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# e-Science on Weather Simulation Using WRF model

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## Description of the Work

gWRF (gLite based WRF), developed by ASGC, uses the global e-Science infrastructure for WRF weather modeling. To improve the WRF overall efficiency, gWRF allows the most computing intensive WRF model to run on the Grids whereas users handle WPS and post-processing which do not require intensive CPU resources on their local machines. We have designed a package of scripts and made WRF MPI version running on gLite-based Grid infrastructure. In order to get an optimized physical model, we have also done some comparison of historical data to our massive simulations around Southeast Asia. Our presentation will demonstrate the results of those comparison in the studies of the rainfall and path of typhoon, wind field and sand storm.

The future plans include continuous efforts toward the gWRF performance, easy-to-use User Interface, job management, visualization function and promotion to the world-wide user communities.

## Conclusions

WRF provides a high degree of flexibility, and allows for parallel computing (MPI and OpenMP ). It can be used in running various sizes of computation and to simulate a geographic region ranging from several meters to several thousand kilometers in grid size. By comparing the gWRF simulation with historical data, the result of the gWRF simulation appears rather accurate.

## Impact

Since WRF is one of the common software for the meteorology and the simulation requires large amounts of computing, the grid architecture could accelerate the simulation process and improve their resolution. gWRF allows for efficient job assignments, maximizes the benefits of distributed computing resources and is capable of high-resolution weather simulations. gWRF also provides users with a new approach to atmospheric modeling.

## Overview (For the conference guide)

Climate change has become a world-wide topic today. The Weather Research & Forecasting Model (WRF), a mesoscale numerical weather prediction model, is today's most advanced and most widely used atmospheric model. By taking advantage of workwide distributed computing resources, WRF could run the weather simulation model to support the common methodology in a more accurate and efficient manner. We engage in the e-Science collaboration and activity on the global meteorology virtual research environment.

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