

**Earth observations, independent
empirical data, adaptive learning,
and environmental evaluations ...**

**... could this be a systematic
approach to acquiring the
observational evidence?**

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**U.S. EPA, Office of Research & Development
Environmental Evaluators Networking Forum
June 8, 2009**



Presentation Contents:

- ***What's GEOSS and why should environmental evaluators care about GEOSS?***
 - ***GEOSS analogies:***
 - ***'System of Systems' -- ATMs;***
 - ***Sensor Networks -- monitoring environments and persons***
- ***GEOSS aspires to enable better predictions and decisions for the benefit of society***
- ***Two examples:***
 - ***Air quality, environmental health decision-making, and public health benefits***
 - ***Weather forecasting improvements over past 30 years***
- ***Evaluation of GEOSS; outcomes and impacts***





GEOSS

Global Earth Observation System of Systems

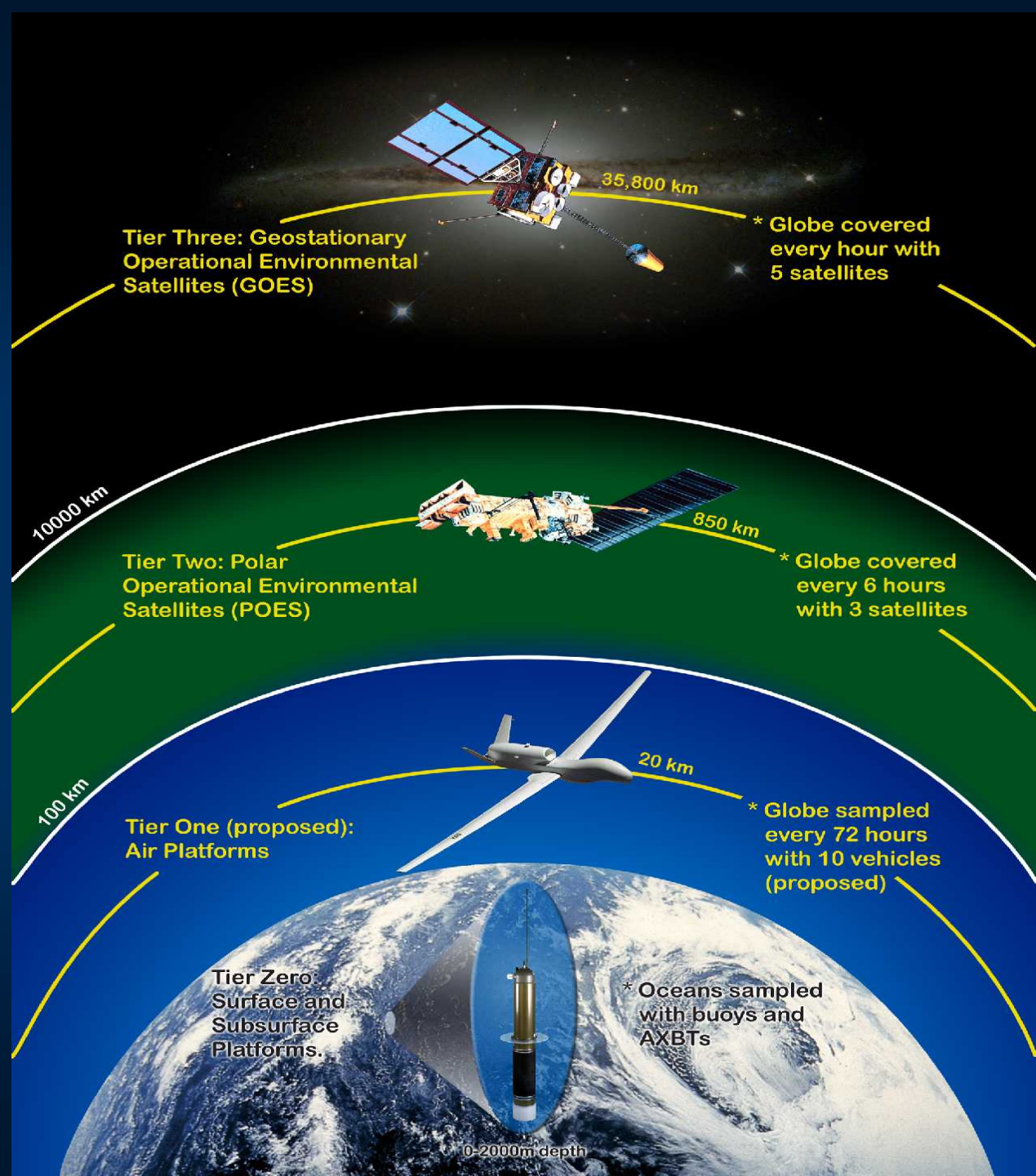
Taking the pulse of the planet by linking observations, models, and analysis to information for decisions and living.

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GEOSS -
Linking data
from satellite
sensors, aerial
sources and
ground-based
monitors on
land, ocean
and air to help
us think
globally and
act locally to
protect human
health and the
environment.



Why GEOSS?

The more we understand the Earth, the better stewards we become.



Climate Change



Energy Resources




Ocean Resources



Disasters



Weather



Sustainable Agriculture



Water Resources



Ecological Forecasts



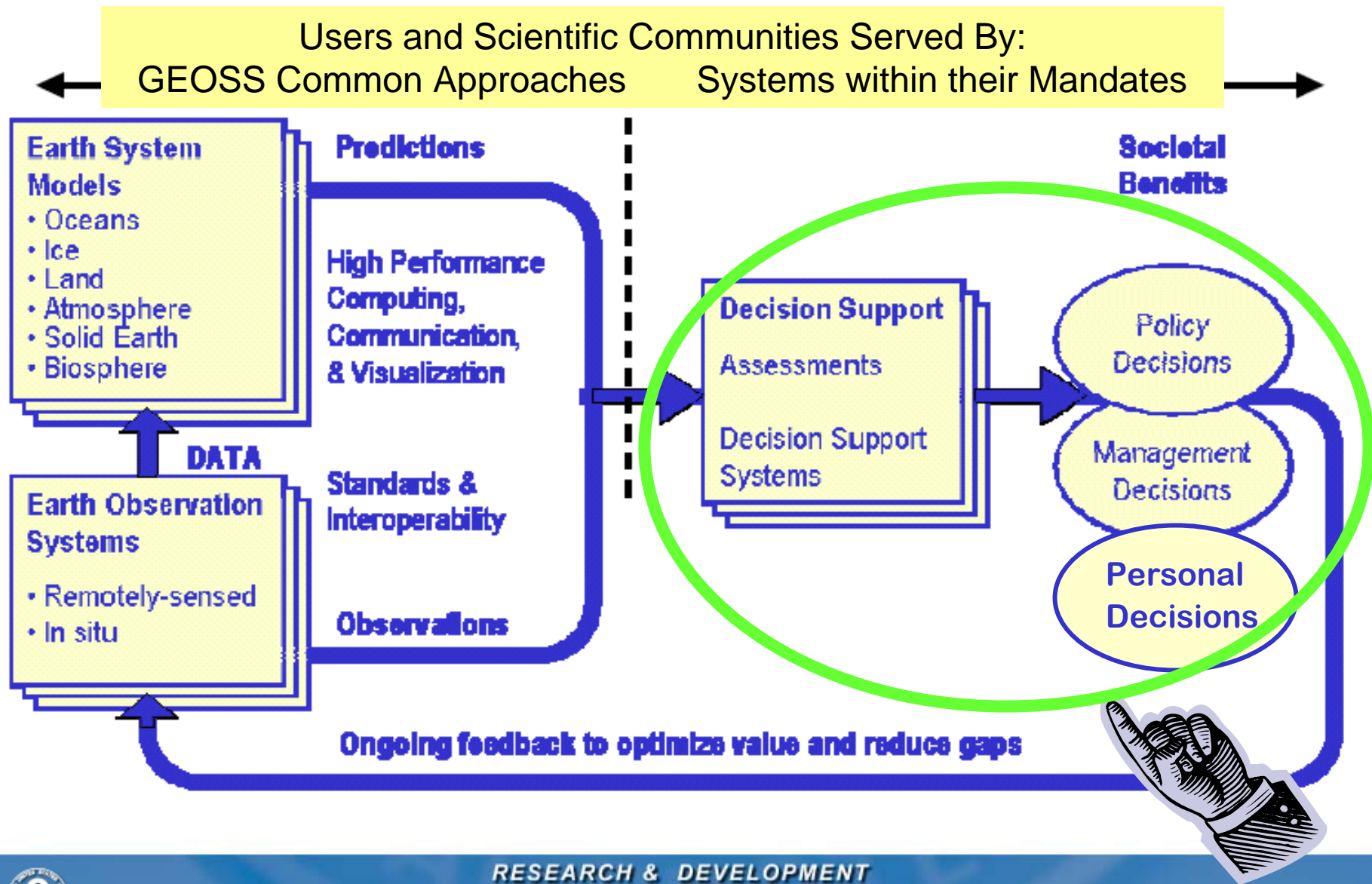
Human Health



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The GEOSS Architecture



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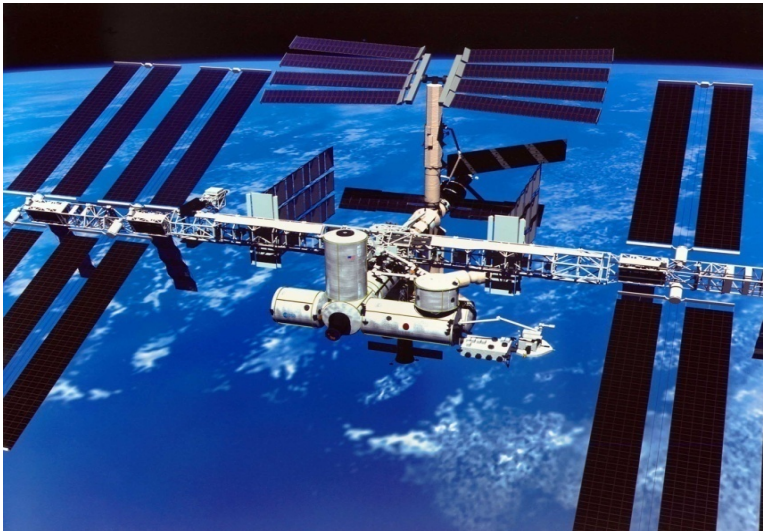
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Monitoring – how many sensors?



Biosphere 2 –over 750



ISS –over 2000



Shuttle Atlantis –over 1000

Genes –Thousands on one chip



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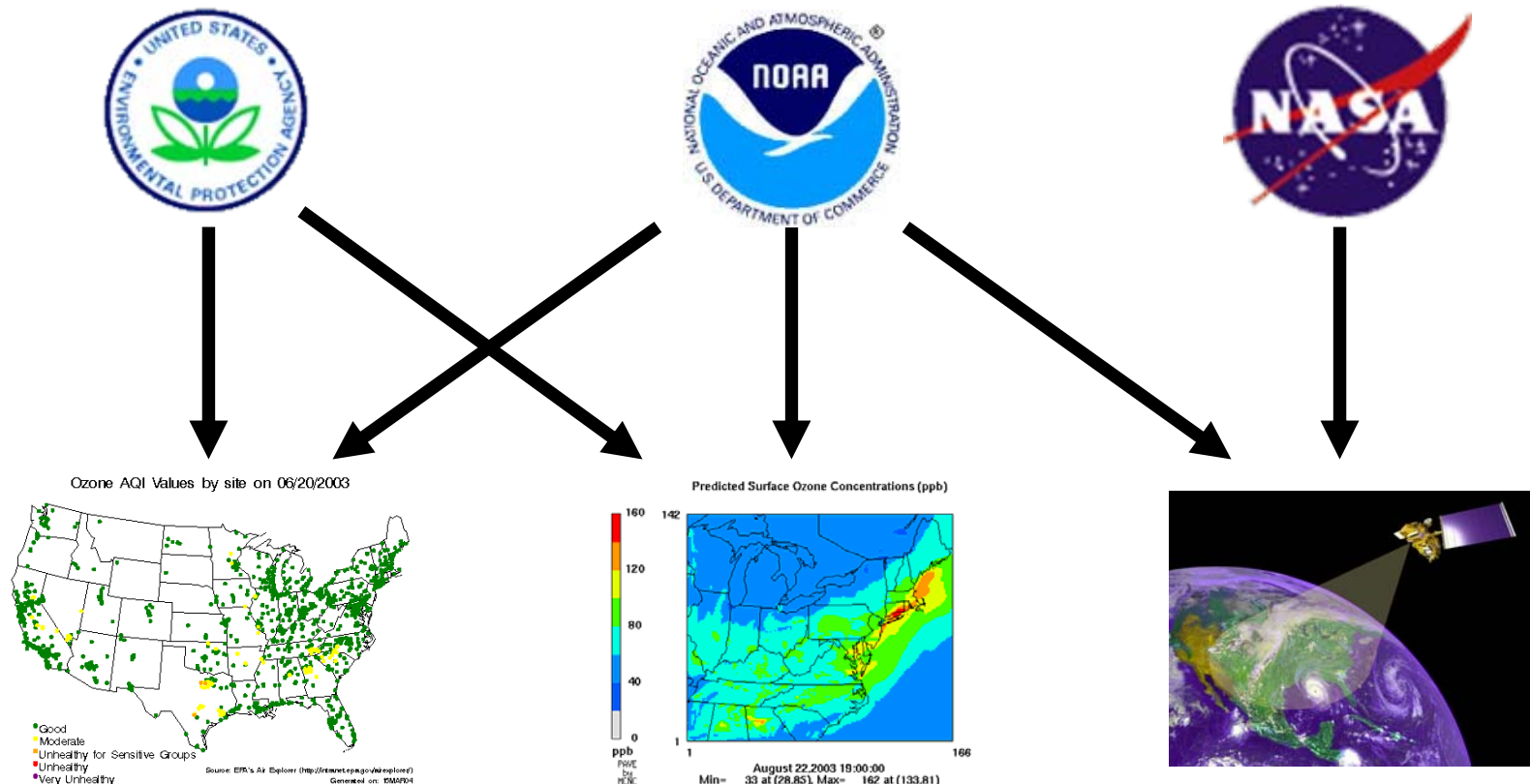
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Partnerships & collaboration; an example characterizing air quality



Monitoring



Modeling



Satellites

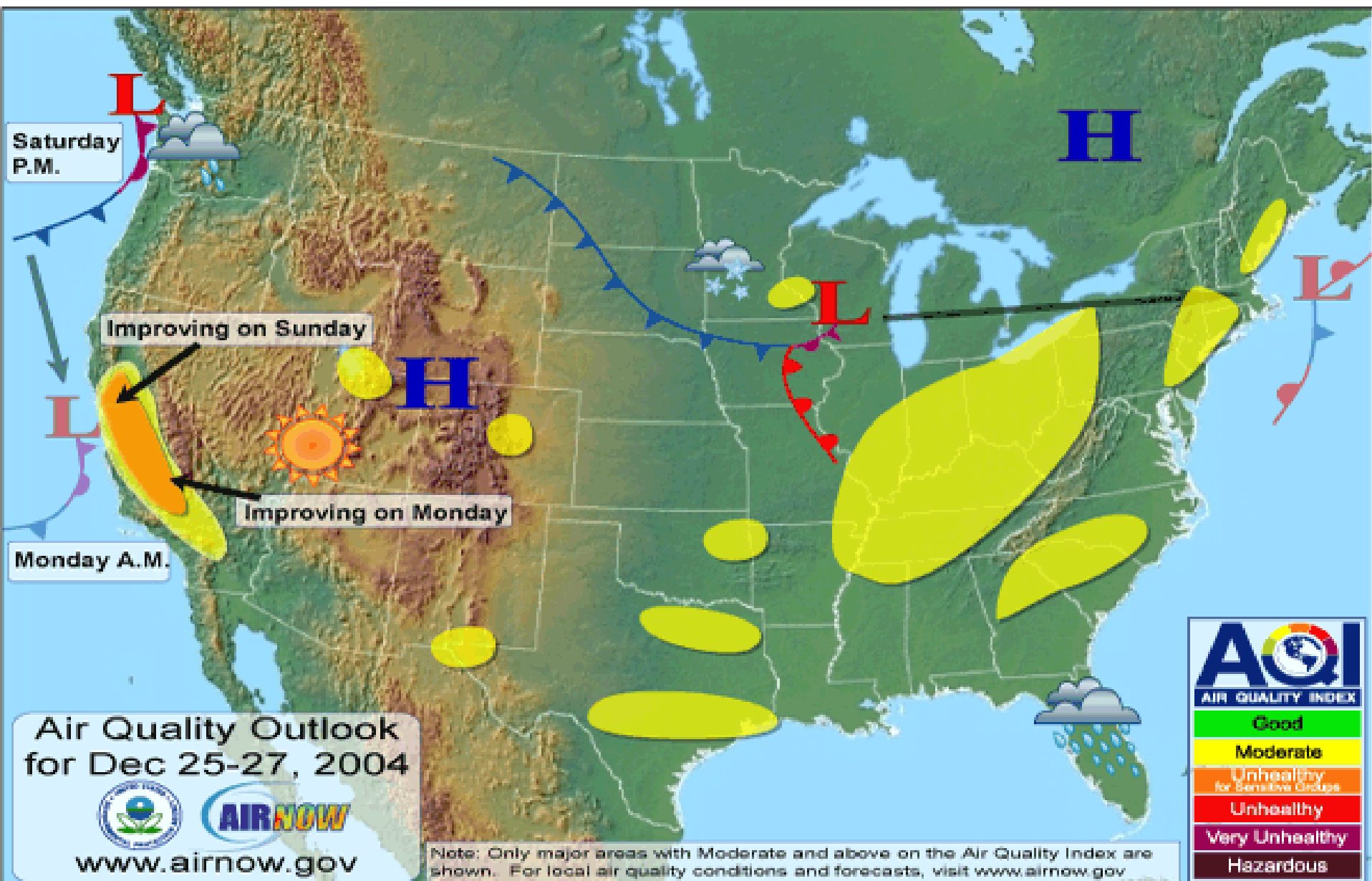


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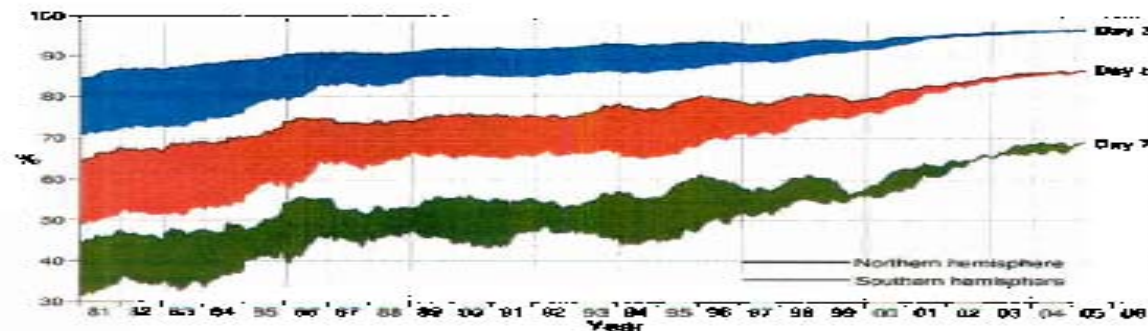
Quality of Air Means Quality of Life

[Home](#)[National Forecast](#)[Local Forecasts & Conditions](#)[Partners](#)**AIRNOW**www.airnow.gov

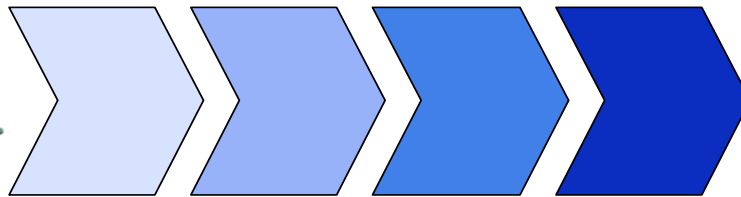
Improved Environmental Health Decision-Making, Patterned after Improvements in Weather Forecasting

Sidebar 1.1 Improvements in Weather Forecasting Resulting from Satellite Observations

One of the greatest societal benefits provided by Earth sciences in the past 30 years has been the steady improvement of weather forecasts. The chart shows the monthly moving average of the correlation (a perfect forecast is 100 percent) between observed and forecast weather features for 3-day, 5-day, and 7-day forecasts. The accuracy of forecasts of large-scale weather patterns in both hemispheres has been increasing steadily from 1980 to 2004. The Southern Hemisphere forecast (bottom curve), which was significantly worse than the Northern Hemisphere forecast (top curve) in 1980, has caught up in accuracy in recent years. This dramatic improvement has been due largely to more and better global satellite data.



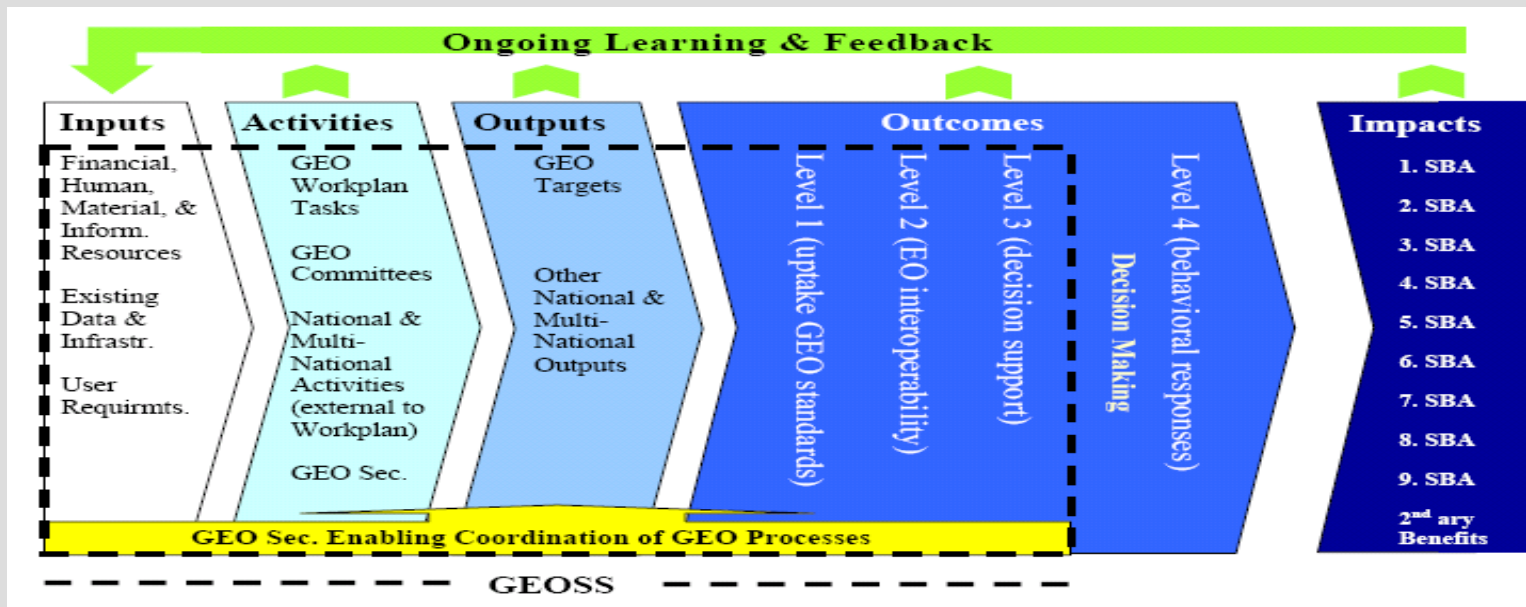
SOURCE: A.J. Simmons and A. Hollingsworth, 2002, "Some Aspects of the Improvement in Skill of Numerical Weather Prediction," *J. R. Meteorol. Soc.* 128: 647-678.



THE GLOBAL EARTH OBSERVATION
SYSTEM OF SYSTEMS



M&E Conceptual Framework



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