*Regional Cooperation for*
*Limited Area Modeling in Central Europe*

LACE
nwp central europe

# Operational LBCs used in LACE

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# Outline

Overview of operational LBCs used in LACE
Options for LBCs from IFS
Issues, problems, questions ...

# Overview of operational LBCs for LACE

Limited area models (LAMs) need lateral boundary conditions (LBCs)
Operational NWP LAM needs prognostic LBCs, taken from a global NWP model
Available options are several, but here we focus on LBCs from ARPEGE and IFS.

ARPEGE: 8 km resolution, 105 levels
IFS: 15.4 km resolution, 60 levels
LBCs are on a quadratic grid

# Some facts

We get LBC files from IFS dissemination

We can experiment using IFS data from MARS archive

These are not identical (but should not be very different)

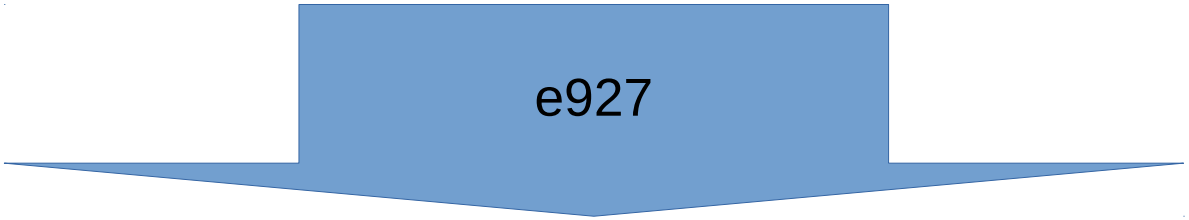
# What could I get from MARS

Options that work with some meaningful grid values for HRES (and for EPS too):
current oper octa grid O1280 (O640)
Reduced GG for GP fields N640
Reduced GG for SP fields T1279
Latlon 0.07/0.07 (0.15/0.15)
Full GG F1280 ...

901 works with N grids
Use MIR (mars -m) for SST (Ulf Andrae)

# Procedure from ARPEGE

ARPEGE grid

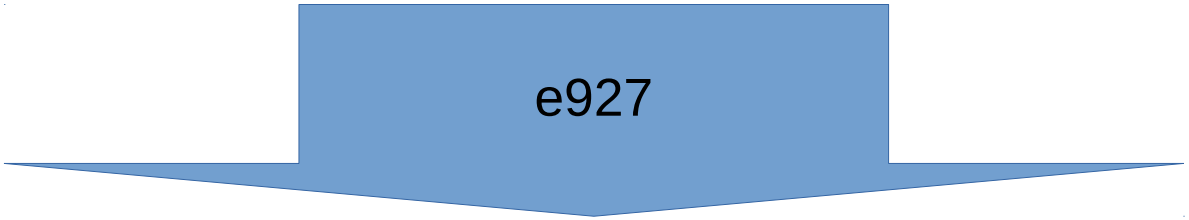



ALADIN Lambert grid

# Procedure from IFS

IFS grid (octahedral → gaussian)


ARPEGE grid




ALADIN Lambert grid

# Procedure from IFS (option gl)

IFS grid (octahedral → latlon)


ALADIN Lambert grid

# Overview of operational LBCs for LACE

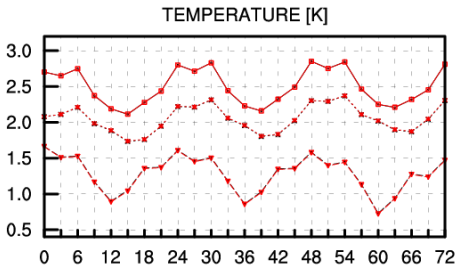
File sizes:

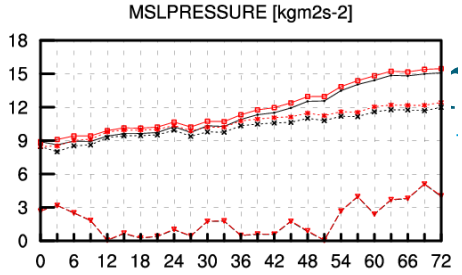
Operational from IFS **9.8M**
From ARPEGE **54M**

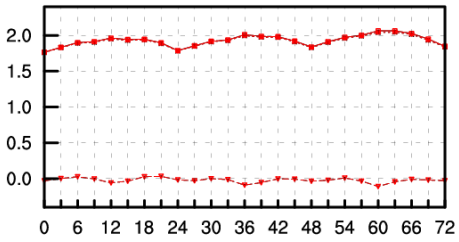
Quad 137 lev **67M** (gl: 93M)
Quad 60 lev **36M** (gl: 49M)
Cubic 60 lev **26M** (gl: 34M)
Cubic 137 lev **43M** (gl: 59M)

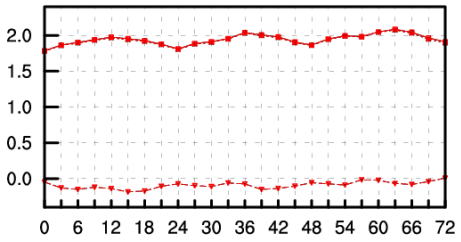
Note: files from gl are larger (Taille)!

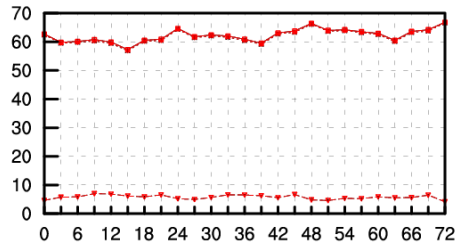
# Evolution of scores with forecast range

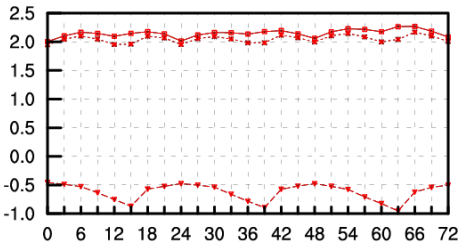


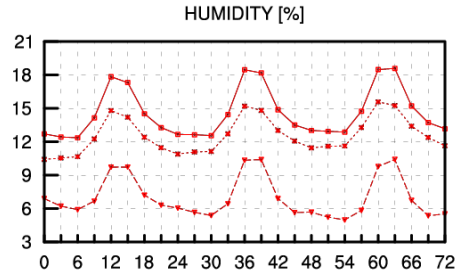




Period: 20180201...20180227
Network: 0UTC
SURFACE

IFSQ stde
IFSQ rmse
IFSQ bias
IFSC stde
IFSC rmse
IFSC bias

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aladinhr@noa.gric.dhz.hr Wed Mar 14 07:42:28 UTC 2018

# Evolution of scores with forecast range

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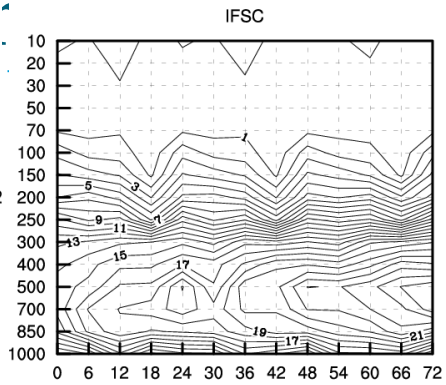
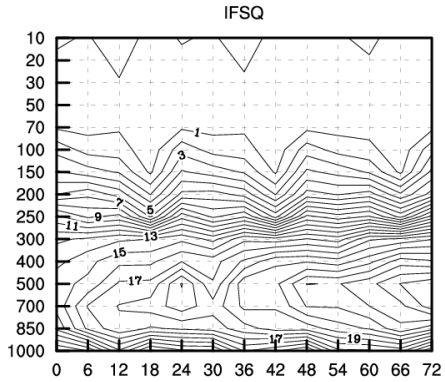
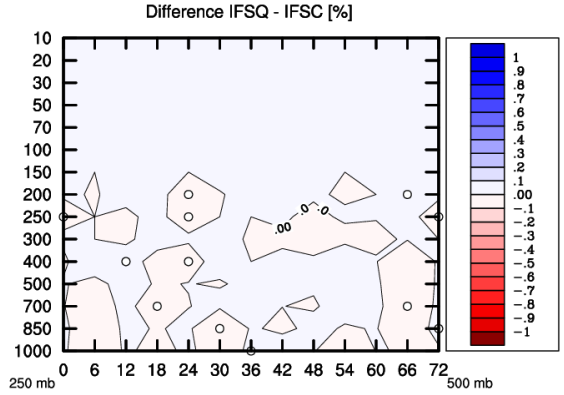
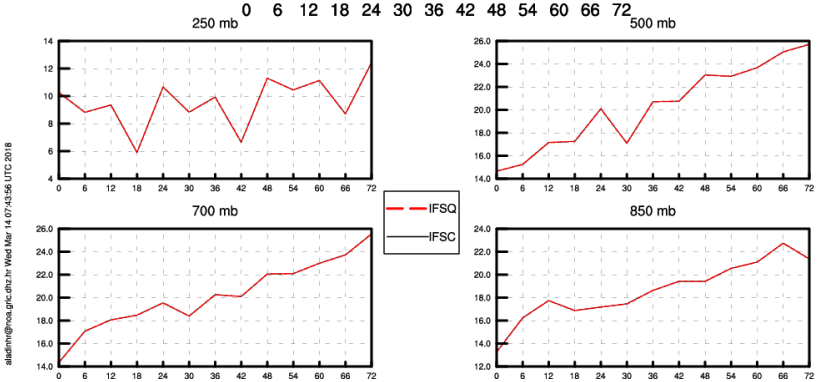
RELATIVE_HUMIDITY (RMSE)

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# Quad and cubic grid 8km res

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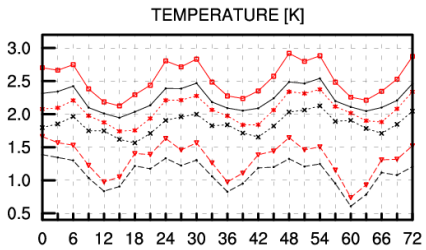
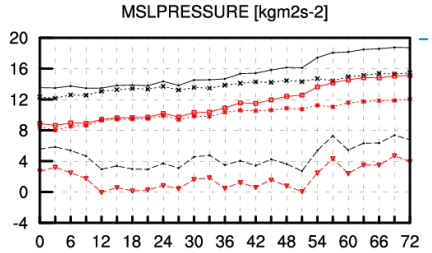
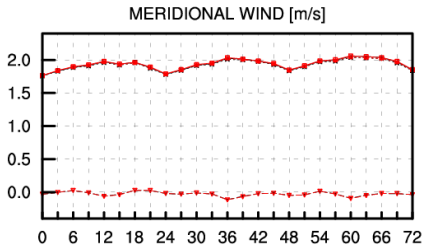
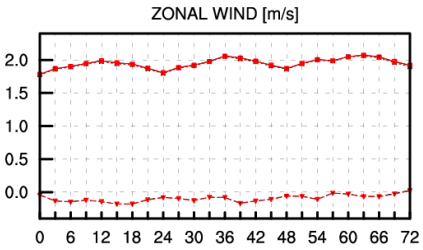
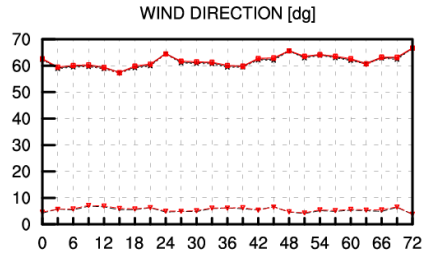
Evolution of scores with forecast range

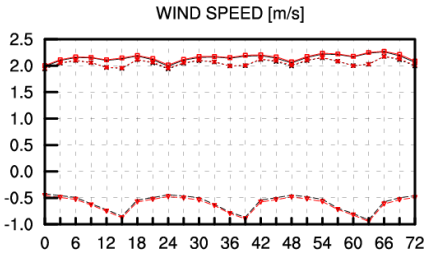


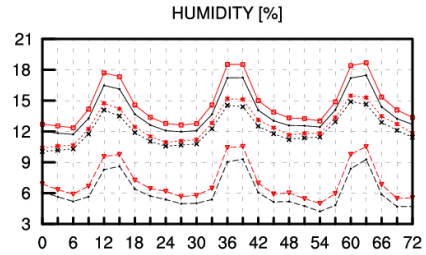

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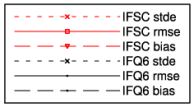
Network: 0UTC
SURFACE

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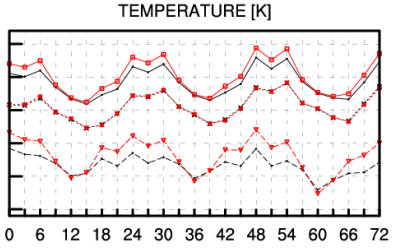
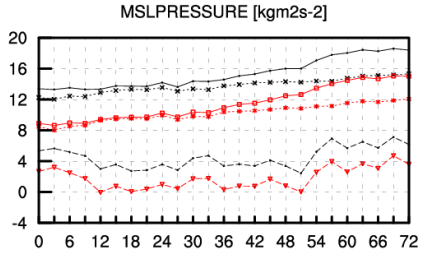
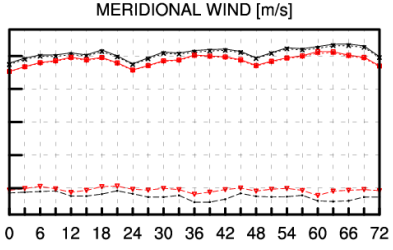
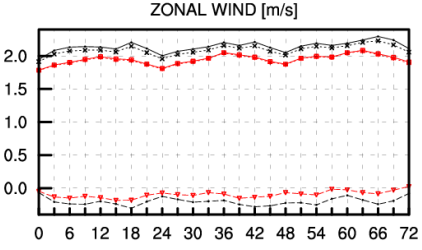
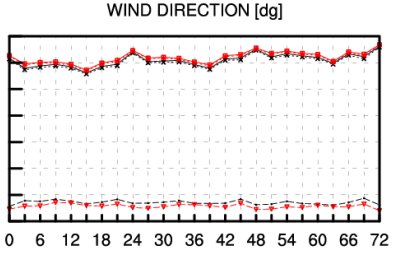
Evolution of scores with forecast range

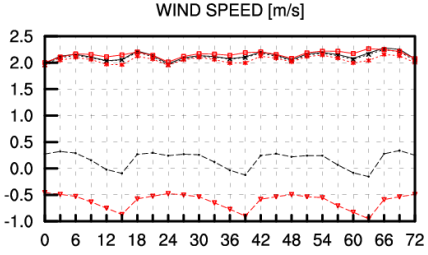


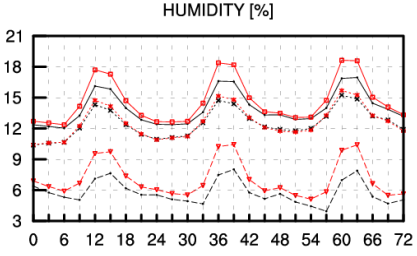

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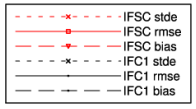
SURFACE

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# Quad grid 8km res 137 lev

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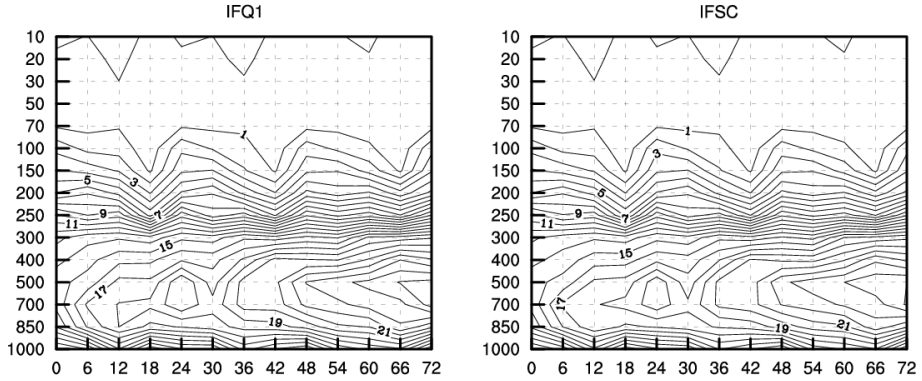
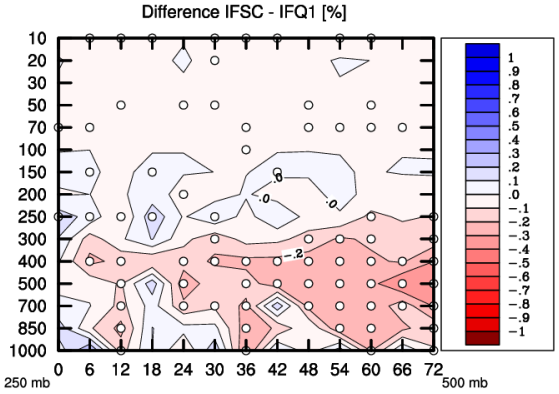
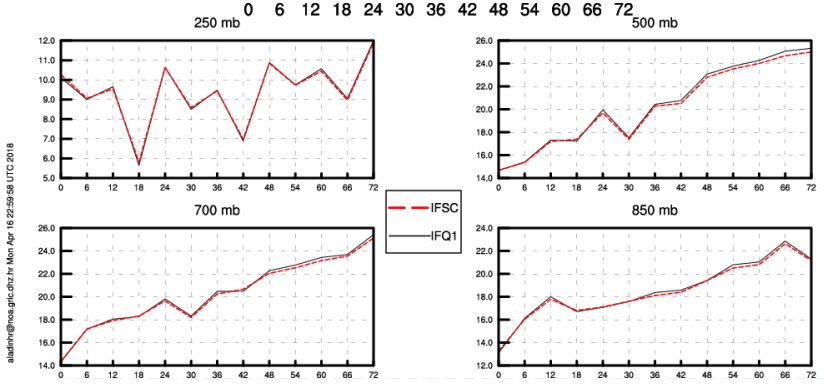
## Evolution of scores with forecast range

Period: 20180201...20180227 Network: 0UTC
RELATIVE_HUMIDITY (RMSE)

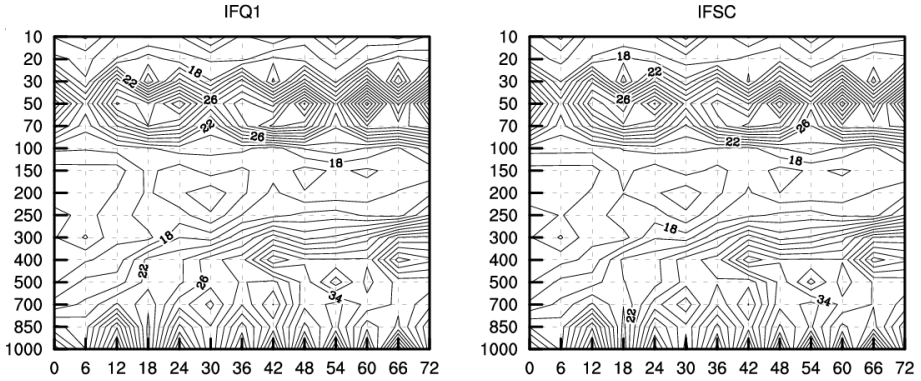


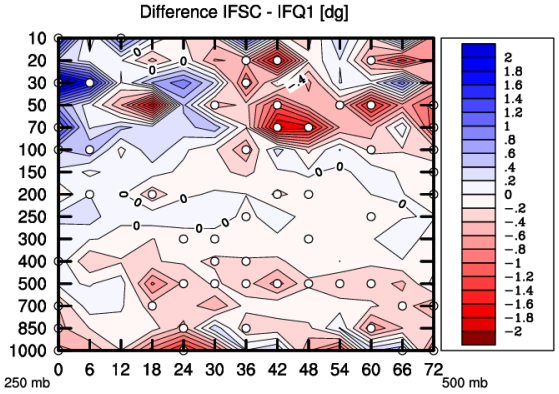



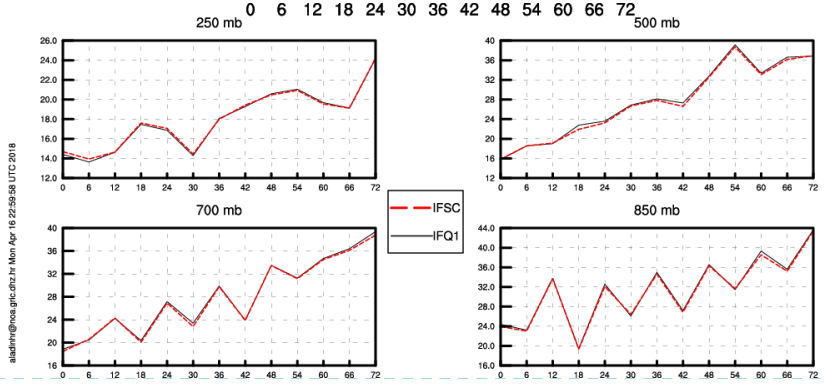




## Evolution of scores with forecast range

Period: 20180201...20180227 Network: 0UTC
WIND_DIRECTION (RMSE)

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# Cubic grid 8km res 137 lev

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## Evolution of scores with forecast range

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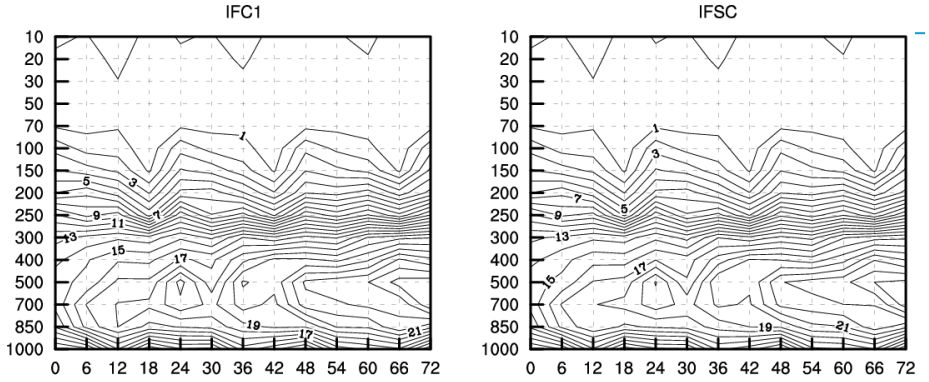
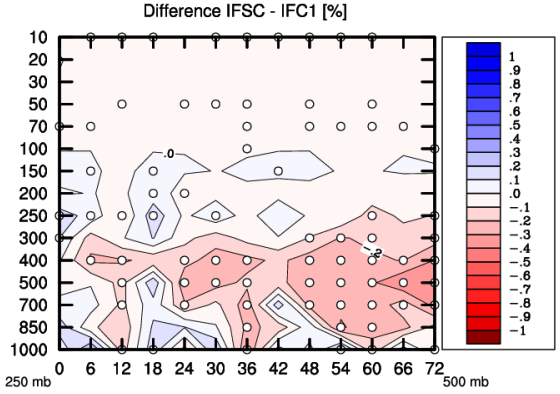
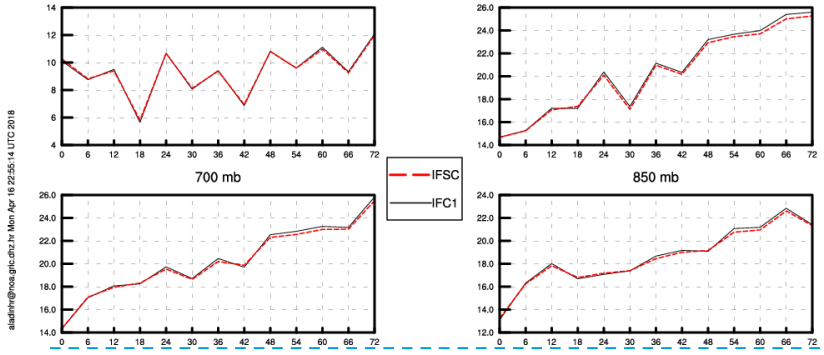
RELATIVE_HUMIDITY (RMSE)




## Evolution of scores with forecast range

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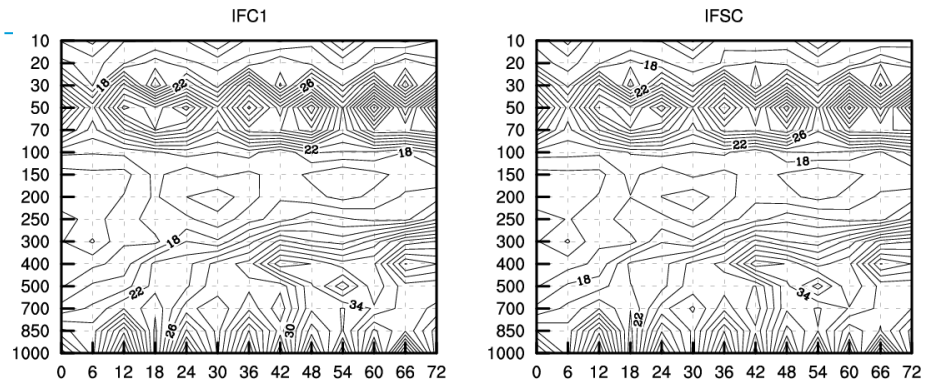
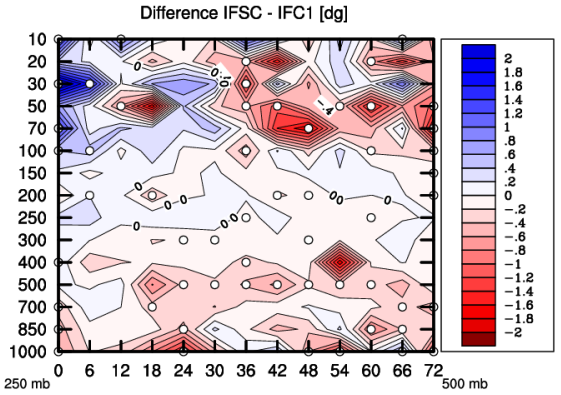
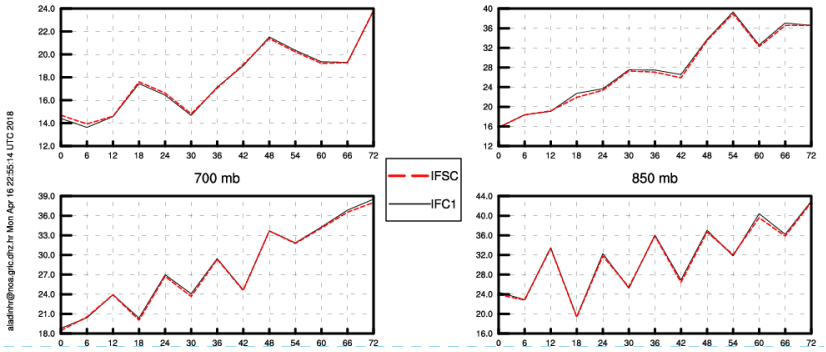
WIND_DIRECTION (RMSE)

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# Conclusion:
# Reduce number of interpolations

What needs to be done for 901 to read octahedral grid?
Other configurations … 903?

O1280 → ATLAS? → LAM (Lamb, Merc, ..)

Is using gl reducing the number of interpolations?

# Appendix: Levels in the vertical

The FA file headers contain information on A and B coefficients and data on model levels. There is more than one way to compute model levels.

Use hourly LBCs if you can afford it!