Envisaged Implementations of HIRLAM and HARMONIE Models in the AEMET Platform.

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Content

- CRAY X1e configuration and its current use
- HIRLAM operational and pararel runs
- HIRLAM verifications and future implementation
- HARMONIE nested runs in the CRAY X1
- Experimental runs and verifications in the ECMWF System
- Conclusions

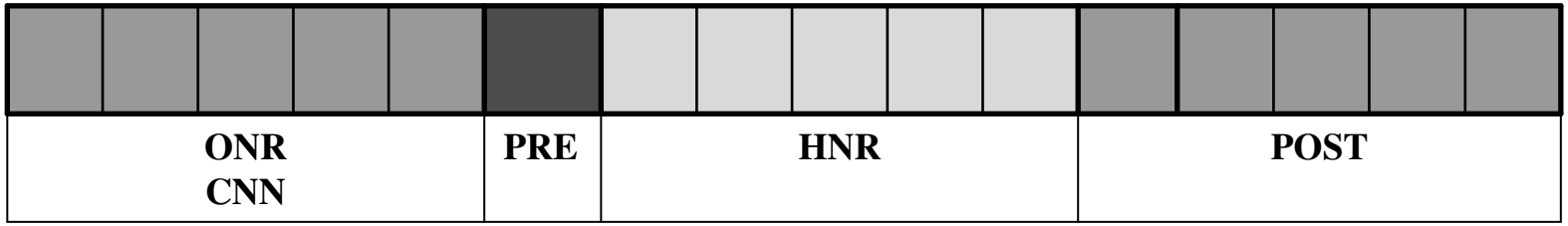
AEMET's CRAY Xe1

- 16 physical nodes
  - 8 MSP each
  - 1,2 GHz, 19,2 Gflops -64 bits- por MSP
- 32 logical nodes 31 nodes for applications + 1 for system
- 128 MSP / 512 SSP
- 512 GB memory (16 nodes, 32 GB c/u)
- 2,5 Tflops peak for aplications

- ***20 TB SAN (/stornext/SANDISK)***
- ***1 TB direct disk (/stornext/ARCHIVE)***
  - ***24 TB tape library***

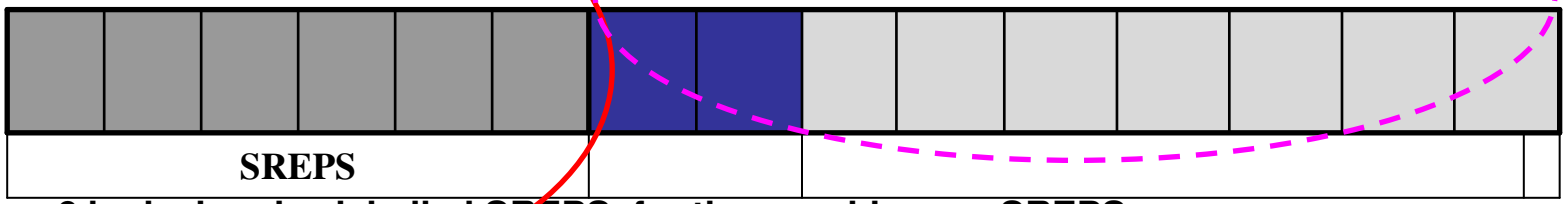
USE OF THE MACHINE

16 virtual nodes. Part devoted to Operations



5 logical nodes labelled ONR, for HIRLAM/ONR and HIRLAM/CNN
5 logical nodes labelled HNR , for HIRLAM/HNR
5 logical nodes labelled POST, for post-processing HIRLAM
1 logical node labelled PRE, for pre-processing HIRLAM

15 virtual nodes Part devoted to Research



6 logical nodes labelled SREPS, for the user hirseps, SREPS
9 free logical nodes for general use.

1 virtual node devoted to control of the System

HIRLAM OPERATIONAL RUNS in AEMET.

HIRLAM v7.2 with SL, 3D-VAR, KF/RC

3 versions with horizontal resolutions:

0.16º (ONR) Euro-atlantic domain

0.05º (HNR) Iberia domain

0.05º (CNN) Canary Islands domain

- 40 vertical levels
- Projections 72 h ONR & 36 h HNR and CNN
- Runs at 00, 06, 12 & 18 UTC
- ONR with blending and boundaries (50km) from ECMWF.
- HNR and CNN with boundaries from ONR (16km)

and HIRLAM current paralel runs

HEC:
like HNR, but directly nested to ECMWF boundaries with
-50km resolution (during summer 2010)
-25km resolution (during seconf half September)

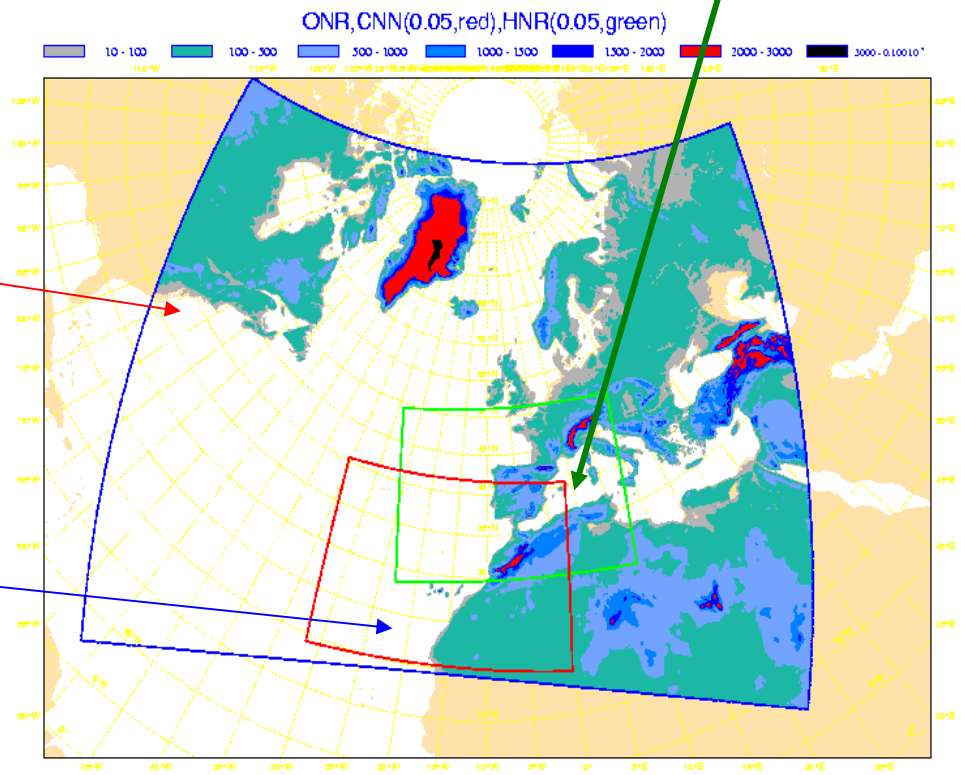
CEC:
like CCN,
but directly nested to
ECMWF boundaries with
-25km resolution (being implemen

SK3 like ONR, in current pararel runs

CNR like CCN, in current pararel runs

XXXr reruns of ECMWF boundaries

HIRLAM/HNR and ECMWF/HEC/



Current use (time distribution) of the operational part of the CRAY X1e

16 first virtual nodes

ONR

hhUTC+1H 51min
hhUTC+2H 50min

CNN
hhUTC+2H 50min
hhUTC+3H 45min

-
SK3 +CNR
hhUTC+3H 53min
hhUTC+6H 05min

ONRr
hhUTC+6H 20min
hhUTC+7H 00min

SK3r
hhUTC+6H 50min
hhUTC+7H 25min

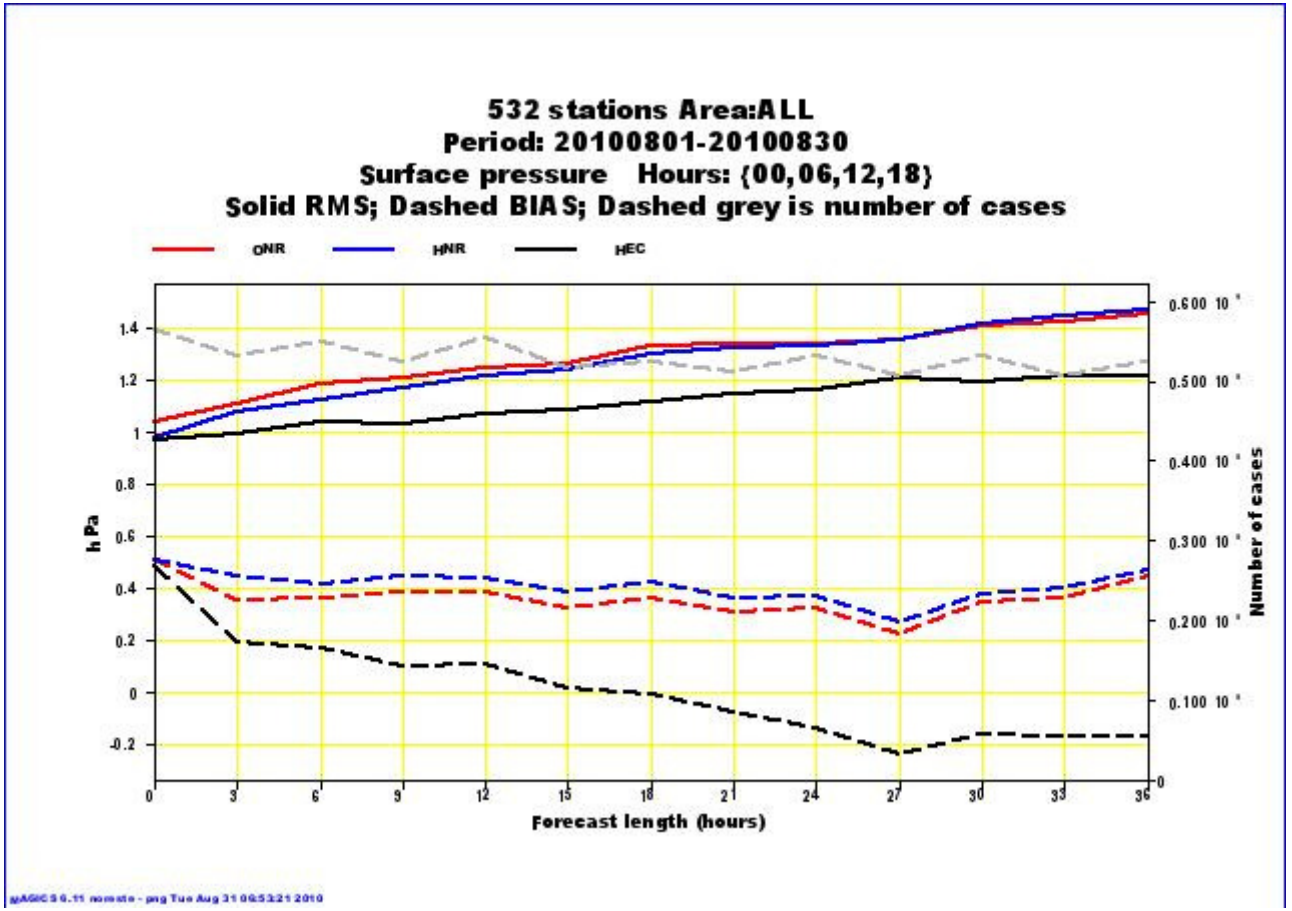
HNR
hhUTC+2H 40min
hhUTC+3H 45min

HEC
hhUTC+3H 53min
hhUTC+5H 16min

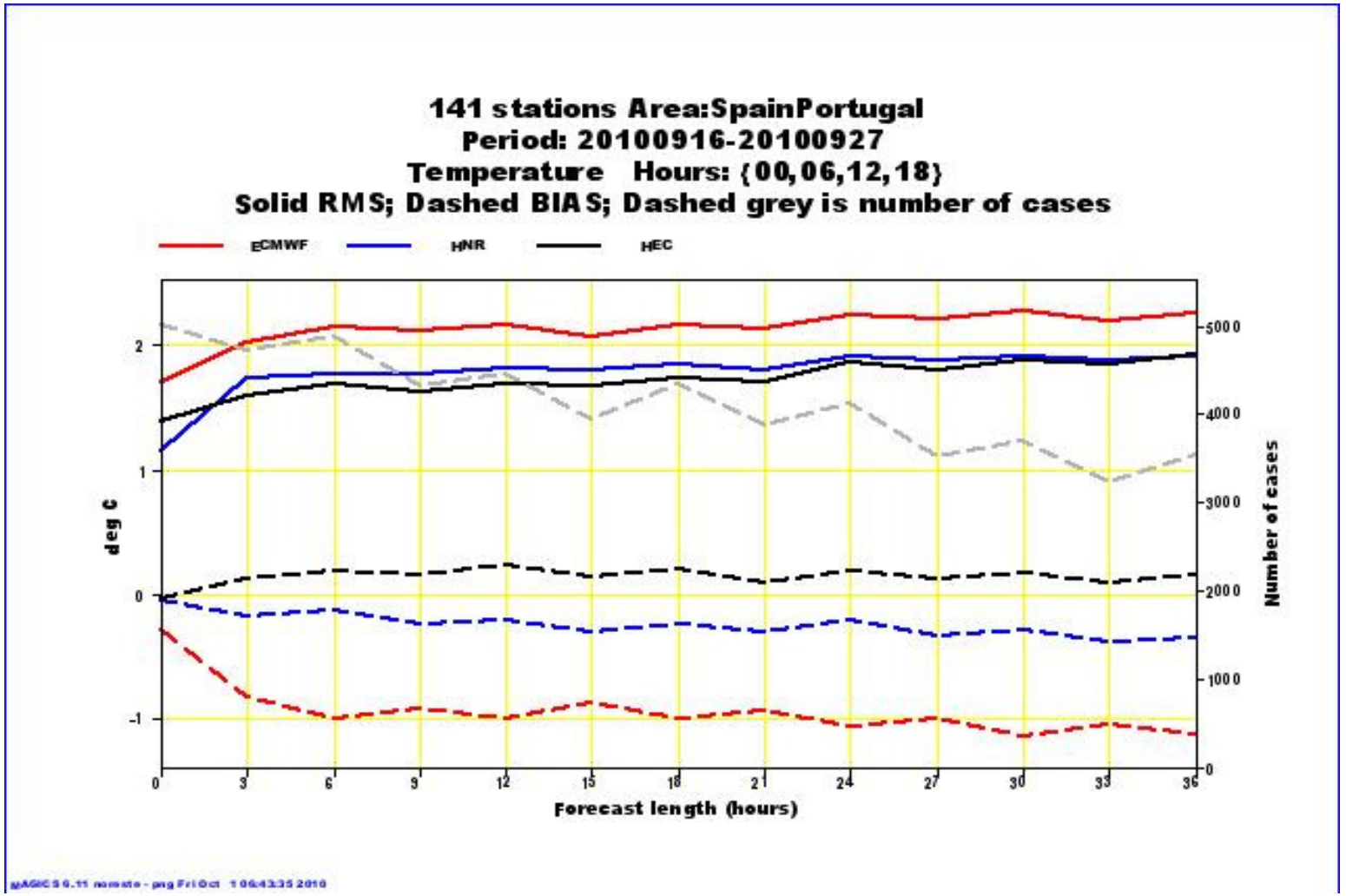
HECr
hhUTC+6H 50min
hhUTC+7H 25min

Starting at: 00, 06, 12, 18 UTC

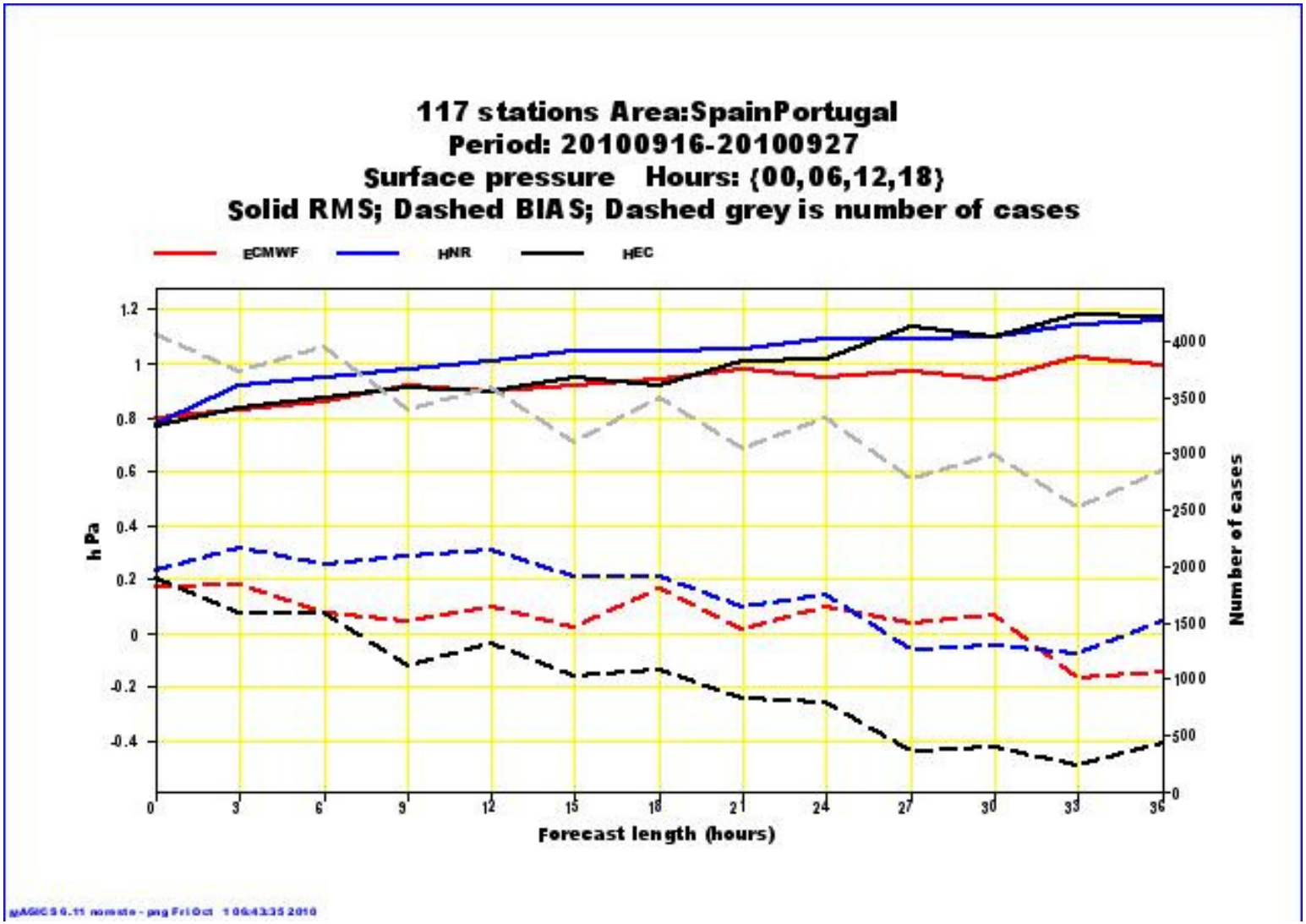
ECMWF, HNR and HEC bias and rms



ECMWF HNR and HEC bias and rms



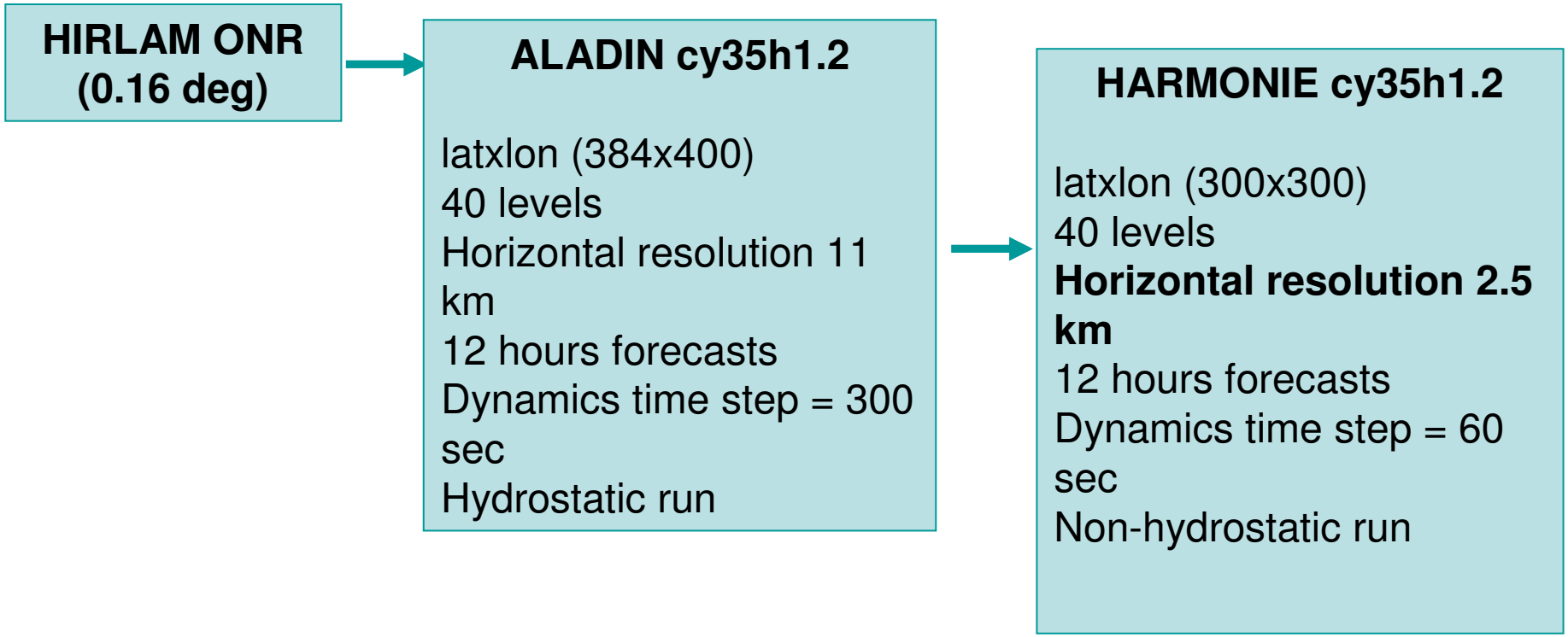
ECMWF, HNR and HEC bias and rms



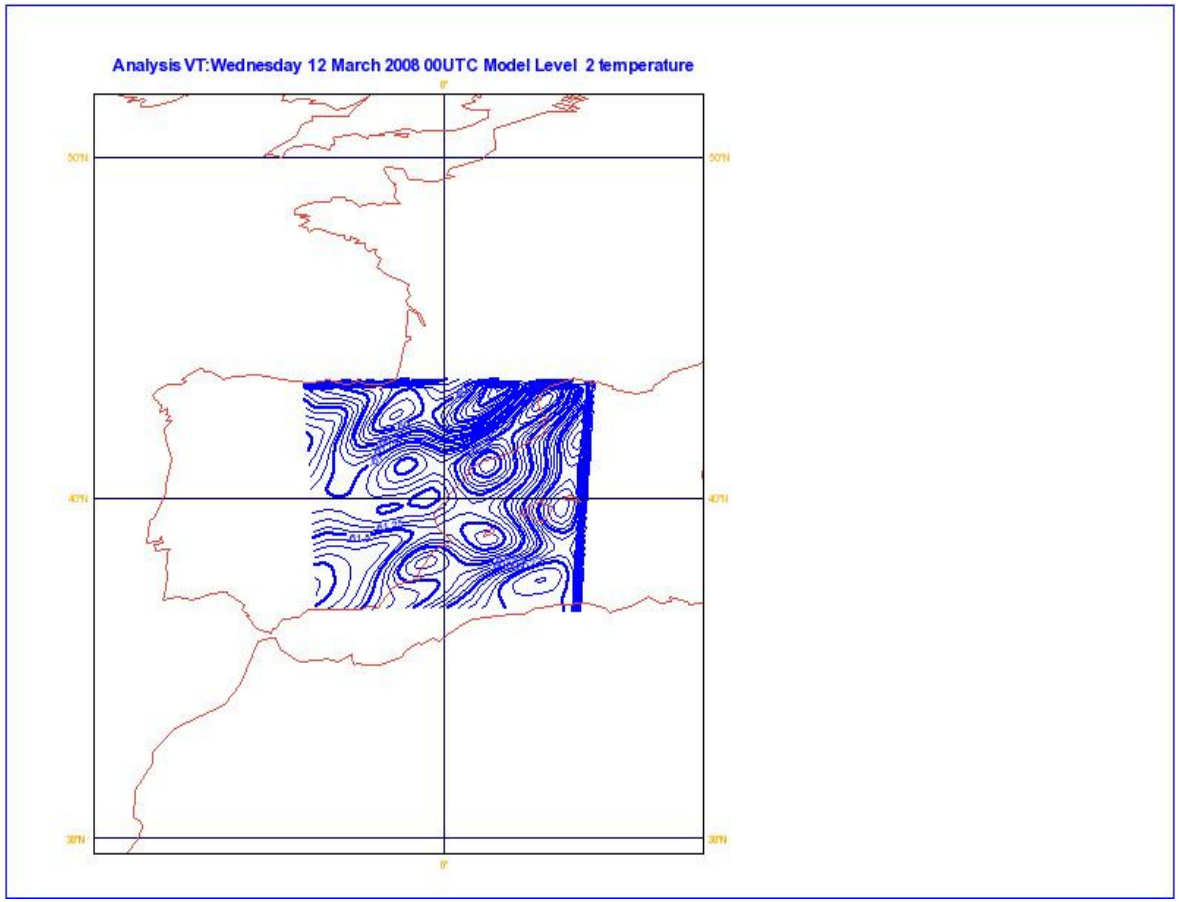
Conclusions on the future use of the HIRLAM model

- HEC directly nested to ECMWF improves current HNR and ONR results both using boundaries with 50km and 25 km resolution.
- When data policy eventually allows it, and current functionalities of ONR could be covered by outputs of the ECMWF boundary project, operations in AEMET would use HEC and CEC versions of HIRLAM directly nested to ECMWF boundaries.
- Then, ONR could be disconnected and the operational availability of the 0.05º runs significantly anticipated.

HARMONIE nested runs in AEMET



HARMONIE 2.5 km integration area over SPAIN in AEMET experimental RUNS (without assimilation)



Harmonie experiments at the ECMWF platform

Five experiments (20 days each) with a two way nesting
(ECMWF 16km-> 2.5 km boundaries) through:

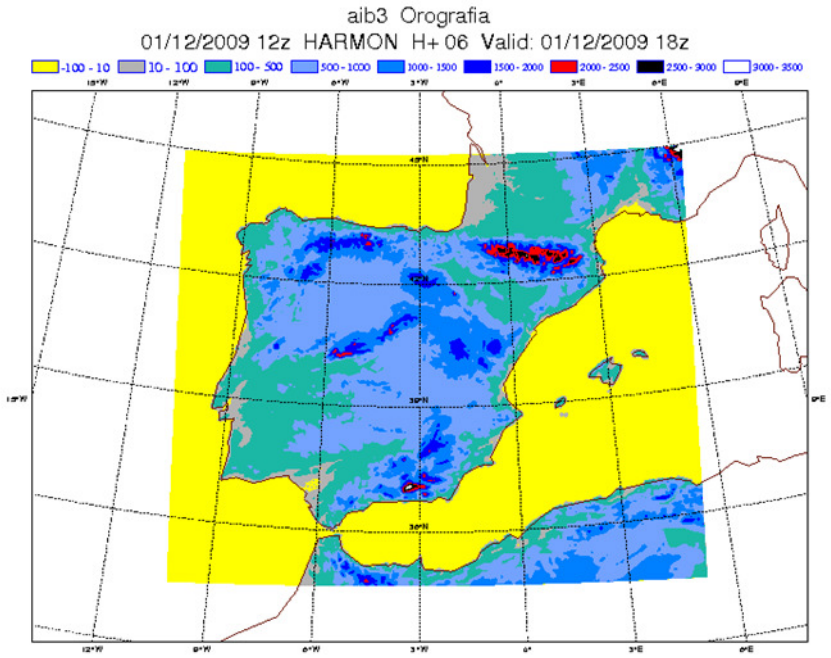
ALADIN (8km) with assimilation, Aladin Physics
ALADIN (8km) without assimilation, Aladin Physics
ALADIN (8km) without assimilation, ECMWF Physics
HIRLAM (8km) with assimilation, HIRLAM Physics

ECMWF with ECMWF asimilation and Physics (no intermediate nesting)

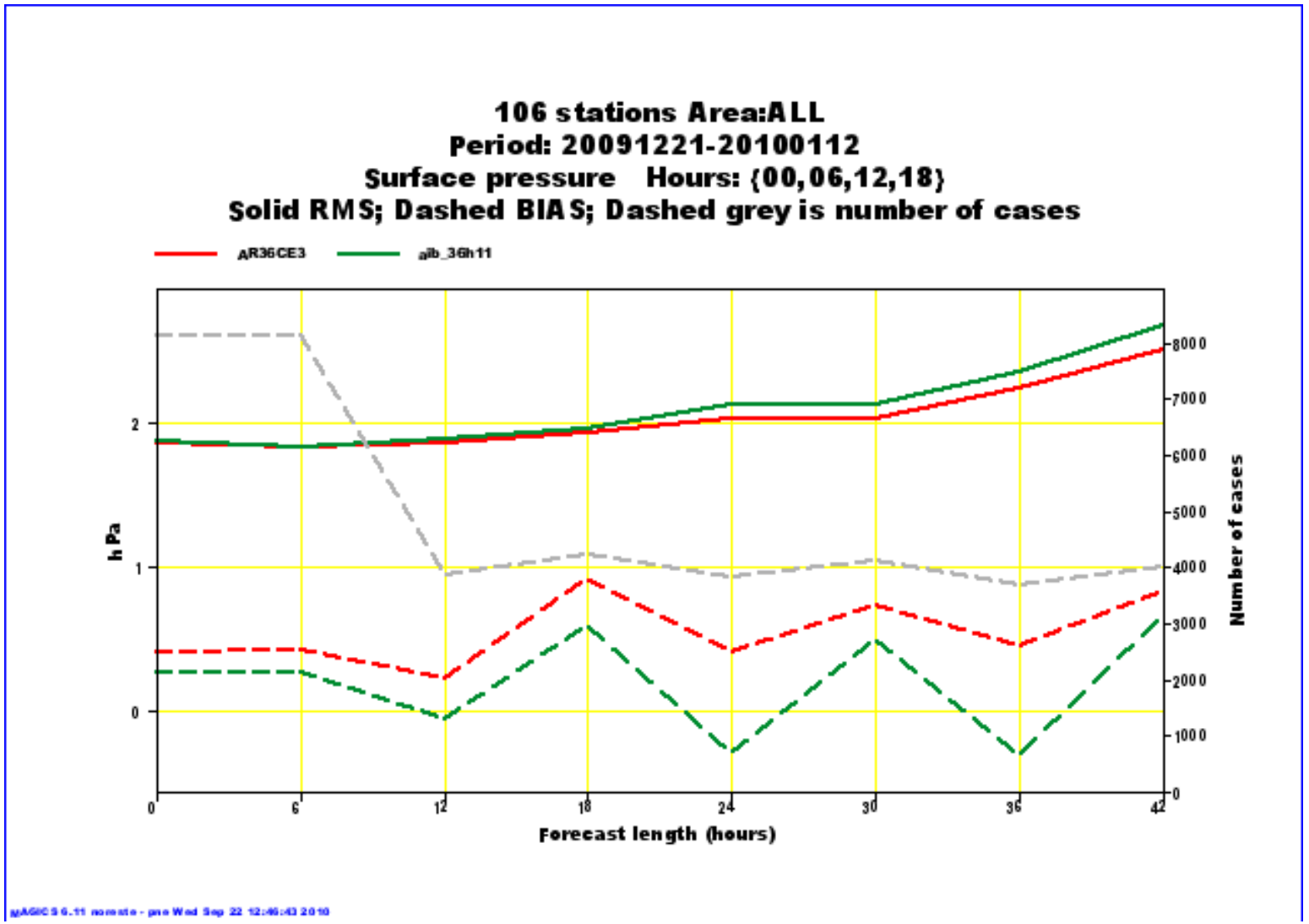
Domain: Full Iberian Peninsula and Balearic islands, see picture

(Only the last two experiments currently completed)

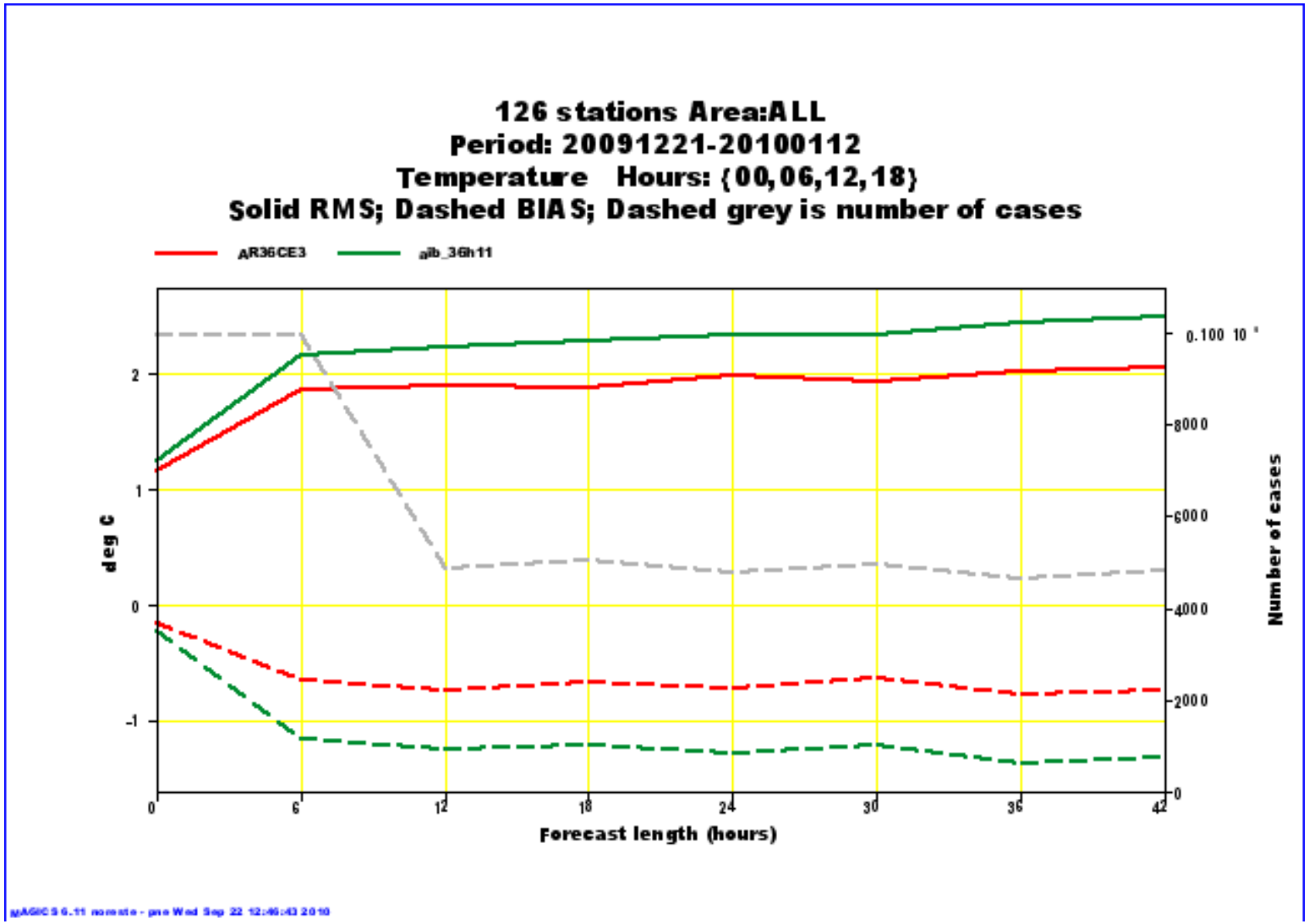
Full Iberian Peninsula and Balearic islands domain



AR36CE3 and AR36HIR bias and rms



AR36CE3 and AR36HIR bias and rms



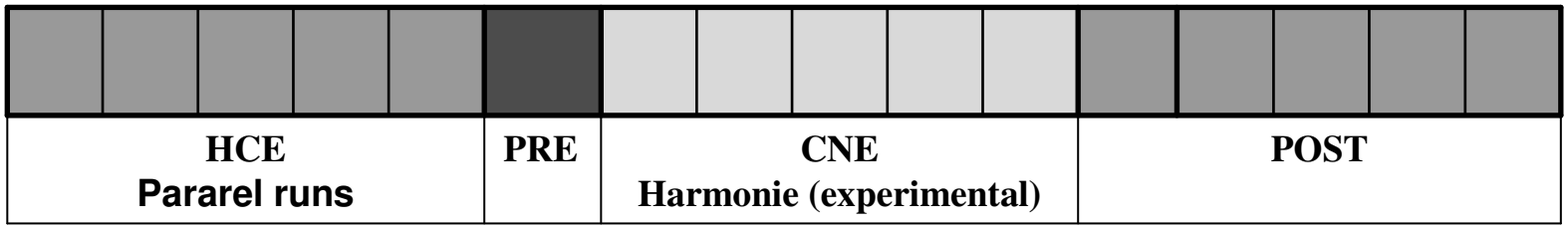
Conclusions on the envisaged implementation of HARMONIE on the CRAY machine

- In AEMET, the HARMONIE model (version 35h1.2) with 2.5 km resolution has been run during more than one year into a reduced Iberian domain, nested to 11 km an ALADIN version using boundaries from HIRLAM (ONR). Also It has been directly nested to the ECMWF into the full Iberian domain (few days runs).

- The experiments in the ECMWF platform are still in progress. Provisional results are not conclusive on the use or not of a two way nesting, on the election of the most suitable physics and on the benefit of using higher ECMWF 10km resolution boundaries

- With the current configuration and use of the CRAY machine in AEMET the envisaged implementation of HARMONIE is as it follows:

Envisaged future use (time distribution) of the operational part of the CRAY X1E



2h for HCEr +HCE (boundaries from the ECMWF)

4h for Pararel runs with SK3 or CNR or HEC or CEC or HARMONIE

2h for CNEr+CNE (boundaries from the ECMWF)

4h for an experimental run (2.5 km) with Harmonie, projection 12-15hours

Starting at hh:00, 06, 12, 18 UTC