257 (100.0 %)     257 ( 90.2 %)      285
       entre 1000 et  850 hPa   :   423 (100.0 %)     423 ( 99.8 %)      424
            zone  20 / 60 dg    :   423 (100.0 %)     423 ( 99.8 %)      424
       entre  850 et  700 hPa   :    44 (100.0 %)      44 ( 97.8 %)       45
            zone  20 / 60 dg    :    44 (100.0 %)      44 ( 97.8 %)       45
       entre  700 et  500 hPa   :     1 (100.0 %)       1 ( 50.0 %)        2
            zone  20 / 60 dg    :     1 (100.0 %)       1 ( 50.0 %)        2
temperature a 2 metres          :   727 (100.0 %)     727 ( 96.2 %)      756
       superieure a 1000 hPa    :   257 (100.0 %)     257 ( 90.2 %)      285
            zone  20 / 60 dg    :   257 (100.0 %)     257 ( 90.2 %)      285
       entre 1000 et  850 hPa   :   423 (100.0 %)     423 ( 99.8 %)      424
            zone  20 / 60 dg    :   423 (100.0 %)     423 ( 99.8 %)      424
       entre  850 et  700 hPa   :    45 (100.0 %)      45 (100.0 %)       45
            zone  20 / 60 dg    :    45 (100.0 %)      45 (100.0 %)       45
       entre  700 et  500 hPa   :     2 (100.0 %)       2 (100.0 %)        2
            zone  20 / 60 dg    :     2 (100.0 %)       2 (100.0 %)        2
vent zonal a 10 metres          :     0 (  0.0 %)     738 (100.0 %)      738
       superieure a 1000 hPa    :     0 (  0.0 %)     280 (100.0 %)      280
            zone  20 / 60 dg    :     0 (  0.0 %)     280 (100.0 %)      280
       entre 1000 et  850 hPa   :     0 (  0.0 %)     412 (100.0 %)      412
            zone  20 / 60 dg    :     0 (  0.0 %)     412 (100.0 %)      412
       entre  850 et  700 hPa   :     0 (  0.0 %)      44 (100.0 %)       44
            zone  20 / 60 dg    :     0 (  0.0 %)      44 (100.0 %)       44
       entre  700 et  500 hPa   :     0 (  0.0 %)       2 (100.0 %)        2
            zone  20 / 60 dg    :     0 (  0.0 %)       2 (100.0 %)        2
vent meridien a 10 metres       :     0 (  0.0 %)     738 (100.0 %)      738
       superieure a 1000 hPa    :     0 (  0.0 %)     280 (100.0 %)      280
            zone  20 / 60 dg    :     0 (  0.0 %)     280 (100.0 %)      280
       entre 1000 et  850 hPa   :     0 (  0.0 %)     412 (100.0 %)      412
            zone  20 / 60 dg    :     0 (  0.0 %)     412 (100.0 %)      412
       entre  850 et  700 hPa   :     0 (  0.0 %)      44 (100.0 %)       44
                                                                  5145,5        87%
```

“TERMINEE” successful end

```
 20 0.713156006339948E+00 0.000000000000000E+00 0.100000000000000E+01
 21 0.814772483993770E+00 -.921099347196038E+01 0.116028031550897E+02
 22 -.158204028432920E+01 -.130405620204388E+02 0.110006714896062E+02
 23 0.282227149212618E+03 0.257616667413767E+03 0.297661748741650E+03
 24 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
 25 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
 26 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
 27 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
 28 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
VARSF
   GPNORM OUTPUT
FIELD     AVERAGE                MINIMUM                MAXIMUM
    1 0.670074284138043E+01 0.130152971907347E-03 0.167602255008796E+03
    2 0.127265517605680E+00 0.500000000000000E-01 0.376282280382754E+00
    3 0.963287237073110E+00 0.946547920293412E+00 0.973333299223351E+00
    4 0.477673857312691E+03 0.000000000000000E+00 0.843272902671747E+04
    5 0.653454861111111E+00 0.000000000000000E+00 0.100000000000000E+01
    6 0.476709758568389E+00 0.000000000000000E+00 0.100000000000000E+01
    7 0.612013943593545E+00 0.000000000000000E+00 0.100000000000000E+01
    8 -.201769693896239E-03 -.157071007750220E+01 0.157073856120269E+01
VCLIV
   GPNORM OUTPUT
FIELD     AVERAGE                MINIMUM                MAXIMUM
    1 0.183914030154044E+02 0.300000000000000E+01 0.580000000000000E+02
    2 0.192240122156933E+02 0.600000000000000E+01 0.920000000000000E+02
    3 0.432026407851387E+01 0.100000000000000E+00 0.800000000000000E+01
    4 0.266322916666667E+01 0.100000000000000E+01 0.400000000000000E+01
    5 0.180888996445761E+04 0.100000000000000E+01 0.500000000000000E+04
    6 0.177626556355732E+01 0.000000000000000E+00 0.625744248491174E+01
    7 0.596847930733575E+00 0.000000000000000E+00 0.100000000000000E+01
    8 0.671007327643376E+00 0.130152971907347E-03 0.167602255008796E+02
VO3ABC
   GPNORM OUTPUT
FIELD     AVERAGE                MINIMUM                MAXIMUM
    1 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
    2 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00
    3 0.000000000000000E+00 0.000000000000000E+00 0.000000000000000E+00

 ANALYSE TERMINEE  configuration demandee    701

    ***********************************************
    *                                             *
    * A BIENTOT DANS L'ANALYSE OBJECTIVE CANARI *
    *                                             *
    ***********************************************
 NSTEP =     0 CNT0    000000000   3.012   3.012   3.181   0.947      1956757504      1784823808      1956757504              0
               0
===-=== START OF TIMING STATISTICS ===-===
TOTAL WALLCLOCK TIME        0.0 CPU TIME       0.0 VECTOR TIME        0.0


===-=== END   OF TIMING STATISTICS ===-===
  *** END CNT0 ***
                                                                                                          5739,2        99%
```

Observational database (ODB)

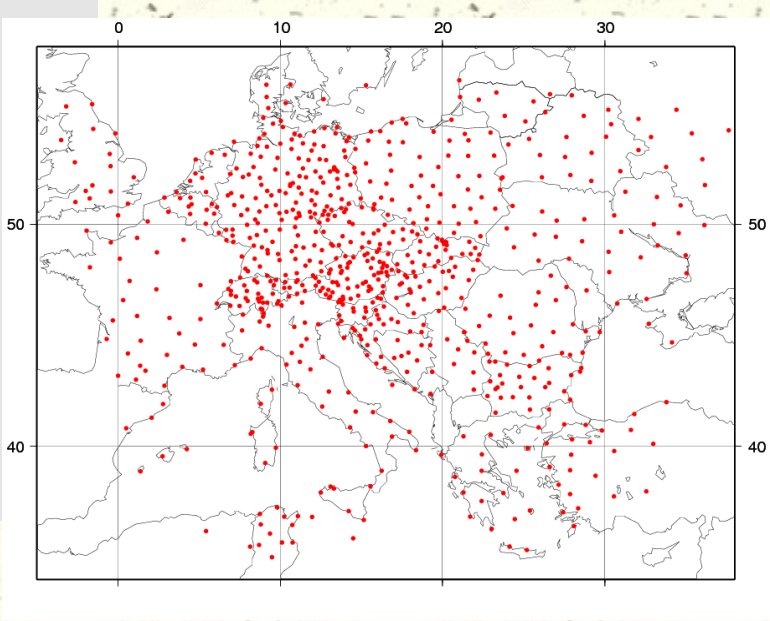
- contains informations related to
  - report - station ID, lat, lon, date, time,
  - observation type, value and error
  - quality control flags - FG check, blacklisting, spatial QC, final, ...
  - analysis flags – active, pasive, final, ut2
  - departures – obs-guess, obs-analysis
  - … see ODB documentation http://www.cnrm.meteo.fr/gmapdoc/meshtml/DOC_odb/odb.html

Observation database (ODB)

Let's try command: ODBViewer/view.sh

ODBViewer/plot_rpt.pl myview.rpt

```
: 6 1 727
: VIEW="myview" on 20071108 at 091913
: Pool#1: no. of rows x cols = 727 x 6
:
:      statid          lat              lon            press      obstype      varno
:       @hdr           @hdr             @hdr           @body       @hdr        @body
:      ------          ----             ----           -----       ----        -----
    '12970    '  0.8185594191851  0.3444115808831  100210           1          39
    '12860    '  0.8223408495431  0.3525565080931  100370           1          39
    '12846    '  0.8235044605551  0.3246312408711  100470           1          39
    '12992    '  0.8147778142951  0.3694280831831  100370           1          39
    '12843    '  0.8278677836851  0.3348122699971  99900            1          39
    '12882    '  0.8287404483111  0.3769511184311  100200           1          39
    '12870    '  0.8360127117051  0.3557562210211  98790            1          39
    '12822    '  0.8328129899881  0.3086323312171  100440           1          39
    '12766    '  0.8461937408311  0.3583742148991  97790            1          39
    '12930    '  0.8092510546861  0.3118322178671  100320           1          39
    '12851    '  0.8354309994651  0.3493567967851  89730            1          39
    '12772    '  0.8392124238231  0.3624446591641  98730            1          39
    '12815    '  0.8357217653191  0.3013602423551  100480           1          39
    '12892    '  0.8368857676211  0.3811934143131  99780            1          39
    '12824    '  0.8264134008191  0.3051418472461  100170           1          39
    '12825    '  0.8252497898071  0.3031053970741  100290           1          39
    '12866    '  0.8313586167221  0.3601195441511  100460           1          39
    '12942    '  0.8028511455171  0.3179408702491  99410            1          39
    '12821    '  0.8310674958031  0.3106686068551  100230           1          39
    '12950    '  0.8136142032831  0.3287036176151  100550           1          39
    '12830    '  0.821468359451   0.3135775471191  98490            1          39
    '12910    '  0.8188501910391  0.2847796144611  98220            1          39
    '12935    '  0.8188501910391  0.3147409835991  100560           1          39
    '12922    '  0.8147778142951  0.2993239667171  100470           1          39
    '12805    '  0.8322311068151  0.2897246558311  100610           1          39
    '12756    '  0.8395033702091  0.3406301509251  99660            1          39
    '12836    '  0.8316493885751  0.3196861995011  100270           1          39
    '12782    '  0.8072147779041  0.3509811179651  100580           1          39
    '12786    '  0.8444484115791  0.3868813757031  100210           1          39
    '16597    '  0.625700053684   0.2527817951531  100660           1          39
    '10035    '  0.9517861605771  0.1666785943561  102020           1          39
    '10147    '  0.9360783718421  0.1745329251991  102360           1          39
    '10162    '  0.9363691436951  0.1986765888411  101600           1          39
    '10184    '  0.9442232253291  0.2338741197671  102250           1          39
    '10224    '  0.9258971681831  0.1535889741761  102600           1          39
    '10270    '  0.9232791743051  0.2236930906421  101850           1          39
    '10338    '  0.9151759645241  0.1690059591051  101940           1          39
    '10361    '  0.9096073121421  0.2021672468451  101420           1          39
    '10393    '  0.9113528159271  0.2463823270911  101060           1          39
    '10400    '  0.8953539062731  0.1181006708961  102410           1          39
    '10438    '  0.8953539062731  0.1649336143131  99850            1          39
    '10469    '  0.8973901819111  0.2135118869831  100830           1          39
    '10488    '  0.8924451409421  0.2405641403891  99540            1          39
    '10548    '  0.8825548832691  0.1812232958211  97120            1          39
    '10647    '  0.8735372906231  0.1509829156721  101310           1          39
    '10685    '  0.8781915601391  0.2074032346011  95710            1          39
    '10738    '  0.8496843993351  0.160861237571   97940            1          39
    '10763    '  0.8639379797371  0.1934406005851  98700            1          39
    '10788    '  0.8523023932131  0.2193297675121  98200            1          39
    '10852    '  0.8453210762051  0.1908226067071  96900            1          39
                                                                                1,1
```



Analysis file - ICMSHARPA+0000

- contains analysed surface/soil fields
  - SURFTEMPERATURE T_s
  - PROFTEMPERATURE T_d
  - SURFRESERV.EAU/GLACE w_s(liquid/solid)
  - PROFRESERV.EAU/GLACE w_d(liquid/solid)
  - SURFPREC.NEI* snow
- derived from incerements of
  - CLSTEMPERATURE T2m
  - CLSHUMI.RELATIVE RH2m

Analysis file - ICMSHARPA+0000

Let's try command: frodo ICMSHANAL+0000
vi INFO.ICMSHANAL+0000

- using also guess file You can see increments

Let's try command: Chagal/chagal.sh

Content

- Analysis diagnostics
  - Output listing
  - Observational database
  - Analysis file
- Namelist parameters
- Some LAM aspects and tuning on example of ALADIN/CE

Namelist parameters

- NACTEX control of OI analysis
  - LAEOMF – calculation of observed departures
  - LAEOMN – calculation of analyzed departures
  - LAECHK – spatial quality control
  - LAET2M – the T2m analysis
  - LAEH2M – the RH2m analysis
  - LAESNM – snow analysis
  - LAESST – SST analysis
  - LAEICS – calculation of surface fields
  - RCLIMCA – relax. coeff for the land surface fields
  - RCLISST - relax. coeff for SST
  - LAEV1M, LAEPDS, LAEHUM, LAEUVT, ...

Namelist parameters

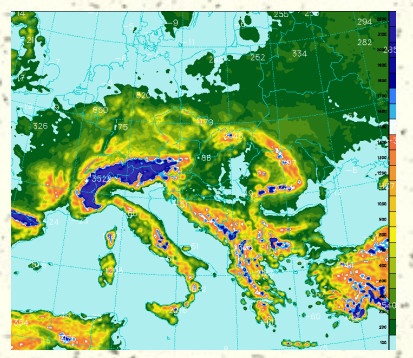
- NACTAN definition of analysis area
  - LANMASK, ALATNB, ALATSB, ALONWB, ALONEB
- NACOBS obs related variables
  - OROLIM – max obs altitude for SYNOP
  - ORODIF - max. real and model orography
- NAMCOK obs selection criteria
  - NMXGQA – max. number of obs by quadrant
  - QDSTRA, QDSTVA – max. distance for horiz., vert. selection
- NALORI
  - RCALPH – coeff to take into account stretching geometry
- NAIMPO control of obs prints
  - LAVISO, LAVOLO, NBSYVO, ...

Namelist parameters

- NAM_CANAPE parameters of OI statistical model
  - REF_STAT - observation error standard deviations
  - REF_S_* - model error standard deviation
  - REF_A_* - reference horizontal lengthscales
  - ...
- NAMOBS
  - LCAPACH - use of ARPEGE or IFS obs operator
  - LCACHMT - use of model surface to define boundary layer
  - LSLREJ - land/see mask control for horiz. interpolation
  - NOBSHOR - horiz. interpolation method (bilinear/bicubic)
- ... for more details see F. Taillefer documentation
  http://www.cnrm.meteo.fr/gmapdoc/spip.php?article3

Some LAM aspects on example of ALADIN/CE

- Setting of ALADIN/CE
  - LACE domain (309x277 grid points, linear truncation E159x143, Deltax=9km)
  - digital filter spectral blending, long cut-off 6h cycle (filtering at truncation E47x42, no DFI in the next +6h guess integration)
  - digital filter spectral blending + incremental DFI initialization of short cut-off production analysis
  - ARPEGE/ALADIN cycle 29T2
  - 3h coupling interval
  - 00 and 12 UTC forecast to +54h
  - 06 and 18 UTC forecast to +24h



Some LAM aspects on example of ALADIN/CE

Namelist differences vesus ARPEGE

- NALORI
  - RCALPH=0.0 stretching factor ... obligatory for LAM
- NACTEX
  - LAECHK=TRUE spatial quality control of observation
  - LAEINC=FALSE incremental mode does not exist for LAM
  - LAESST=FALSE no analysis of SST
  - NSEAICE=0
  - NSSTLIS=0
  - RCLISST=0.

Some LAM aspects on example of ALADIN/CE

Specific sea treatment

- no analysis of SST, but used ARPEGE one
  - we take all sea points surface variables by ald/blending/blendsur.F90
  - ALADIN_Blendsea_done = + ALADIN_GUESS
    + ARPEGE_ANALYSIS
    - ALADIN_GUESS

Some LAM aspects on example of ALADIN/CE

```
#  first add arpege analysis over sea only!

cat >blendsur.namel <<KONEC
 &NAMBLENDSUR
 fname1='ALADIN_GUESS'
 fname2='ARPEGE_ANALYSIS'
 fname3='Blend+sea0'
 zsigns=1.
 zsignl=0.
 /
KONEC

   cp blendsur.namel fort.4
   cp ALADIN_GUESS Blend+sea0

   $HOME/bin/blendsur
```

Some LAM aspects on example of ALADIN/CE

```
#  second  sum Blend+sea0  -  ALADIN_GUESS  over sea only!

cat >blendsur.namel <<KONEC
 &NAMBLENDSUR
 fname1='Blend+sea0'
 fname2='ANADIN_GUESS'
 fname3='ALADIN_Blendsea_done'
 zsigns=-1.
 zsignl=0.
 /
KONEC

   cp blendsur.namel fort.4
   cp ALADIN_GUESS ALADIN_Blendsea_done

   $HOME/bin/blendsur
```

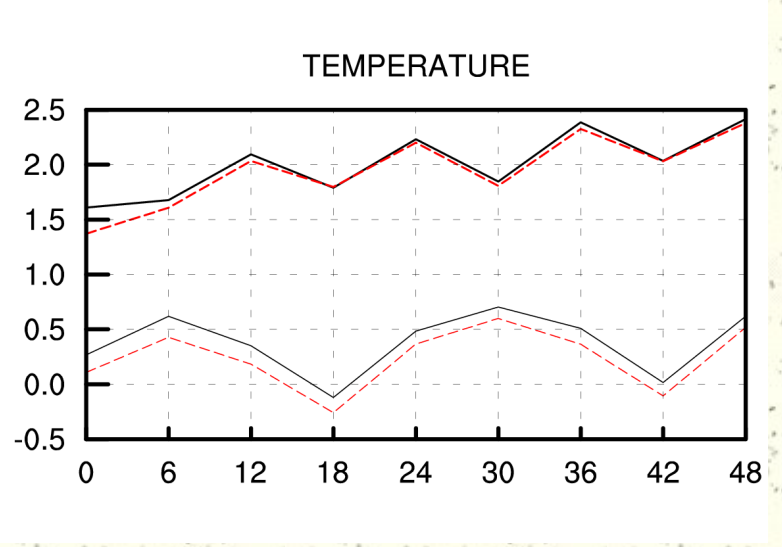
Implementation of analysis in ALADIN/CE

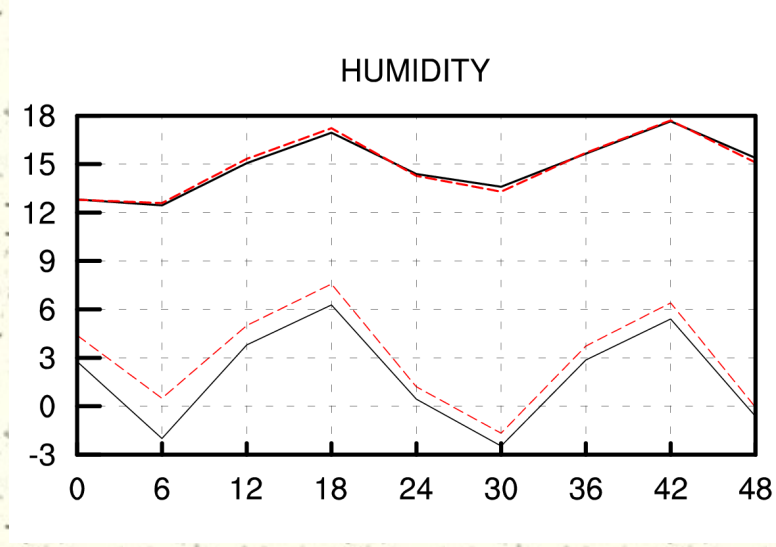
- step 1 - SST analysis is taken from ARPEGE
- step 2 - surface analysis over the land is performed
  - spatial quality control of the observation
  - OI analysis of T2m and RH2m, from which the increments of soil variables are computed
  - any other land soil variables which are not analyzed (like snow) are initialized from the ALADIN guess with the relaxation to the climatology as implemented within the CANARI configuration
- step 3 - upper-air spectral blending

Tests performed with ALADIN/CE

- ADX – ARPEGE namelist without SST analysis

tested from June till November 2005



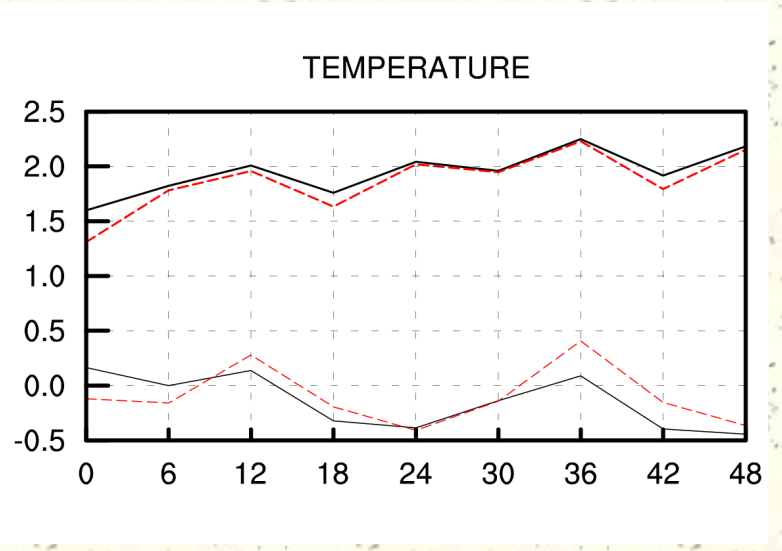


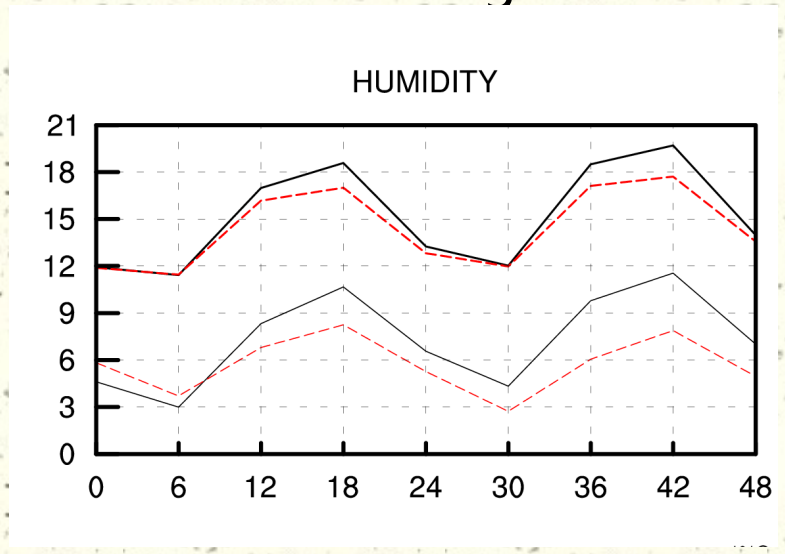
RMSE and BIAS of T2m, RH2m oper (black) and adx (red)

Tests performed with ALADIN/CE

- AEV – tuning of SMU0=0 (removed reduction of OI coefficients dependence on the zenith solar angle)
  - ISBA_POLYNOMES v. 02

tested from March till August 2006

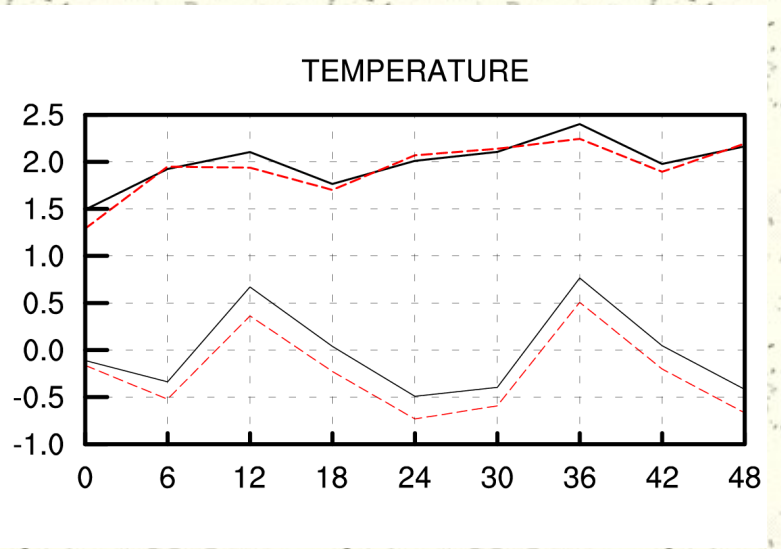


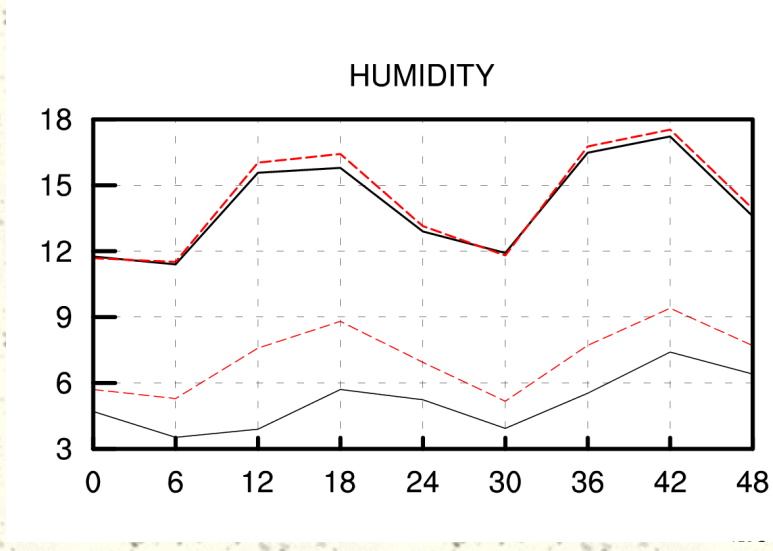


RMSE and BIAS of T2m, RH2m oper (black) and aev (red)

Tests performed with ALADIN/CE

- AEU – test of incremental mode for ALADIN updating of guess upper-air fields by their analysis (from spectral blending) inside CANARI configuration
  - source code modification needed





RMSE and BIAS of T2m, RH2m oper (black) and aeu (red)

Tests performed with ALADIN/CE

- performed tests showed significant impact of the surface analysis
- CANARI surface analysis (version AEV) was switched to operational August 3rd 2006

Thank You for your attention !