



Providing High Performance Computing Infrastructure for Climate and Integrated Water Resources Research in Sub-Saharan Africa

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Undertaking state-of-the-art computationally-intensive research such as climate and hydrological research in developing countries remains a formidable challenge primarily due to the very high cost of high performance computing infrastructure. Even where these high performance computing infrastructure exist, the running cost and availability of expertise makes it too expensive to operate in developing countries. Recent developments in Linux and Open Source initiatives have made it possible for scientists in developing countries to acquire the necessary expertise to build and manage affordable computing infrastructure. Linux clusters offer viable solutions for low-cost, high performance parallel computing capabilities that we need to meet the scientific computing challenges of developing countries. The continuous increase in the performance of community ICT products coupled with the availability of many ready-made software packages for key system services, provides excellent computing platforms

that offer appropriate solutions for many scientific computational problems.

Climate change and its impacts on natural and human systems has become one of the key research questions that the scientific community must address. It is projected that Sub-Saharan Africa is the most vulnerable region as over 70% of its population depends on rain-fed agriculture for their survival and the main source of power for socio-economic development in the subregion is hydro-based, which depends heavily on availability of rainfall and its distribution. However, undertaking climate and environmental research requires both human and computational resources that governments in Sub-Saharan Africa cannot fund.

To help bring affordable High Performance Computing infrastructure and technology to the region, the International Center for Theoretical Physics, Institute of Meteorology and Climate Research, (Garmisch-Partenkirchen, Germany), Kofi Annan Center of Excellence in ICT and Institute of Mathematical Sciences (Ghana) have teamed up to establish a High Performance Computing Infrastructure in Sub-Saharan Africa. The paper discusses how the facility is being used to promote climate and related research in Sub-Saharan Africa.