

Press release - for release: 29<sup>th</sup> August 2012, 10:00 AM

## PRACE system equips science to face the tempest

*PRACE, the Partnership for Advanced Computing in Europe, has awarded 144.565.862 core hours on Cray XE6 System Hermit installed at HLRS Stuttgart – one of the three members of the German Gauss Centre for Supercomputing -- to Prof. Pier Luigi Vidale and his UPSCALE project team, including scientists from NCAS-Climate (Department of Meteorology, University of Reading) and from the Met Office (Exeter), in the United Kingdom. This is the largest allocation of core hours ever to be made on a single PRACE Tier-0 system! The UPSCALE project merited this record-breaking allocation because of its scientific and technical excellence: it aims to continue developing our climate modelling capability and goes for even higher global resolution, all the way to 12km, which is not even envisioned for Met Office global weather forecasting before 2015.*

Every year tropical Atlantic storms wreak havoc on the lives and property of thousands of people causing an estimated US\$26 billion in financial damages and uncountable more emotional and physical losses<sup>1</sup>. The impact of such weather phenomena is projected to double by the end of the century, even without climate change and global warming<sup>2</sup>. While controlling the weather is still beyond the power of humankind, creating virtual storms and simulating their impact is now not only possible, but also increasingly accurate and detailed thanks to leading-edge high performance computers. Climate research as a scientific discipline relies heavily on computing power: even the largest HPC systems available do not yet allow the long centennial simulations necessary to make longer-term predictions. The race for exascale, in which PRACE is a key player, is therefore especially closely followed by climatologists and earth scientists.

*“The UPSCALE project aims to increase fidelity of global climate simulations and our understanding of weather and climate risk, by representing fundamental weather and climate processes more completely. This will test and enhance our confidence in projections of climate change, including extremes,”* Prof. Vidale said. *“Resolving weather features is vital if global climate models are to produce realistic simulations of the mean climate, variability and extremes, particularly at regional and local scales,”* he added. High-resolution models improve simulation of high-impact events, such as tropical cyclones, European blocking and associated European summer (2003 and 2010) and winter extremes (2009 and 2010). A global modelling approach helps scientists understand potentially connected high-impact events, such as the 2005 hurricane season and drought in the Amazon, the 2010 Russian heat wave and the Pakistan floods, as well as the influence of retreating Arctic sea-ice on European climate.

*“HLRS is proud to provide Prof. Vidale and his team with the enormous computational capacity and capability of our Hermit Petascale system,”* says Prof. Michael M. Resch, Director of HLRS. *“At HLRS, we focus on the research of subjects such as health, energy, mobility and environment, and this UPSCALE project resolving global models of the atmosphere and oceans falls square into this range.”*

<sup>1</sup> Ed Hawkins and Pier Luigi Vidale, *Nature Clim. Change* **2**, 574-575 (2012)

<sup>2</sup> Mendelsohn, R. *et al. Nature Clim. Change* **2**, 205-209 (2012).

The results of the work of Prof. Vidale and his team are keenly awaited by the insurance industry: synthetic storms produced by numerical simulation will allow for more robust quantification of risks. The insurance industry uses “cat”<sup>3</sup> models to quantify the risks of catastrophes and determine the price of insurance worldwide. The output of the UPSCALE integrations will be used to understand the basic assumptions on the nature of the climate system that insurance companies make as they construct those cat models. The UPSCALE project runs until the end of 2012, after which Prof. Vidale and his team will certainly report on their findings.

### **About PRACE**

The Partnership for Advanced Computing in Europe (PRACE) is an international non-profit association with its seat in Brussels. The PRACE Research Infrastructure (RI) provides a persistent world-class High Performance Computing (HPC) service for scientists and researchers from academia and industry. The Implementation Phase of PRACE receives funding from the EU's Seventh Framework Programme (FP7/2007-2013) under grant agreements n° RI-261557 and n° RI-283493.

Please visit the PRACE website: <http://www.prace-ri.eu>

Or contact **Marjolein Oorsprong**, Communications Officer:

Telephone: +32 2 613 09 27 E-mail: [M.Oorsprong\[at\]staff.prace-ri.eu](mailto:M.Oorsprong[at]staff.prace-ri.eu)

### **About Cray XE6 Hermit**

On February 24, 2012 the High Performance Computing Center Stuttgart (HLRS) inaugurated its Cray XE6 system code named Hermit, at that time the fastest supercomputer in Germany. With a performance of more than 1 Petaflop/s this supercomputer is used for engineering applications, for health, energy, environment and mobility research. Hermit held number 12 on the renowned TOP500 lists of the world's fastest supercomputers (issue Nov. 2011). In the ranking of industrially used supercomputers, Hermit is still number 1 worldwide. Hermit is designed for sustained application performance and highly scalable applications. It is composed of 3552 dual socket nodes equipped with AMD Interlagos Processors leading to 113664 processing cores overall. Nodes are equipped with 32GB or 64GB main memory. The pre- and post- processing infrastructure aims to support users with complex workflows and with advanced access methods including remote graphics rendering and simulation steering.

### **About GCS**

The Gauss Centre for Supercomputing (GCS) consolidates the three national supercomputing centres HLRS (High Performance Computing Center Stuttgart), JSC (Jülich Supercomputing Centre), and LRZ (Leibniz Supercomputing Centre, Garching) into Germany's Tier-0 Supercomputing institution. Concertedly, the three centres provide the largest and most powerful supercomputer infrastructure in Europe to serve a wide range of industrial and research activities in various disciplines. They also provide top-class training and education for the national as well as the European High Performance Computing (HPC) community. GCS has its headquarters in Berlin/Germany.

**Regina Weigand**, GCS Public Relations

+ 49 711 685-87261

[r.weigand\[at\]gauss-centre.eu](mailto:r.weigand[at]gauss-centre.eu)

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<sup>3</sup> Cat means catastrophe in this context

