# GEOPHYSICAL FLUID DYNAMICS LABORATORY

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## GFDL/NOAA OVERVIEW

- GFDL's Mission
  - Production of timely and reliable knowledge and assessments on natural climate variability, anthropogenic changes and earth system model development.
- NOAA Mission
  - Understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs.





### THE CHALLENGE

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- The Why:
  - **Understanding & Prediction**
  - Water Resource • Management & Agriculture
  - Urban Planning & • Transportation, etc
- The How: •
  - Climate Modeling & • Simulation
  - **HPCS** Infrastructure •
  - Dedicated Scientists and • supporting staff



fragments of DNA code and hastens the sequencing of the entire human genome.

computers based on nuclear magnetic

#### 21st CENTURY>>

bservatory project gets under way in the United States, developing methods ining huge astronomical data sets



nformatics Research Network (BIRN), let multiple institutions share data.

Japan, performing more than 35 trillion



behaviour in the neocortex - the most

2007 CERN's Large Hadron Collider in Switzerland, the world's largest particle

**Jacqueline Ruttimann** 





#### DATA NEEDS: GRID ISSUES





## DATA NEEDS: FACILITATING COLLABORATIONS

- IPCC
- CMIP5
- PCMDI
  - \* NCAR
  - NASA
  - PMEL
  - ✤ GFDL





## DATA NEEDS: FACILITATING





## DATA NEEDS: FACILITATING

NOAR



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## DATA NEEDS: HIGHER RESOLUTION MODELS



Image courtesy of Isaac Held GFDL.

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## VISUALIZATION NEEDS: IMPORTANCE

- Quick incisive summary
- Easier Comprehension
- Impact
- Immediate Pattern Recognition
- Time varying phenomena understood





## VISUALIZATION NEEDS: DYNAMICS

- More versatile viz tools (file types and size, grid spec, etc)
- Easier intuitive interfaces (gui)
- Journal standard output (fonts and formats)
- Interactive tools
- Better rendering quality and speed





#### VISUALIZATION EXAMPLES





#### VISUALIZATION EXAMPLES





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#### VISUALIZATION EXAMPLES







## SUMMARY

- Climate Research is essential to human development.
- Data analysis and Visualizations will continue to remain pivotal in Climate Research.
- Analytical tools will have to continue evolve with changes in Data, Format or Computing Standards.
- Analytic tools that boast capabilities of working in Distributed Parallel Environments will do well.





#### QUESTIONS



