Mission: To observe and understand the Earth system and to develop products through a commitment to research that will advance NOAA’s environmental information and service on global-to-local scales.
• To 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.
Earth System Science: In order to understand any of it, we must understand how it ALL works together.
"End to End"
Earth System Science

Physical Phenomena
Observations  Scientific Study  Analysis Model  Prediction Model

Societal Benefits
  Health
  Disasters
  Weather
  Energy
  Water
  Climate
  Agriculture
  Ecosystems
  Oceans
Pipeline Theory of Improving Prediction

“Where we are now”

“Where we would like to be”
Road Map of the high-end Earth System Modeling
A plan by NOAA researchers to develop the world's best model for weather and climate prediction.

**2006-2013**: The “Geodesic Grid” Planet Simulator, 3rd generation non-hydrostatic finite-volume model with 1-4 km or finer resolution.

**Primary model for:**

- Medium Range Weather Prediction 0 to 2 weeks, including improve hurricane track and intensity.
- Seasonal to Inter-annual Prediction 2 weeks to 2 years
- Decadal to Centennial projection
Predicting the Future Depends on Better understanding of the Past

Earth System Analysis Model

Improved:
- Detection
- Attribution
- Projection
- Prediction

A few Petabytes ($10^{15}$)
Environmental data collected between 1850-2005

Exabytes ($10^{18}$) coming!

GEOSS Data