



Climate Vision

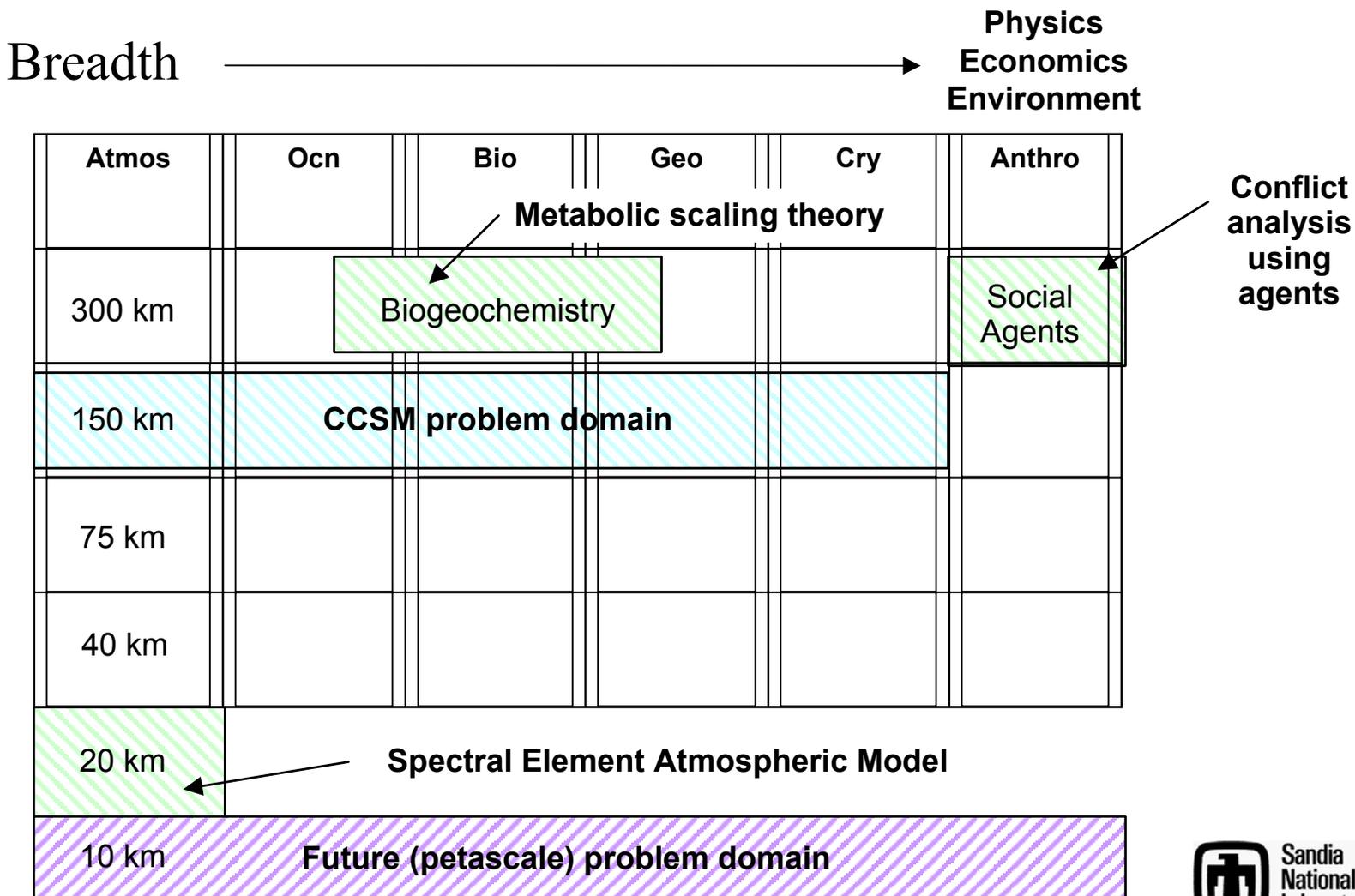
Create the capability that customers will turn to for the next generation of climate modeling, and to understand the economic and social impacts of climate change

To meet this vision we will:

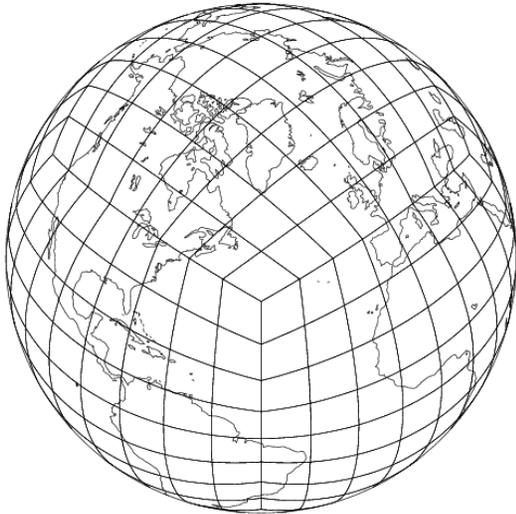
- Use Sandia-developed tools and expertise to help the climate system modeling community improve the performance and increase the resolution of simulation capabilities and have software ready for the next generation of supercomputers that will allow the U.S. to leapfrog the Japanese Earth Simulator (Depth).
- Develop agent-based models to simulate the impact of climate change on regional economies and social networks (Breadth).
- Couple the economic/social agent-based model to the Community Climate System Model (CCSM) with bi-directional feedbacks.

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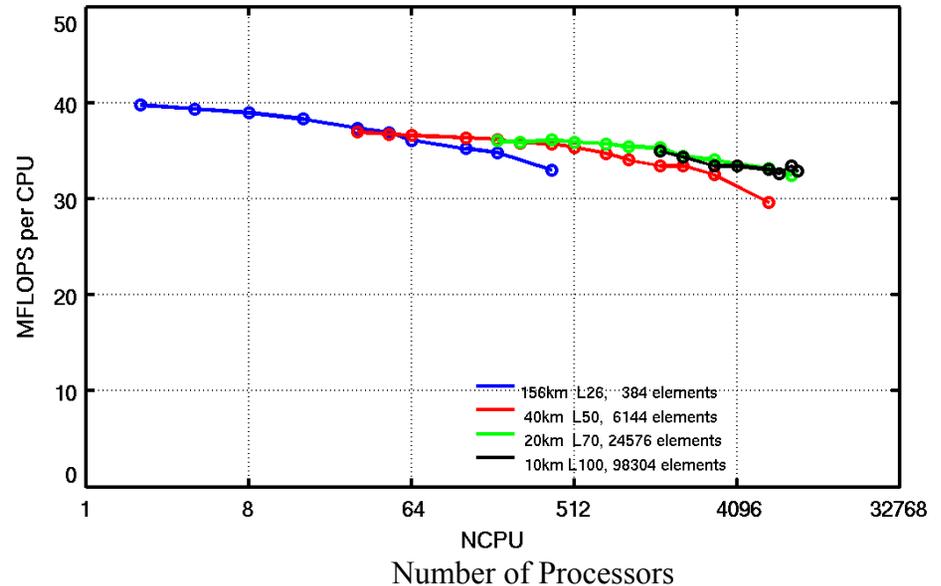
Overview: Sandia initiative has depth and breadth



Sandia is collaborating with NCAR to improve the performance and resolution of the Spectral Element Atmospheric Model (SEAM)



Performance on ASCI Red

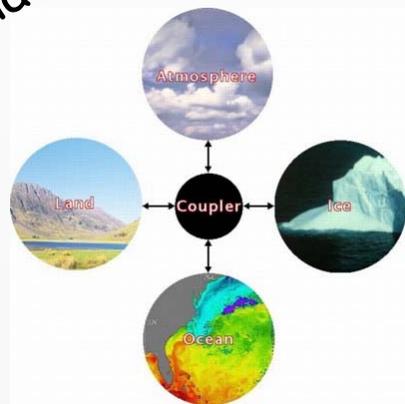


- Global Circulation Model coupled to the Community Atmospheric Model Physics Package
- ASCI Red (1997): 10km resolution runs at 1.4x reality
- Red Storm (Fall 2004): 10km resolution projected to run at 34x reality
- PetaScale computing (2009): 10km resolution projected to run at 870x reality
- NCAR model (funded by DOE Office of Science) run on Sandia MP computers; Sandia algorithms for local grid refinement enable regional scale simulation within global simulation

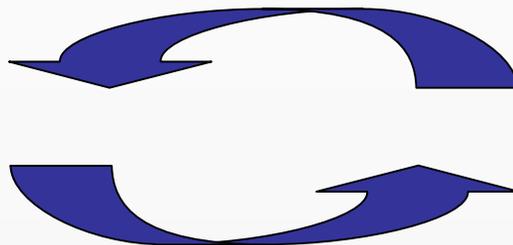
Conflict Analysis Using Agents

Climate and Environmental Scarcity

Climate model

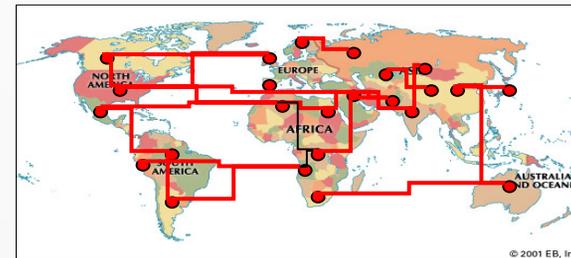


Social/Political/Economic feedback



Climatological feedback

Conflict model



To achieve the level of detail needed for local/regional simulations that accounts for dynamic network structures:

Climate Models, Nation/State Agent models and GeoPolitical models can be combined on our massively parallel computational platforms to enable bi-directional feedbacks.