Group 3 – Breakout Summary

HPC in the Geosciences Workshop
Sep. 27th 2006
How can the community best facilitate through the development of geosciences CI- better collaboration in the areas of education, outreach, training and workforce development?

- **Education in general**
  - can be a unique training ground, can teach many things not taught at universities, such as scientific visualization
  - accomplished by workshops
  - websites

- **Opportunity for industry involvement**
  - Data sets and simulation results expose the students and public to hurricanes, tsunamis, earthquakes;
  - challenge to visualization companies, such as Amira, data is too big for IDL and Matlab

- **Significant social, economic implications in doing this outreach task well. much more so than Earth Simulator did, which did not do a good job in this outreach mission in Japan.**

- **Provide high visibility facility with lots of attractive high-tech access for high-school kids to encourage them to scientific and technical careers**
How can the economy of scale of HPC enterprise be best demonstrated?

- Collaboratory will help to spread the word and create opportunities not possible with just having hardware, more so than the National Centers today.
- Visualization will flourish because of the demand, more than in cluster culture, in which visualization did not thrive.
- Investment by doing many interesting problems in the environmental sciences.
- Allows geosciences to maintain leadership in computing.
- Accessibility to state-of-the-art hardware, otherwise not possible with cluster technology.
What is the best model for establishing a fair relationship between available resources, required science and allocation?

- We must allay the fears of some colleagues (e.g. solid-earth geophysics) who worry about losing money for their PC clusters.
- We must strive for a balance in the composition of the panels:
  - science reviewers and code-readiness reviewers, the two may not overlap sometimes,
  - not enough qualified reviewers in some disciplines.
- Allocations for user support as well as CPU time to bring some people up to speed.
- Strong education component to teach people how to use these big iron. Without education, no progress will be made. In this regard, the Earth Simulator did not do well:
  - summer school for this purpose.
How can geosciences HPC enterprise best be designed in order to provide the capability for addressing emerging opportunities and for supporting "hero" computing requirements?

- How to divide up the machine - issue of half a hero. This is a difficult design problem, and requires leadership in promoting the frontier kind of question: scientifically driven - for example, largest turbulent model, oceanic circulation with high resolution, tsunami modeling with high resolution and coupling to earthquakes, plate-tectonics, formation of the core.

- Job allocation, in Pittsburgh center, many jobs take 1/2 processors and some jobs 100%, possible to do interactive computing most hero-like NSF center, as compared to San Diego and Illinois.

- Try to increase scientific productivity by establishing reasonable tradeoffs

- Emerging opportunities, on-demand computing hurricanes, disease, explosions