

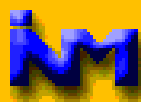
MM5 AT INM SREPS PROJECT

Daniel Santos

SMNT – INM

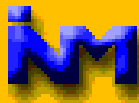
2ª Reunión RED IBÉRICA MM5

LISBOA, MARZO 2004



SREPS PROJECT OVERVIEW

- Two main strategies of Short Range Ensemble Prediction System (SREPS) has been developed:
 - Perturbation of IC and BCs
 - SLAF
 - Breeding
 - Multimodel and multi-ICs
 - HIRLAM
 - HRM
 - **MM5**
 - UKMO (on going)



NEW CRAY X1



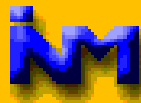
- Combines the two traditional CRAY approaches in computer design:
 - **SINGLE PARALLEL VECTORIAL WITH SHARE MEMORY** (as SV1).
 - **MASSIVE PARALLEL WITH DISTRIBUTED MEMORY** (as T3E).



NEW CRAY X1 (II)



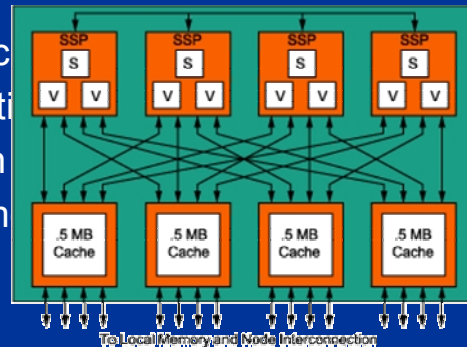
- **NODE:**
 - Each node consists of four **MULTISTREAMING PROCESSORS (MSPs)**, has globally addressable shared local memory and four SPC I/O ports.
 - Memory capacity: 16 GB by node.



NEW CRAY X1(III)



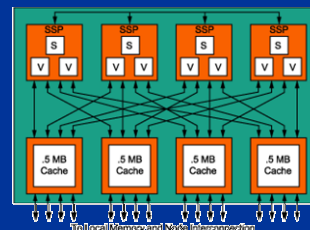
- **MSP** (Multistreaming processor):
 - **4 SINGLE-STREAMING PROCESSORS (SSP).**
 - 12,8 Gflops of peak computation rate in 64-bit data computation (25,6 in 32-bit, 3,2 in 16-bit).
 - 2MB shared cache memory.

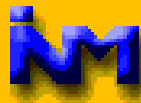


NEW CRAY X1(IV)



- Each **SSP**:
 - 1 scalar processor 400 MHz: 800 Mflops and 800 MIPS.
 - 2 x 2 vectorial pipelines 800 MHz (3,2 Gflops in 64 bits and 6,4 Gflops in 32 bits).

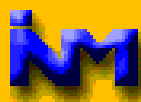




INM CRAY X1

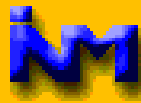


- 10 application nodes + 1 support node (**44 MSP**).
- **176 processors** (SSP).
- Theoretical peak performance: 563 Gflops.
- **176 GB memory**.
- **2 TB** directly attached disk + **4 TB** in Storage Area Network (SAN).
- Gigabit Ethernet.



MM5 INSTALATION

- MM5 has been installed in the new **CRAY X1** using:
 - **NEW COMPILATION FLAGS**.
 - **NEW OPTIMIZATION OPTIONS** customized for this machine.
 - **5 DIFERENT ICs AND BCs** and **2 NEW** Vtables (**GRIB INTERPRETERS**).
 - **2 SUBROUTINES MODIFIED** for HIRLAM inputs
 - **NEW** MM5toGRIB (**GRIB OUTPUT CONVERTER**).



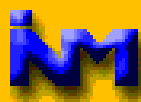
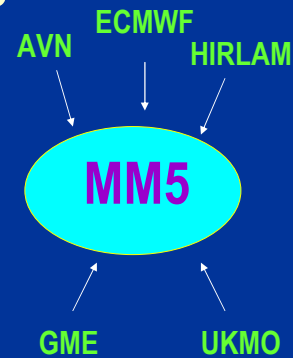
MM5 ICs AND BCs

- **5 DIFERENT ICs AND BCs:**

- Aviation Model (USA)
- ECMWF (Europe)
- HIRLAM
- German Global Model
- United Kingdom Met Office

- **2 NEW Vtables (GRIB INTERPRETERS)** for inputs of:

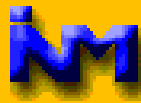
- HIRLAM
- ECMWF



MM5toGRIB

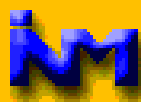
- The new GRIB converter for MM5 output allows:

- Select the variables that we want to obtain in GRIB format.
- Interpolate to regular latitude longitude grid for LAMBERT, POLAR STEREOGRAPHIC and MERCATOR projections.



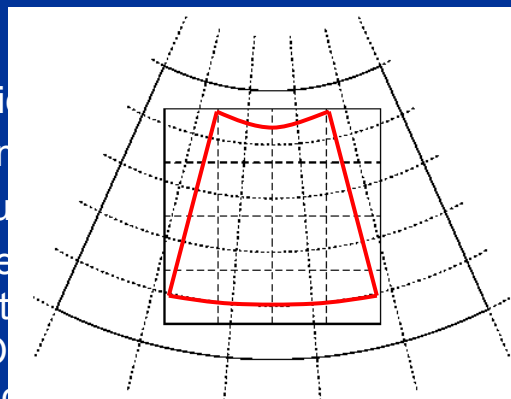
SUBROUTINES MODIFIED FOR HIRLAM INPUTS

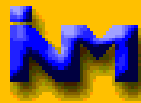
- 2 SUBROUTINES has been modified:
 - gribcode.F
in REGRID package in order to allow
 $KSEC(1) = 10$ (\Rightarrow Rotated GRIB).
 - proc_ingest_first_guess.F
in REGRID package in order to transform
HIRLAM RH in percent.



MM5 EXPERIMENTS CONFIGURATION

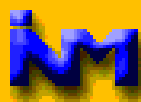
- Integrati
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 - longitude coordinates \rightarrow MERCATOR
 - projection.





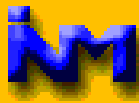
MM5 EXPERIMENTS CONFIGURATION (II)

- Physical options:
 - Explicit Moisture Scheme: Simple Ice (Dudhia).
 - Cumulus parametrizations scheme: Grell.
 - Planet Boundary Layer Scheme: MRF PBL.
 - Atmospheric Radiation Scheme: Cloud-Radiation
 - Ground Temperature Schemes: Multilayer mode.



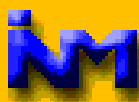
RESULTS

- 48 hours common integration period since 2004-01-05 at 00 h for all models in SREPS.
- MAPS:
 - SLP & Prec 6 h H + 24 h Geo & T 500 hPa H + 24 h
 - SLP & Prec 6 h H + 48 h Geo & T 500 hPa H + 48 h

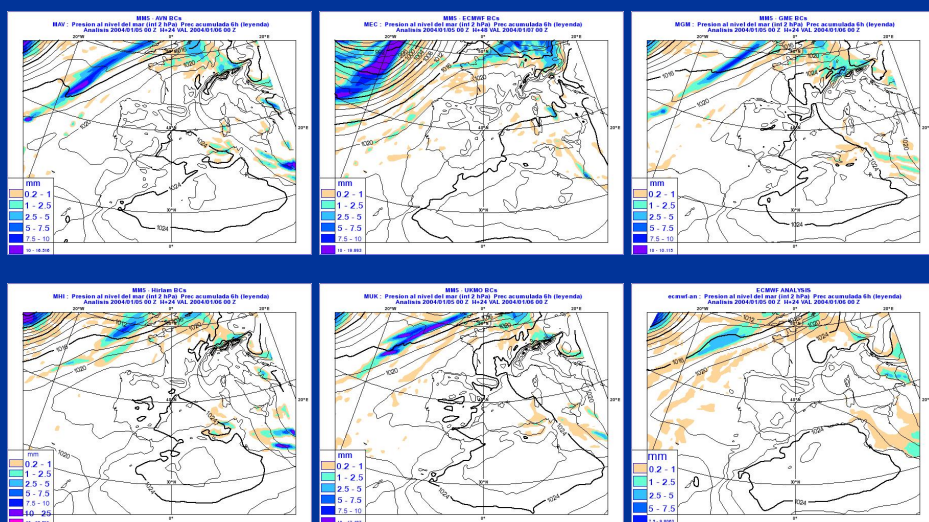


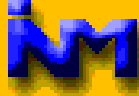
CONCLUSIONS & FUTURE PLANS

- The model works automatically with this 5 ICs and BCs.
- We need to check the spread of this 5 ensemble members and also the quality of the forecast.(=> VALIDATION).
- We are doing a 15 day period of test.
- Non operative 2 INTEGRATIONS of this 5 members will be done dally during this summer.

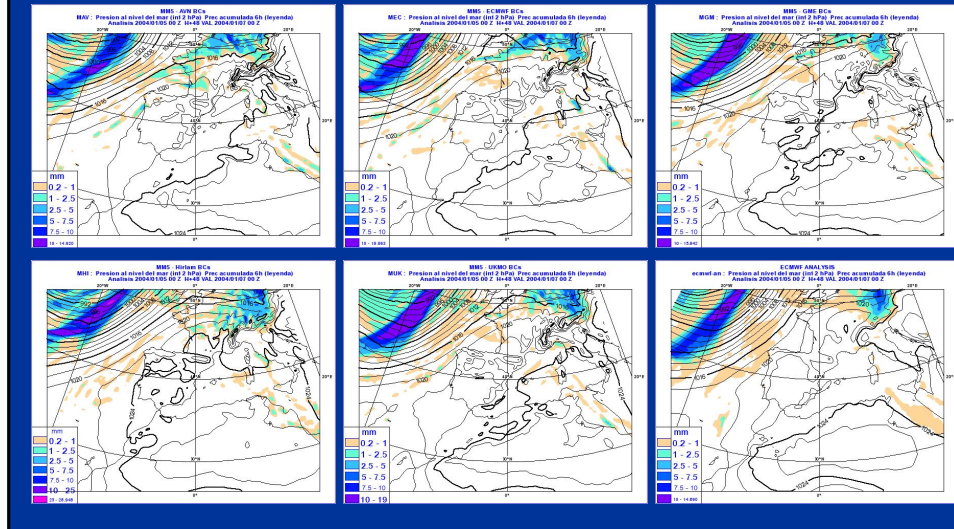


SLP & Prec 6 h H + 24 h

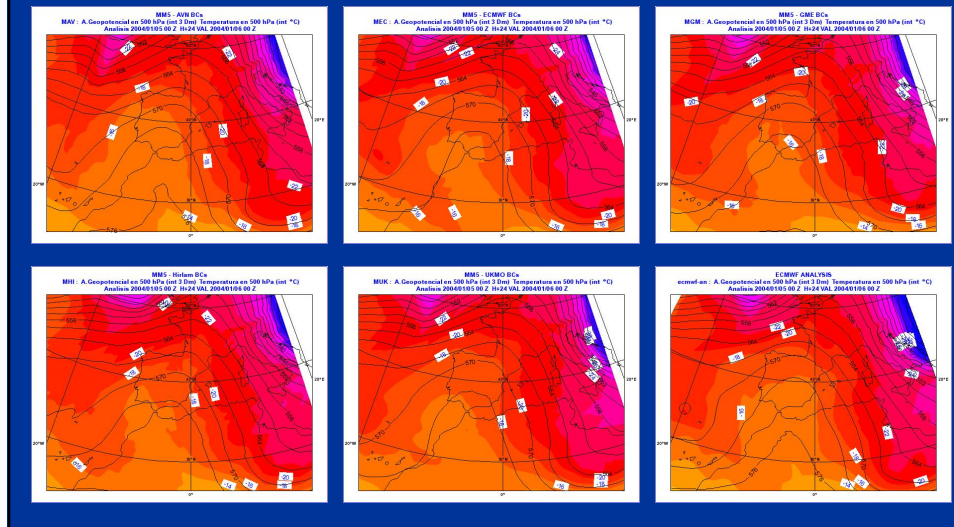


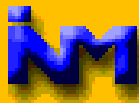


SLP & Prec 6 h H + 48 h



Geo & T 500 HPa H + 24 h





Geo & T 500 HPa H + 48 h

