IS-ENES
2nd HPC Workshop on Climate Models
Toulouse, 30 January-1rst February 2013

Workshop Introduction & opening remarks

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Coordinator of IS-ENES

ENES

European Network for Earth System modelling

http://enes.org

A network of European groups in Earth's climate system modeling

Launched in 2001 by Guy Brasseur (MOU)

More than 40 groups from academic, public and industrial world

a better integration of the European climate modelling effort with respect to human potential, hardware and software

Main focus : discuss strategy to accelerate progress in climate/Earth system modelling and understanding

Several EU projects

FP5: PRISM, FP6: ENSEMBLES,
FP7: METAFOR, COMBINE, **IS-ENES**, EUCLIPSE, EMBRACE
IS-ENES2, SPECS
Collaboration with PRACE

IS-ENES : Infrastructure for ENES
FP7 project « Integrating Activities »

1ʳˢᵗ phase: March 2009- Feb 2013 (7.6 M€), 18 partners
2ⁿᵈ phase: Apr 2013- March 2017 (8 M€), 23 partners

Infrastructure :
Models and their environment
Model data
Interface with HPC ecosystem

Users :
The ENES community
(global & regional climate models)
Impact studies
Climate services

Support to international databases :
CMIP5 & CORDEX (EuroCordex, Africa, Medcordex)

WCRP
World Climate Research Programme

Better understand and predict climate variability & changes
Foster:
- The integration of the European ESM community
- The development of ESMs and their environment
- High-end simulations
- The application of ESM simulations for climate change impacts

JPI
Climate

Follow-up of 1rst workshop
Lecce, 14-16 December 2011

- Focused on dynamical cores and massively parallel computing

- Some recommendations:

  Benefit from international networking

  Foster comparison of model computing performance

  Develop interactions between the 3 G8 exascale projects on climate:

  ENES: Icomex & Exarch and USA: ECS

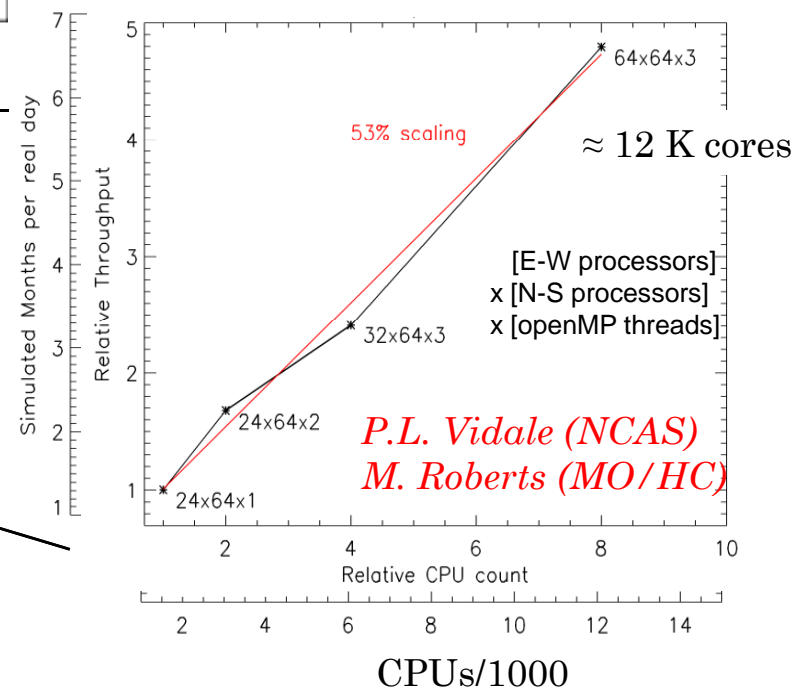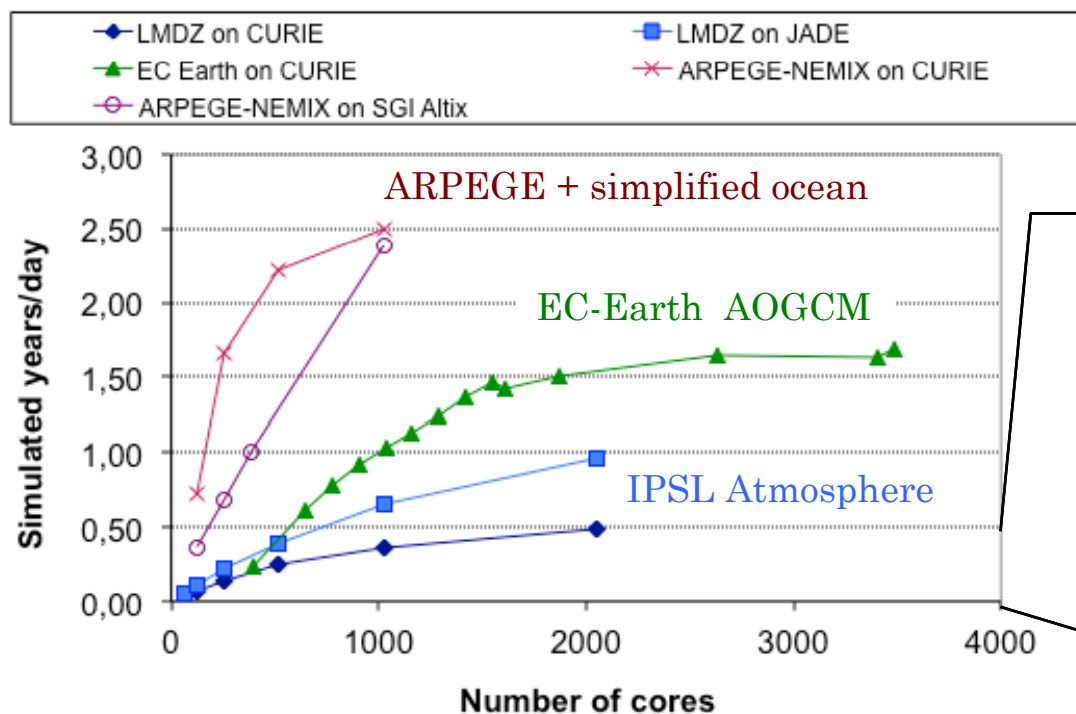- Difficulties: future architectures, co-design, training

S. Joussaume, SC 2012

Joint Weather and Climate
Research Programme

A partnership in climate research

## Scalability tests at resolution 25-30 km for the atmosphere

HadGEM3 – CRAY XE6 Hector

ARPEGE + simplified ocean

EC-Earth AOGCM

IPSL Atmosphere

53% scaling

≈ 12 K cores

[E-W processors]
x [N-S processors]
x [openMP threads]

P.L. Vidale (NCAS)
M. Roberts (MO/HC)

G. Riley et al., IS-ENES

CPUs/1000

Need to revisit dynamical cores
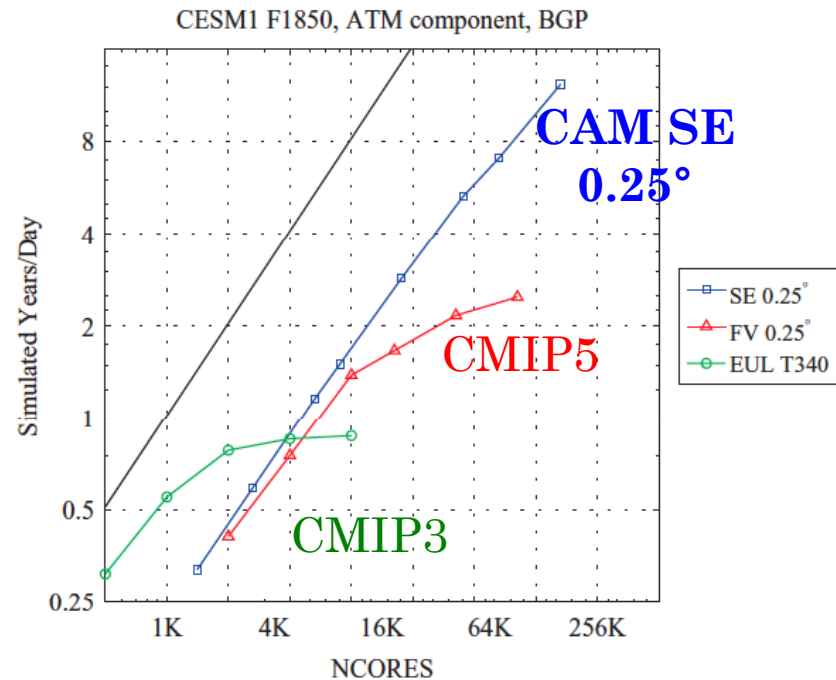
S. Joussaume, SC 2012

On-going international projects:
G8 exascale project ICOMEX
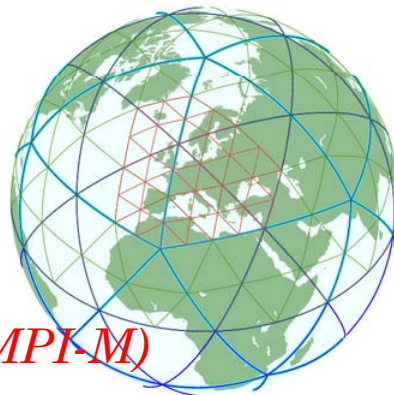Dynamical Core MIP

Cubed-sphere
(CAM-SE)
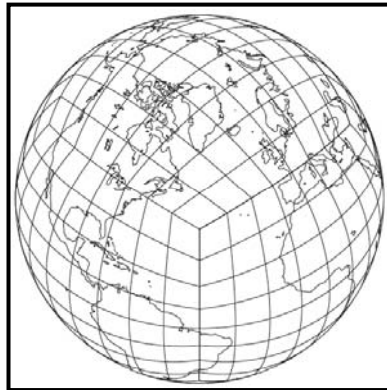
CESM1, 0.25°, BGP

Collaboration NCAR-Sandia,
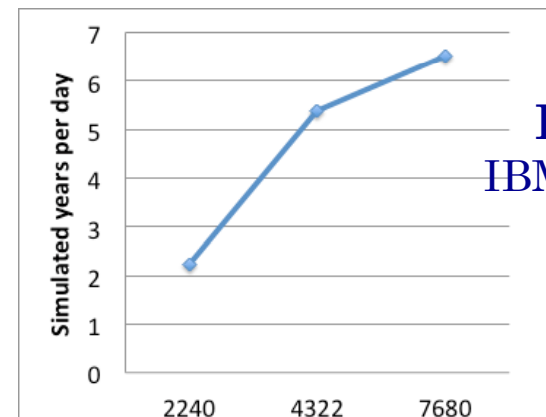*Dennis et al. (IJ HPC appl, 2012)*

CAM SE
0.25°

CMIP5

CMIP3

Icosahedric grids
ICON (DE)
DYNAMICO (FR)

Court. L. Linardikis (MPI-M)

ICON 35 km
IBM Power P6 nodes

- *How can we improve climate model performance on massively parallel computers ?*

- *How do we prepare for exascale (including data) ?*