International Collaborations: Lessons Learned from the Atmospheric Sciences

Susan K. Avery
Woods Hole Oceanographic Institution

POGO, January 2008
The Problem

- Goal: Provide benefits to society of earth science research and observations
- Operational services and decision support needs and culture different than research needs and culture
- Earth science needs to study a complex system of interacting systems
- Traditional science is focused on the parts
- Data is scattered all around, in wildly different formats, (unintentionally) inaccessible to most and often not sustainable
- Interactions amongst different systems are difficult to see
- Interaction amongst different disciplines is rare and difficult
- Traditional institutional and geographical boundaries inhibit sustained interaction
The Sun & Earth (Land, Atmosphere, Ocean) Form a Complex System Which Has Characteristic Properties

- Prediction is difficult based on knowledge of components alone
- History matters
- Emergent features
- Negative and positive feedbacks
<table>
<thead>
<tr>
<th>Atmosphere</th>
<th>Ocean</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Knows no boundaries; global culture</td>
<td>• One ocean, many basins, nation borders</td>
</tr>
<tr>
<td>• No resource extraction or use</td>
<td>• Many resources extracted or used</td>
</tr>
<tr>
<td>• Physical, chemical environment</td>
<td>• Ocean life intimately linked to environment</td>
</tr>
<tr>
<td>• Promotion of science justified by provision of services</td>
<td>• Promotion of science driven mainly by exploration, scientific understanding of processes</td>
</tr>
<tr>
<td>• Service need requires global sustained observations</td>
<td>• Service need diffuse; not clarified</td>
</tr>
<tr>
<td>• Benefit well articulated and documented</td>
<td>• Benefit difficult to justify to stakeholders</td>
</tr>
<tr>
<td>• Variety of platforms, sensors; long history of routine measurements; well identified national ownership</td>
<td>• Variety of platforms, sensors; just beginning networked observations; diverse ownership</td>
</tr>
</tbody>
</table>
WMO provides international operational framework

- WMO is far from a perfect organization, but it has been, and is, fairly effective
- Permanent representatives are typically heads of the hydrometeorological services in their countries
- Data are shared for operational purposes
- Observing guidelines and standards are established
- Observing system intercomparisons are performed
- Optimize operational observing resources and data
- Open data policy in the U.S. has created vibrant and robust private sector that provides complementary services to those of the public sector
- Operational observing system provides backbone for research that is sustainable; research doesn’t pay for this backbone
While services are context, international science essential for evolution of services and applications

- Grand challenge questions that require international collaboration; role of cyberinfrastructure in addressing systems science
- International science planning important for developing new resources
- ICSU scientific committees
- IPCC - Does it really set stage for international science?
- WCRP – Next generation of programs?
- New integrated observational capabilities and data that improve prediction and knowledge products; development of informatics
- AMS facilitating interaction with WMO, other professional societies
What can POGO do?

- Help define and clarify initial focus and objectives for global ocean networks and data information systems; identify what is ready
- Focus on benefit areas (products); clear understanding of public value/need
- Effectively partner with other international organizations (e.g., WMO, WCRP, SCOR, GOOS/GEO). Large challenge.
- Develop next generation of international science plans (with WCRP, IGBP, SCOR, SCAR)
- Determine and advocate framework for international operational observing system collaboration
- Determine and advocate role for cyberinfrastructure in science, observing systems, and decision-support
- Next POGO meeting: focus on synthesis of OceanObs09?