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Topic: Reducing the uncertainties in predicting climate change (done for 4th IPCC).

The climate modeling and its solution done for 4th Intergovernmental Panel on Climate Change(IPCC)[1],very closely predicts the extreme weather forecast events(drought, floods, hurricanes, etc.) and man's impact on climate(global warming) ,taking into accounts the various physical factors (like wind evolution, temperatures, radiation, clouds),geographical factors (like topography, soil humidity, oceans and marine currents, sea ice),biological factors (like biogeochemical cycles , particular vegetation, atmospheric pollutants and many others),human factors (like changes brought about by human activities). The accuracy of such prediction is of paramount importance in various fields of both science as well as commerce.

This application solves one of the very complicated, atmosphere-ocean coupled models.

The main scientific objective was to enhance the predictions to a very high degree, then the previous prediction done before. And, hence for 4th IPCC report a total of 1,30,000 atmospheric \*grid points were considered, for a mesh of around 30 km .The simulation results obtained, were also extensively compared to physical results(like melting of ice in Antarctica)[1].

The Parallel platform that has been used was vector systems.

The application ran on, the Earth Simulator, ranking first in the Top 500 from 2001 to 2004, (now not present in top500 list).

The application was performed using a total of 80,000 computing hours (the equivalent of just over nine years, if a single processor would be used ) ,producing 40 Terabytes (10<sup>12</sup> bytes) of data ,with six NEC SX6s processors, giving eight times faster performance than the 1st IPCC report.

Also the application scales to large problems on many processors, because the main requirement is computing power.

Main Article: [main article pdf](#)

References Used [1] [wikipedia reference](#)

[2] [ipcc pdf](#)

[3] [ipcc reference](#)

[4] [nec reference](#)

\*Here, grid point is considered to be the intersection point in the mesh drawn in atmosphere.

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