

Visualization of Climate Data

Presented to

George Seweryniak

**Mathematical, Information, and Computational
Sciences**

Ryan Hurd

Computer Science and Mathematics

**Oak Ridge, Tennessee
August 9, 2006**

Why is Visualization Important?

- Transform numerical results/data into images
- Easier to understand
- Easier to discover patterns
- Good for education
- Links Art and Science
- Makes science more attractive to the common person

Collecting Climate Data

- Using high performance computers
- Implementing numerical climate models
- Simulating past climate conditions using algorithms
- Same for future predictions

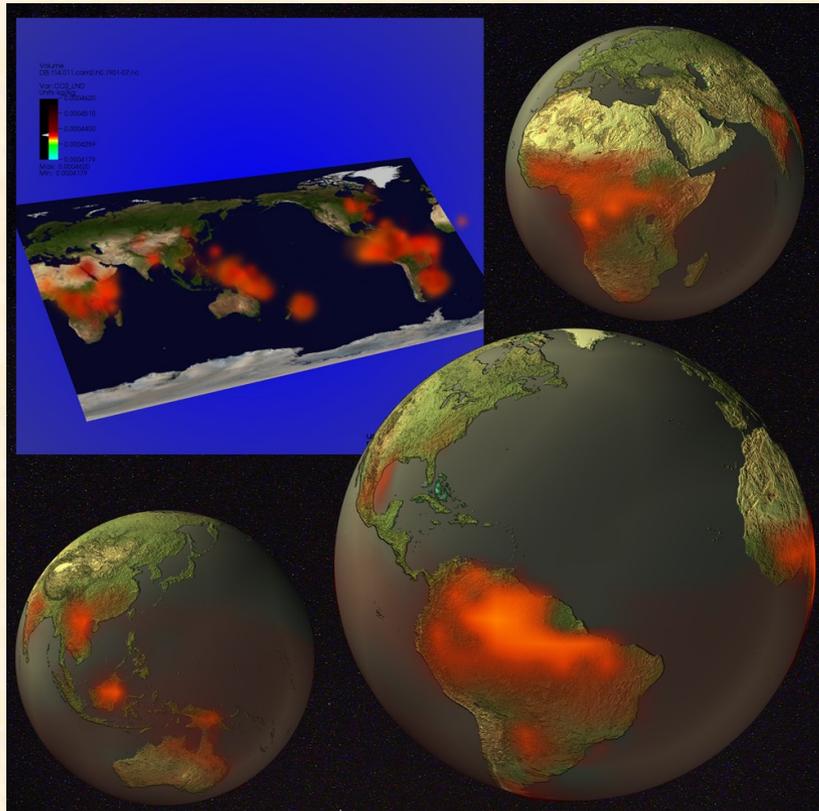


Visualizing Climate Data



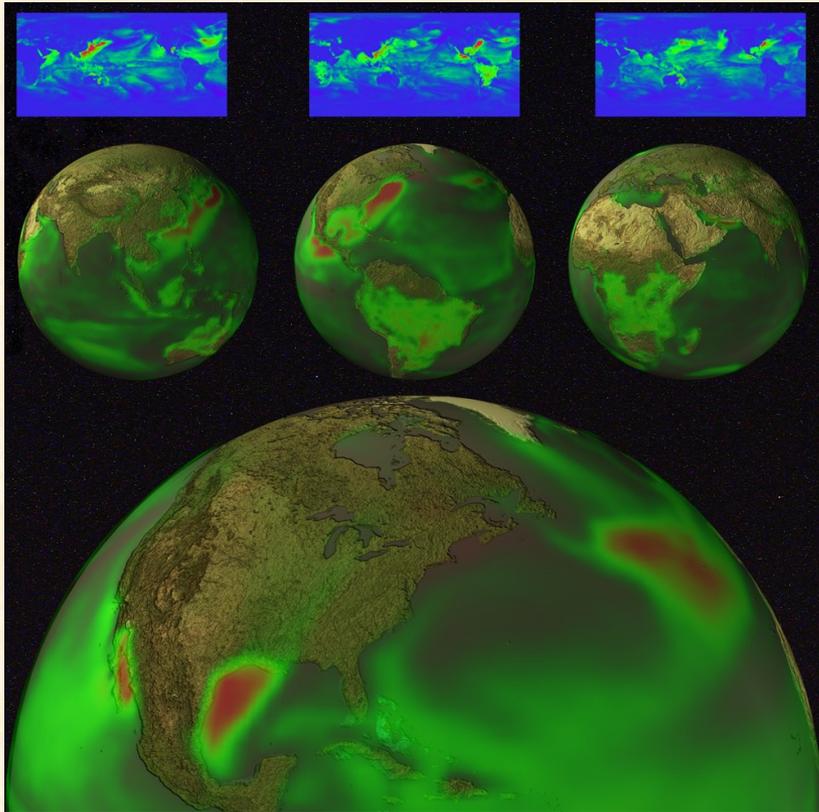
- Transforming results/data into 2D or 3D images
- Using software: Maya, VisIt, Photoshop
- Showing interesting results
- Make it look “pretty”
- Presented on EVEREST

Carbon Dioxide in the Atmosphere



- Mathematically simulated results
- CO2 in Earth's atmosphere, Summer 1901
- Effects of industrialization
- Rendered in VisIt
- Converted to Maya

Heat Fluctuation



- **Mathematically simulated results**
- **Series of simulated images, 6 hours per frame**
- **Heat flux in the 21st century**
- **Observe dramatic changes in flux**
- **Rendered in Maya**

Acknowledgments

The Research Alliance in Math and Science program is sponsored by the Mathematical, Information, and Computational Sciences Division, Office of Advanced Scientific Computing Research, U.S. Department of Energy.

The work was performed at the Oak Ridge National Laboratory, which is managed by UT-Battelle, LLC under Contract No. De-AC05-00OR22725. This work has been authored by a contractor of the U.S. Government, accordingly, the U.S. Government retains a non-exclusive, royalty-free license to publish or reproduce the published form of this contribution, or allow others to do so, for U.S. Government purposes.