The Newest Oldest Data From Seasat’s Synthetic Aperture Radar

A new suite of digital synthetic aperture radar (SAR) imagery, featuring historic views of Earth’s oceans, sea ice, volcanoes, forests, glaciers, and more, was made available in its entirety for the first time by the Alaska Satellite Facility (ASF) in midsummer 2013. The products were derived from data collected by Seasat, NASA’s first dedicated oceanographic satellite, which launched more than 35 years ago. Data from this mission are the earliest orbital SAR imagery ever gathered. Other sensors carried on board include a radar altimeter to measure spacecraft height above the ocean surface, a scatterometer to measure wind speed and direction, and a passive microwave radiometer to measure sea surface temperature. 

Although it suffered a catastrophic power failure in its fourth month of operation, in 101 days, Seasat collected more information about the oceans—its original focus—than had been acquired in the previous 101 years of shipboard research. As a result, ASF’s suite of SAR products from the mission, available to users under NASA’s open-access data policy, will help fill information gaps in cryospheric, geomorphological, and environmental time series data used to range of scientific disciplines.

Mission Background

With the launch of its Seasat mission on 28 June 1978, NASA undertook a historic task: to demonstrate the feasibility of orbital remote sensing for global ocean observations. In addition to the radar altimeter, scatterometer, and microwave radiometer, this platform hosted an L-band SAR sensor that collected imagery with a resolution of 25 meters, obtained in 10-kilometer-wide swaths covering much of North America, northern Europe, and the adjacent seas [Jeremy, 1980; Ford et al., 1980]. Seasat’s SAR data collected by the sensor allowed scientists to create images and detect surface waves, internal waves, the Gulf Stream system, the California Current, the North Pacific subtropical front, and other coastal phenomena [Fu and Holt, 1982]. More than 100 passes were recorded over the Beaufort Sea, providing insight into major morphological features, structural changes, and drift motion of sea ice. Even with the power failure on 10 October of the launch year, Seasat succeeded in its primary goal of taking oceanography into space.

During operation, Seasat utilized two basic orbital configurations at an inclination of 108°. The initial observational phase was a 77-day repeat cycle. On 8 September, the satellite was maneuvered into an exact 3-day repeat [Knudsen, 1980]. Years later, these repeat-pass data enabled scientists to pioneer the interferometric SAR technique, which provides a means to measure precise deformation from earthquakes and volcanoes, for example [Gabriel et al., 1983; Zebker et al., 1992; Zebker and Goldstein, 1986].

Seasat

NASA’s Proposed Federal Budget Sees Small Dip, Emphasizes Innovation and Autonomy in Space

NASA’s proposed federal budget for fiscal year (FY) 2015, released on 4 March, includes new plans to send a probe to Jupiter’s icy moon Europa, a ramp-up in funding for a mission to redirect an asteroid into near-Earth orbit, and plans to return to the United States the capability to launch astronauts into space, among other highlights.

This budget builds upon the steady fiscal approach to send humans to Mars in the 2020s, said NASA administrator Charles Bolden at a 4 March teleconference. “This budget ensures that the United States will remain the world’s leader in space exploration and scientific discovery for years to come.”

If the proposed budget is enacted, it would realign the administration’s commitment that NASA be a catalyst for social and economic growth, Bolden added. Through it, “we’ll continue to build on U.S. preeminence in science and technology, improve life on Earth and protect our home planet, while creating good paying jobs and strengthening the American economy,” he said. However, proposed cuts, particularly to education—which would drop nearly 24% to $88.9 million compared to the FY 2014 enacted budget—would force those reliant on eliminated funds to look for alternative sources.

NASA’s FY 2015 budget for science: 

About $7.9 billion—roughly 3.5%—is to be trimmed from NASA’s Science Mission Directorate in the FY 2015 proposed budget compared to the amount set for FY 2014. This would bring the Science Mission Directorate’s funding stream to nearly $4.97 billion. Within this cut, earth science, planetary science, and astrophysics would lose some funding, although astrophysics would get a slight boost (see Table 1). “This budget is balanced in a different way,” Bolden said. “Science is an investment for the nation, a $5 billion science budget for Science Mission Directorate provides a balanced approach for us to support our number one effort, which is to provide pathways to Mars,” Bolden said.

News cont. on page 94

Table 1. NASA’s Fiscal Year (FY) 2015 Proposed Budget Compared With the FY 2014 Enacted Budget

<table>
<thead>
<tr>
<th>Program</th>
<th>FY 2014 Enacted</th>
<th>FY 2015 Proposed</th>
<th>Percent Change</th>
<th>Proposed OGSI* Additions</th>
<th>Percent Change with OGSI Additions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science</td>
<td>$1351.2</td>
<td>$4972.0</td>
<td>−3.5%</td>
<td>$1873.7</td>
<td>+0.2%</td>
</tr>
<tr>
<td>Earth Science</td>
<td>$1826.0</td>
<td>$1770.3</td>
<td>−5.1%</td>
<td>$439.3</td>
<td>+3.1%</td>
</tr>
<tr>
<td>Planetary Science</td>
<td>$1345.0</td>
<td>$1280.3</td>
<td>−4.8%</td>
<td>$100.6</td>
<td>+4.3%</td>
</tr>
<tr>
<td>Astrophysics</td>
<td>$610.8</td>
<td>$612.7</td>
<td>+0.3%</td>
<td>$18.9</td>
<td>+0.6%</td>
</tr>
<tr>
<td>James Webb Space Telescope</td>
<td>$658.0</td>
<td>$654.5</td>
<td>−0.6%</td>
<td>$4.3</td>
<td>+0.5%</td>
</tr>
<tr>
<td>Heliophysics</td>
<td>$654.0</td>
<td>$668.9</td>
<td>+2.3%</td>
<td>$9.8</td>
<td>+0.1%</td>
</tr>
<tr>
<td>Aerosciences</td>
<td>$566.0</td>
<td>$551.1</td>
<td>−2.6%</td>
<td>$34.9</td>
<td>+6.5%</td>
</tr>
<tr>
<td>Space Technology</td>
<td>$376.0</td>
<td>$370.5</td>
<td>−1.6%</td>
<td>$5.5</td>
<td>+1.5%</td>
</tr>
<tr>
<td>Human Exploration Operations</td>
<td>$7891.2</td>
<td>$7861.4</td>
<td>−0.4%</td>
<td>$2816.0</td>
<td>+3.6%</td>
</tr>
<tr>
<td>Exploration Systems Development</td>
<td>$3135.2</td>
<td>$2784.1</td>
<td>−10.6%</td>
<td>$95.7</td>
<td>+3.1%</td>
</tr>
<tr>
<td>Commercial Spaceflight</td>
<td>$936.0</td>
<td>$884.3</td>
<td>−5.4%</td>
<td>$22.7</td>
<td>+2.7%</td>
</tr>
<tr>
<td>Exploration Research and Development (HRSP* and AESP*)</td>
<td>$832.0</td>
<td>$843.1</td>
<td>+1.3%</td>
<td>$10.6</td>
<td>+1.3%</td>
</tr>
<tr>
<td>Space Operations (ES* and Space and Flight Support)</td>
<td>$13778.0</td>
<td>$13905.4</td>
<td>++3.4%</td>
<td>$1005.6</td>
<td>+4.6%</td>
</tr>
<tr>
<td>Education</td>
<td>$116.6</td>
<td>$88.9</td>
<td>−23.8%</td>
<td>$10.0</td>
<td>−15.2%</td>
</tr>
<tr>
<td>Cross-Agency Support</td>
<td>$2791.0</td>
<td>$2778.6</td>
<td>−5.0%</td>
<td>$10.0</td>
<td>−0.3%</td>
</tr>
<tr>
<td>Construction, Environmental</td>
<td>$515.0</td>
<td>$446.1</td>
<td>−13.4%</td>
<td>$29.7</td>
<td>+6.4%</td>
</tr>
<tr>
<td>Compliance, and Restoration</td>
<td>$37.5</td>
<td>$37.0</td>
<td>−1.3%</td>
<td>$0.5</td>
<td>+1.4%</td>
</tr>
<tr>
<td>Inspector General</td>
<td>$1000.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$17,460.6</td>
<td>$17,646.5</td>
<td>−1.1%</td>
<td>$885.5</td>
<td>+4.9%</td>
</tr>
</tbody>
</table>


News cont. on page 94

Mission Background

During operation, Seasat utilized two basic orbital configurations at an inclination of 108°. The initial observational phase was a 77-day repeat cycle. On 8 September, the satellite was maneuvered into an exact 3-day repeat [Knudsen, 1980]. Years later, these repeat-pass data enabled scientists to pioneer the interferometric SAR technique, which provides a means to measure precise deformation from earthquakes and volcanoes, for example [Gabriel et al., 1983; Zebker et al., 1992; Zebker and Goldstein, 1986].

Seasat

Visit fallmeeting.agu.org.

2014 AGU Fall Meeting Session Proposals Now Open!

IN THIS ISSUE:

News: NOAA Seeks to Make Its Data More Usable, p. 95
Forum: Linking Believoground Knowledge Across Scales, p. 96
Meeting: Sharing Resources for Alsecon Arc Research, p. 97
Meeting: Environmental Change in Northwestern Canada, p. 98
Research Spotlight: Subarctic Lake Desiccation, Magma Conduit Clog, p. 100

Table 1. NASA’s Fiscal Year (FY) 2015 Proposed Budget Compared With the FY 2014 Enacted Budget
Earth Science
Earth science, which would have its funding reduced by about 3% compared to the FY 2014 enacted budget, would receive $8.83 billion in the FY 2015 budget request. This money would be used in part to launch the Soil Moisture Active Passive (SMAP) satellite, which would help scientists better understand the water, energy, and carbon cycles everywhere from the soil to the stratosphere. The Stratospheric Aerosol and Gas Experiment III (SAGE III) instrument package, which would measure water vapor, aerosols, ozone, and other gases in Earth’s atmosphere from a mount aboard the ISS, would also receive funding.

Other money for the Earth sciences would go to maintaining current satellite programs that are advancing our understanding of Earth from space. NASA is planning to launch after FY 2015. These include the Surface Water and Ocean Topography (SWOT) mission to learn more about the top layers of the world’s oceans, the Cyclone Global Navigation Satellite System (CYGNSS) to improve weather prediction, and the Geodetic Emissions: Monitoring of Pollution (TEMPO) mission to monitor major air pollutants across North America by

Planetary Science
Planetary science loses about 5% in the FY 2015 proposed budget—roughly $106 million compared to the FY 2014 enacted budget, dropping down to $2.11 billion. The money would continue development and improvement of several missions to Mars, including the Interior Exploration Using Seismic Investigations, Geodesy and Heat Transport (InSight) mission to place a lander on Mars to study its deep interior, a new Mars roving planned for launch in 2020. New funding of $15 million in FY 2015 for fund predevelopment work for a potential mission to Europa, Jupiter’s largest moon. Recent observations from the Hubble Space Telescope show that geyser on Europa’s surface is active, with liquid heated below and flowing toward the surface. Although no details on this project have yet been released, the mission that flies through these water jets could help scientists search for life outside Earth.

In addition to oceanography, sea ice tracking, and intercometor, the Seawar SAR has key applicability for the following types of studies:

• Images from Seawar SAR can be compared to mosaics of North America from the Japanese Earth Resources Satellite 1 (ERS-1), collected in 1995, and the most recent Advanced Land Observing System-1 Phased Array (type L-band Synthetic Aperture Radar) (ALOS-PAL) products from 2011. Such comparisons can help scientists detect land and boreal forest covers changes through time.

• The seven orbit cycles of 3-day repeat data can be used to show changes of deformation over known active faults in North America and Pacific Rim volcanism.

• Two international stations also came online about midway through the mission (Okinawa, Japan, and Oakhanger, United Kingdom). It is expected that the valuable asset was preserved, the raw data tapes were duplicated first in 1988 and again in 1999. If damaged, the tapes were transferred from older 30-track tapes to more durable Sony DVM-30, 15-track tapes. It is from 15 30-year-old tapes that ASR’s online archive was generated during the last week of December by the American Geophysical Union unless expressly stated.

Christina E. Kuster, Executive Director, DOI: http://www.agu.org/pubs/cos

In concert with this decoding effort, the original processed imagery was not suitable for matching historical coverage maps obtained from the National Aeronautics and Space Administration’s (NASA) Geophysical Electronic Manuscript Submissions (GEMS) and was released publicly. Mission that drives the software used in the project is the Solar and Heliospheric Observatory (SOHO), which is planned for launch in 2016 and would be the first light spacecraft to return to Earth a sample from an asteroid.

Astrophysics and Heliophysics
Astrophysics would face the largest share of cuts in the FY 2015 proposed budget—roughly 10% compared to the FY 2014 enacted budget. This $601 million drop to $670.3 million reflects a representation by NASA to focus on programs leading to near-term space missions. The mission with the largest share is the Origins-Spectral Interpretation-Resource Identification-Security-Heliophysics Explorer (OSIRIS-REx) mission, which is planned for launch in 2016 and would rendezvous with asteroid Itokawa in 2022. Although some data around AllSeas ARs are available at https://www.cos.at.allsat.edu/seasat/.


Acknowledgements
ASRF thanks Paul Rosen at the Jet Propulsion Laboratory for his guidance and support on space technology, whose guidance was invaluable to the success of this data rescue project.

References
Fu, L.-L., and B. Holt (1982), Seasat return of coastal data, JPL Publ., 82-130.
Today, ASF, utilizing a custom version of the NASA guidelines for data formatting.

Space Technology
Funding to enhance technology used in space increases by approximately 22% to $576 million in the FY 2015 budget request compared to the $576 million in the proposed FY 2015 budget—reflect the agency’s commitment to “returning space station research to Earth.” The SDO mission reflects a reprioritization by NASA to continue developing Solar Probe Plus, a probe that will fly closer than any other spacecraft to the sun.

Funds for the Human Exploration Operations—up 27% to $483.3 million over the FY 2014 enacted budget—reflect the agency’s commitment to “returning space station research to Earth.” The SDO mission reflects a reprioritization by NASA to continue developing Solar Probe Plus, a probe that will fly closer than any other spacecraft to the sun.

Boothe to commercial spaceflight operations—up 27% to $483.3 million over the FY 2014 enacted budget—reflect the agency’s commitment to “returning space station research to Earth.” The SDO mission reflects a reprioritization by NASA to continue developing Solar Probe Plus, a probe that will fly closer than any other spacecraft to the sun.

Human Exploration Operations
Funds for the Human Exploration Operations—up 27% to $483.3 million over the FY 2014 enacted budget—reflect the agency’s commitment to “returning space station research to Earth.” The SDO mission reflects a reprioritization by NASA to continue developing Solar Probe Plus, a probe that will fly closer than any other spacecraft to the sun.

Boothe to commercial spaceflight operations—up 27% to $483.3 million over the FY 2014 enacted budget—reflect the agency’s commitment to “returning space station research to Earth.” The SDO mission reflects a reprioritization by NASA to continue developing Solar Probe Plus, a probe that will fly closer than any other spacecraft to the sun.
NOAA Looks for Advice to Make Its Data Easier to Use

“There is no sector in American business that wouldn’t like to have better environmental information,” said Joseph Klimavicz, chief information officer for the National Oceanic and Atmospheric Administration (NOAA).

The agency collects an enormous amount of data from its satellites, ships, aircraft, and other instruments and is looking for ways to make the data more readily available to business sectors ranging from energy and gas to insurance and finance to agriculture and aquaculture, Klimavicz told Eos.

NOAA has issued a request for information (RFI) from industry and other organizations—including research laboratories and universities—for ideas on how to better make use of this potential treasure trove of data. The RFI, issued on 24 February, asks for information by 24 March “to determine whether capability and interest exists for establishing partnerships with NOAA for the purpose of intelligently positioning NOA’s vast data holdings in the cloud, to be co-located with easy and affordable access to computing, storage, and advanced analytical capabilities.”

The NOAA initiative follows a 5 March 2014 White House executive order, “Making Open and Machine Readable the New Default for Government Information.”

The RFI is intended to inform NOAA about the current state of industry sources, business practices, technical capability, and operational capability as well as to inform the agency on the feasibility of partnering with one or more industry partners “using cost/risk agreements,” the RFI states. “NOAA is looking for partners to incite creative uses and innovative approaches that will tap the full potential of its data, spur economic growth, help more entrepreneurs launch businesses, and to create new jobs.”

“We are a classic big data agency,” Klimavicz explained, “If we can essentially free the data and get it out there in a robust infrastructure, and do that with out asking the taxpayers to pay any more money—they already pay for the collection of the information—that’s why the RFI is out there.” He said the RFI is not only about getting the information out but also represents a change of business model. “We are looking at seeing if we can establish a private, collective model where the private sector collectively invests in creating sustainable methods to extract NOAA data, move to the cloud, and then position it with computer storage and advanced analytics.”

Some of the current hurdles to using NOAA data include locating it, Klimavicz said, and then having the time and resources to download what, in some cases, can be large databases of perhaps 100 terabytes that might be updated daily. Klimavicz said he measured the successful use of NOAA data according to “how this information has been turned into economic value.”

“I don’t think that making the bits [of data] to the cloud or several different clouds is really the impact that I’m looking for” with the RFI, he said.

“I’m looking for new businesses that haven’t even been developed yet to flourish,” he said. “What we are hoping, after we get the information out, [is] that we can help the economy in terms of creating new businesses. We are familiar with the Climate Corporation and the Weather Company and what they have done, but we think many more businesses can be created and jobs created by making this information easier to use and access.”

Klimavicz said he anticipates that the RFI will solicit widely differing views on how to proceed. He added that a goal, once the agency has reviewed responses to the RFI, is to begin making some of the data available for proposals by the end of the fiscal year.

For more information, see http://www.noaa.gov/NOAACC2.

—FLANDER SIEGELSTOCK, Staff Writer
Climate change, land use practices, and other consequences of a growing human population affect soil sustainability. Unfortunately, scientists studying belowground processes have traditionally been limited to data and models that capture intermediate spatial and temporal scales, failing to accurately characterize soil phenomena at societally relevant scales, including the larger spatial scales at which many policy decisions are made. However, traditional approaches are now changing rapidly due to the ever-increasing availability of data that span from nanometers to megameters and from seconds to millennia. Informational advances present an opportunity for new collaborations—particularly between belowground observational scientists and Earth system modelers—to link knowledge across scales to better understand the world beneath our feet.

**Limited Scales of Observation**

Important soil biogeochemical processes are typically measured at centimeter to meter scales but are influenced by factors at finer and coarser scales (Figure 1). At the finer end, carbon and other substrates are enzymatically released from within soil colloids at the nanometer scale. Scaling up, representation of dominant controls on biogeochemical processes requires data on microbial community composition and oxygen content (micrometer scale), soil structural features and plant community composition (meter scale), hydrology (kilometer scale), and land use and climate (megameter scale). Our limited ability to make direct observations of nutrient transformations and interacting drivers at multiple spatial scales often renders predictions outside the meter scale uncertain and makes it difficult to predict phenomena at larger scales.

Field-based studies of soil biogeochemical cycles typically occur at intermediate (weeks to monthly) time scales. However, significant nutrient transformations can occur during brief events (spanning minutes to hours) when substrate availability, soil moisture, temperature, and microbial populations align. Although recent advances in automated measurements of dynamic processes, such as trace gas fluxes, are becoming widespread, intermittent behaviors remain difficult to predict accurately in ecosystem models. Comparable problems plague our understanding of the temporal variability of belowground phenomena at longer (decadal) time scales; few studies capture interannual shifts in soil processes or their drivers.

**New Resources for an Outstanding Problem**

The importance of temporal and spatial scaling was recognized early in soil science’s history. Waksman [1942] commented that soil colloids (nanometer) exert effects on soil microbial processes (micrometer), which influence plant growth (meter) and field soil fertility. Nevertheless, a statement made by Ojima [1992, p. 2] more than 20 years ago still rings true today: “We are still in the early stages of dynamically linking the components of the earth system in our models. In many cases, the observations necessary to validate the [models] do not exist.” We are now in a unique position to overcome disparities between measurement resolutions and desired scales of prediction. New technology and network science are increasing our ability to explore both ends of Figure 1. Metagenomic approaches can determine how functional attributes of soil microbial communities change across biomes or in response to climate. Thus, study of microbiology now informs scales at which we can probe ecologically significant processes. New publicly available megameter-scale data sets of soil properties are emerging, such as the Harmonized World Soil Database of the United Nations Food and Agriculture Organization and those built through the Critical Zone Observatory network, the National Ecological Observatory Network, the Natural Resources Conservation Service’s U.S. General Soil Map (STATSGO), and the U.S. Geological Survey’s Geochemical and Mineralogical Data for Soils program.

We suggest three parallel efforts to leverage new data and build a comprehensive understanding of belowground processes. First, we need to strengthen commitments to collect and curate publicly available data—data sets that are not accessible are not valuable. This push must come from science networks as well as individual researchers.
Cross-scale understanding and improved predictive capacity of biogeochemical processes are critical to determine how we sustain soil health and function. This is one of the grand challenges of our time. We recognize that meeting this challenge is a tall order, but as we expand our ability to see across scales, we are positioned to produce unique data sets and build new knowledge across scales through cooperative action.

In particular, we need data on abiotic and biotic features across scales to better resolve mechanisms underlying soil biogeochemical processes, drivers, and feedbacks. We emphasize that collaborative efforts are needed to produce process-based models that provide a full range of spatial and temporal scales.

Finally, both efforts will require interdisciplinary collaboration, likely driven by scientists currently in training. They must have access to academic programs that provide appropriate quantitative skills to query and analyze large data sets, along with broad understanding of global issues affecting soils. We emphasize that collaborative efforts must work toward producing process-based models that incorporate biology, chemistry, and physics to understand controls on soil biogeochemical processes. Although daunting, similar approaches have been applied elsewhere. The biogeochemical and biogeohistorical scales of vegetation have been explored by integrating species-specific leaf gas exchange measurements, eddy flux data, remote sensing, and Earth system models [e.g., Bonan et al., 2012]. Comparable approaches belowground are being developed in the study of soil organic matter as an ecosystem property. Nature 479, 45–50, doi:10.1038/nature10386.

A primary objective of the meeting was to gauge the level of interest in shared logistic facilities to lower research costs and maximize National Science Foundation (NSF) funding for fieldwork. Several participants gave brief presentations on existing data and potential sites for joint work. Participants also discussed how to best share existing samples and data so as not to duplicate prior field campaigns. Workshop attendees determined that a logistical manager or office may be needed to coordinate efforts once a field facility is in place. A key workshop outcome was a virtual field campaign platform that includes a ship and helicopter. This could be in the form of a shared facility for fieldwork and research be conducted with a small (80- to 120-foot) boat capable of supporting helicopter operations, or in a larger University National Oceanographic Laboratory System (UNOLS) vessel with a helicopter required? Finally, could cost-effective research be conducted with a small (80- to 120-foot) boat capable of supporting helicopter operations, or in a larger University National Oceanographic Laboratory System (UNOLS) vessel with a helicopter required?

Participants also discussed how to best share existing samples and data so as not to duplicate prior field campaigns. Workshop attendees determined that a logistical manager or office may be needed to coordinate efforts once a field facility is in place. A key workshop outcome was a virtually seamless vote in support of developing shared field platforms that include a ship and helicopter. This could be in the form of a ship with a helicopter or perhaps a combination of a smaller ship and chartered helicopters based at airstrips with commercially available fuel (in the oceanic arc, these are on the Unalaska, Atka, and Adak islands). Such a facility could be used to support research in the Aleutian arc so that the cost per project could be reduced.

Field campaigns in the Aleutians are logistically challenging and expensive unless research is conducted in the vicinity of one of the few airstrips, which are widely spaced along the more than 2500 kilometers of plate boundary. Further, an ambitious approach is required for collecting geological, geophysical, and geodetic data from the numerous active volcanoes.

A primary objective of the meeting was to gauge the level of interest in shared logistic facilities to lower research costs and maximize National Science Foundation (NSF) funding for fieldwork. Several participants gave brief presentations on existing data and potential sites for joint work. Participants also discussed how to best share existing samples and data so as not to duplicate prior field campaigns. Workshop attendees determined that a logistical manager or office may be needed to coordinate efforts once a field facility is in place. A key workshop outcome was a virtually seamless vote in support of developing shared field platforms that include a ship and helicopter. This could be in the form of a ship with a helicopter or perhaps a combination of a smaller ship and chartered helicopters based at airstrips with commercially available fuel (in the oceanic arc, these are on the Unalaska, Atka, and Adak islands). Such a facility could be used to support research in the Aleutian arc so that the cost per project could be reduced.

Field campaigns in the Aleutians are logistically challenging and expensive unless research is conducted in the vicinity of one of the few airstrips, which are widely spaced along the more than 2500 kilometers of plate boundary. Further, an ambitious approach is required for collecting geological, geophysical, and geodetic data from the numerous active volcanoes.

A primary objective of the meeting was to gauge the level of interest in shared logistic facilities to lower research costs and maximize National Science Foundation (NSF) funding for fieldwork. Several participants gave brief presentations on existing data and potential sites for joint work. Participants also discussed how to best share existing samples and data so as not to duplicate prior field campaigns. Workshop attendees determined that a logistical manager or office may be needed to coordinate efforts once a field facility is in place. A key workshop outcome was a virtually seamless vote in support of developing shared field platforms that include a ship and helicopter. This could be in the form of a ship with a helicopter or perhaps a combination of a smaller ship and chartered helicopters based at airstrips with commercially available fuel (in the oceanic arc, these are on the Unalaska, Atka, and Adak islands). Such a facility could be used to support research in the Aleutian arc so that the cost per project could be reduced.

Field campaigns in the Aleutians are logistically challenging and expensive unless research is conducted in the vicinity of one of the few airstrips, which are widely spaced along the more than 2500 kilometers of plate boundary. Further, an ambitious approach is required for collecting geological, geophysical, and geodetic data from the numerous active volcanoes.

A primary objective of the meeting was to gauge the level of interest in shared logistic facilities to lower research costs and maximize National Science Foundation (NSF) funding for fieldwork. Several participants gave brief presentations on existing data and potential sites for joint work. Participants also discussed how to best share existing samples and data so as not to duplicate prior field campaigns. Workshop attendees determined that a logistical manager or office may be needed to coordinate efforts once a field facility is in place. A key workshop outcome was a virtually seamless vote in support of developing shared field platforms that include a ship and helicopter. This could be in the form of a ship with a helicopter or perhaps a combination of a smaller ship and chartered helicopters based at airstrips with commercially available fuel (in the oceanic arc, these are on the Unalaska, Atka, and Adak islands). Such a facility could be used to support research in the Aleutian arc so that the cost per project could be reduced.

Field campaigns in the Aleutians are logistically challenging and expensive unless research is conducted in the vicinity of one of the few airstrips, which are widely spaced along the more than 2500 kilometers of plate boundary. Further, an ambitious approach is required for collecting geological, geophysical, and geodetic data from the numerous active volcanoes.

A primary objective of the meeting was to gauge the level of interest in shared logistic facilities to lower research costs and maximize National Science Foundation (NSF) funding for fieldwork. Several participants gave brief presentations on existing data and potential sites for joint work. Participants also discussed how to best share existing samples and data so as not to duplicate prior field campaigns. Workshop attendees determined that a logistical manager or office may be needed to coordinate efforts once a field facility is in place. A key workshop outcome was a virtually seamless vote in support of developing shared field platforms that include a ship and helicopter. This could be in the form of a ship with a helicopter or perhaps a combination of a smaller ship and chartered helicopters based at airstrips with commercially available fuel (in the oceanic arc, these are on the Unalaska, Atka, and Adak islands). Such a facility could be used to support research in the Aleutian arc so that the cost per project could be reduced.

Field campaigns in the Aleutians are logistically challenging and expensive unless research is conducted in the vicinity of one of the few airstrips, which are widely spaced along the more than 2500 kilometers of plate boundary. Further, an ambitious approach is required for collecting geological, geophysical, and geodetic data from the numerous active volcanoes.

A primary objective of the meeting was to gauge the level of interest in shared logistic facilities to lower research costs and maximize National Science Foundation (NSF) funding for fieldwork. Several participants gave brief presentations on existing data and potential sites for joint work. Participants also discussed how to best share existing samples and data so as not to duplicate prior field campaigns. Workshop attendees determined that a logistical manager or office may be needed to coordinate efforts once a field facility is in place. A key workshop outcome was a virtually seamless vote in support of developing shared field platforms that include a ship and helicopter. This could be in the form of a ship with a helicopter or perhaps a combination of a smaller ship and chartered helicopters based at airstrips with commercially available fuel (in the oceanic arc, these are on the Unalaska, Atka, and Adak islands). Such a facility could be used to support research in the Aleutian arc so that the cost per project could be reduced.

Field campaigns in the Aleutians are logistically challenging and expensive unless research is conducted in the vicinity of one of the few airstrips, which are widely spaced along the more than 2500 kilometers of plate boundary. Further, an ambitious approach is required for collecting geological, geophysical, and geodetic data from the numerous active volcanoes.

A primary objective of the meeting was to gauge the level of interest in shared logistic facilities to lower research costs and maximize National Science Foundation (NSF) funding for fieldwork. Several participants gave brief presentations on existing data and potential sites for joint work. Participants also discussed how to best share existing samples and data so as not to duplicate prior field campaigns. Workshop attendees determined that a logistical manager or office may be needed to coordinate efforts once a field facility is in place. A key workshop outcome was a virtually seamless vote in support of developing shared field platforms that include a ship and helicopter. This could be in the form of a ship with a helicopter or perhaps a combination of a smaller ship and chartered helicopters based at airstrips with commercially available fuel (in the oceanic arc, these are on the Unalaska, Atka, and Adak islands). Such a facility could be used to support research in the Aleutian arc so that the cost per project could be reduced.
AGU CHAPMAN CONFERENCE ON LOW-FREQUENCY WAVES IN SPACE PLASMAS

The objective of this conference is to develop a deeper understanding of the fundamental physics of low-frequency waves, including the generation mechanisms and propagation modes, the interaction of the waves with space plasmas and energetic particles, and their applications to various areas.

Deadline for applications: 30 March 2014

Space Weather

AGU seeks a dynamic, well-organized editor with high editorial standards, and strong leadership skills to serve a 4-year term as the editor in chief for Space Weather.

An active scientist, well known and well regarded in his or her discipline, the editor in chief is the principal architect of the scientific content of the journal.

Responsibilities include:
• Act as an ambassador to the author/editor/reviewer/scientist community.
• Set the strategy for the journal.
• Lead the editor selection process.
• Assign and balance review work load.
• Make decisions of ethics.
• Review and contribute to periodic monitoring reports.
• Conduct and attend meetings.

Journal Scope: Space Weather is an online publication devoted to the emerging field of space weather and its impact on technical systems, including telecommunications, electric power, and satellite navigation.

For more information regarding the scope of work and editorial philosophy, visit http://publications.agu.org/journals/editor/editor-search/. To be considered as a candidate or to recommend a highly qualified colleague, please send a letter of interest and curriculum vitae via email to submissions@agu.org. Please specify Space Weather in the subject line of the email.

Deadline for applications: 16 April, 11:59 P.M. EDT

Have an Idea or Topic to Present at the Fall Meeting?

Submit A Session Proposal

Deadline: 16 April, 11:59 P.M. EDT

You must be current in your 2014 membership dues in order to propose a session.

fallmeeting.agu.org

Observation, Diagnosis, and Prediction of Environmental Change in Northwestern Canada

First Annual General Meeting of the Changing Cold Regions Network: Saskatoon, Saskatchewan, Canada, 21–23 October 2013

Ongoing and rapid environmental change within western and northern Canada is of major societal and scientific concern and has local to global-scale implications. There is an urgent need to understand the changes and develop improved diagnostic and predictive modeling tools to manage uncertain futures.

The Changing Cold Regions Network (CCRN) addresses these challenges, focusing on the detection, analysis, and modeling of change across a range of spatial scales over this geographic domain, including the Saskatchewan and Mackenzie river basins. CCRN brings together a team of more than 50 Canadian university and government scientists, as well as prominent international collaborators, with funding over 5 years (2013–2018) from the Natural Sciences and Engineering Research Council of Canada. Fourteen Water, Ecosystem, Cryosphere and Climate (WECC) Observatories provide new and legacy data for key biomes, including the Rocky Mountain cordillera, the prairies, the boreal forest, and the subarctic tundra. CCRN builds on a strong platform of previous work (e.g., the Mackenzie Global Energy and Water Exchanges (GEWEX) study and the Improved Processes and Parameterization for Prediction in Cold Regions Hydrology network).

CCRN held its first annual meeting in Saskatoon, with 42 participants from Canada, Europe, and the United States. The meeting focused on progress and developments in each of CCRN’s five major themes: (1) observed Earth system change in cold regions—inventory and statistical evaluation; (2) improved understanding and diagnosis of local-scale change; (3) scaling for improved atmospheric modeling and river basin-scale prediction; (4) analysis and prediction of regional- and large-scale variability and change; and (5) community outreach and engagement.

What’s on the Web?

Read the latest offerings from the AGU/Biosphere:


Mountain Beltway: “Friday fold: Obsidian on display at ASU” (http://ow.ly/jhyiJ)

Terra Central: “Wetlands and flood mitigation: The 10 percent solution” (http://ow.ly/spxqk)

Dan’s Wild Wild Science Journal: "Why your car is covered with an inch of ice, instead of a foot of snow!” (http://ow.ly/uqdPq)

In the Geoscientist blog, Evelyn Morrisey tabbed readers along on a field trip to Sutherland, a small town in South Africa’s Northern Cape province. Among the sights is the 18-meter class South African Large Telescope, the largest optical telescope in the Southern Hemisphere.

COMPLEX S-O-I Systems 2014

A Path to Improved Understanding of Complex Soil Systems

Hosted by Lawrence Berkeley National Laboratory, supported by SSSA/Bouyoucos funds and DOE Subsurface Biogeochemical Research.

This flagship conference will make a unique contribution to integrated soil sciences by addressing fundamental and emerging gaps in the current scientific knowledge, and providing a motivational framework toward an improved understanding of complex soil–plant–atmosphere systems.

Complex Soil Systems Conference will be held in Berkeley, California, near Lawrence Berkeley National Laboratory (LBNL) and UC Berkeley, September 3–5, 2014. The conference will consist of oral and poster presentations, group discussions, with the abstracts published online, and includes a welcome reception. The conference is intended to provide a forum for in-depth group discussions, for soliciting feedback on emerging concepts and engaging colleagues with similar interests of the emerging themes:

• Theme 1: Complex Soil Systems: Fundamental concepts of how soil physical, chemical and biological components and processes influence the soil–plant–atmosphere system at multiple spatial and temporal scales.
• Theme 2: Advanced In-Situ Soil Characterization and Experimentation: Quantification of total and soil pool processes using genomic, proteomic, isotopic and field biogeochemical techniques.
• Theme 3: Modeling of Soil Systems: Conceptual, theoretical, and numerical models to describe and predict soil system behavior—linear and nonlinear dynamic models, stochastic, deterministic, and deterministic-chaotic modeling approaches.
• Theme 4: Soil Systems and Global Climate Change: Integrated observations, models, and case studies that document how soils are affected and also influence global climate change at spatial and temporal scales.
• Theme 5: Using a Complex System Approach for Practical Applications: Theory and case studies from managed and unmanaged systems (agriculture, irrigation, remediation, natural ecosystems, carbon sequestration, etc.)
Horizon Marine Seeks Physical Oceanographer. Horizon Marine, Inc., in Massachusetts seeks several postdoctoral research associates and/or more senior scientists to develop and apply Earth System Models (ESMs) and other tools necessary for understanding ocean currents, climate, and marine hazards to support real-time operational decision-making in support of offshore energy industry & detailed routing reports for optimizing asset relocation projects. Experience analyzing large data sets of fields including climate dynamics, ocean and coastal/biogeochemistry, marine ecosystem dynamics, and fisheries science and management is particularly encouraged to apply. Experience analyzing data to understand ocean features and coastal representation, and ecological data assimilation. Personnel will join an active group at Princeton University and GFDL studying the connections between biogeochemistry, ecosystems and climate. This is a two-year position (subject to renewal) based at GFDL in Princeton, New Jersey. Complete applications, including a CV, publication list, 3 references in order to solicit letters of recommendation, and a one-to-two page statement of research interests should be submitted by May 31, 2014 for full consideration, though evaluation of research interests should be submitted by April 21, 2014 for full consideration, though evaluation of research interests should be submitted by March 21, 2014 for full consideration; otherwise evaluation of research interests will be ongoing. Applicants should apply online to http://jobs.princeton.edu. Requisition #140104. This position is subject to the University’s background check policy. Princeton University is an equal opportunity employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability status, protected veteran status, or any other characteristic protected by law.

New England Seeks Oceanographer. The Atmospheric and Oceanic Sciences Program at the National Oceanography Centre, National Environment Research Council, Newport, Rhode Island invites applications for an immediate opening for a postdoctoral scientist position to conduct research in our cutting-edge ocean LIDAR program. The successful candidate will conduct studies that include system modification, development of measurement approaches, testing, collecting and analyzing data, and writing reports on the impacts of LIDAR returned signals. The ocean feature set of interests can be many, although exciting, new capabilities would rank the highest. This could include refined sensing methods and algorithms on in-water optical property estimates, applications related to ocean mixing processes, particularly temperature and salinity fluctuations. Training in optics and oceanography is highly desired. Research experience in one or more the following areas is preferred: lidar system design and processing, active lidar remote sensing and/or oceanography. The candidate is expected to conduct preliminary screening of applications. For inquiries on advertising pricing and availability: E-mail: advertising@agu.org Phone: +1-202-777-7536 Fax: +1-202-777-7478

Positions Available

Horizon Marine Seeks Physical Oceanographer. Horizon Marine, Inc., in Massachusetts seeks several postdoctoral research associates and/or more senior scientists to develop and apply Earth System Models (ESMs) and other tools necessary for understanding ocean currents, climate, and marine hazards to support real-time operational decision-making in support of offshore energy industry & detailed routing reports for optimizing asset relocation projects. Experience analyzing large data sets of fields including climate dynamics, ocean and coastal/biogeochemistry, marine ecosystem dynamics, and fisheries science and management is particularly encouraged to apply. Experience analyzing data to understand ocean features and coastal representation, and ecological data assimilation. Personnel will join an active group at Princeton University and GFDL studying the connections between biogeochemistry, ecosystems and climate. This is a two-year position (subject to renewal) based at GFDL in Princeton, New Jersey. Complete applications, including a CV, publication list, 3 references in order to solicit letters of recommendation, and a one-to-two page statement of research interests should be submitted by May 31, 2014 for full consideration, though evaluation of research interests should be submitted by April 21, 2014 for full consideration, otherwise evaluation of research interests will be ongoing. Applicants should apply online to http://jobs.princeton.edu. Requisition #140104. This position is subject to the University’s background check policy. Princeton University is an equal opportunity employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability status, protected veteran status, or any other characteristic protected by law.
Canada’s subarctic lakes could face widespread desiccation

In Canada’s subarctic—the boreal ecosystem that spans most of mainland Canada—the temperature is climbing, and the snowpack is thinning. Previous research has shown that snow is disappearing even faster than sea ice.

Researchers are concerned that the decline in snow cover will spell the end of many of the country’s abundant subarctic lakes and the unique ecosystems they support. These worries are supported by recent observations that showed subarctic lakes drying out. To assess the susceptibility of subarctic lakes to widespread desiccation, Bouchard et al. spent years monitoring changes in subarctic lakes. They found that many subarctic lakes are sensitive to changes in snowmelt and that recent bouts of drying may be unprecedented in the past 200 years. (Geophysical Research Letters, doi:10.1002/2013GL058635, 2013) —CS

Migrating quake swarm may indicate magma conduit clog

On 13 January 2006, Augustine Volcano, a towering volcano offshore from the Alaska Peninsula, erupted explosively. In the days leading up to the eruption, a series of explosions and earthquake swarms had warned of the impending activity. On 12 January, 36 hours before the first magmatic explosions, a swarm of 54 earthquakes was detected across the 13-station seismic network on Augustine Island.Analyzing the seismic waves produced by the earthquakes, Buurman and West found that the earthquakes were being triggered from point sources within the magma conduit itself. Using seismic wave observations, the authors found that over the course of the 2-hour earthquake swarm, the earthquakes’ hypocenters moved 35 meters deeper into the magma conduit. This progressive deepening, the authors suggest, could have been an indication that the magma conduit was becoming clogged. This block to magma extrusion would have led to a buildup of pressure and may have contributed to the explosive eruption the next day. Augustine is a stratovolcano, a type of volcano whose eruptions can often bring dangerous pyroclastic flows. The authors hope that the detection of subtle shifts in the hypocenters of swarming earthquakes could help improve the predictability of an impending eruption. (Geophysical Research Letters, doi:10.1002/2013GL057864, 2013) —CS

---

CoLin scHuLTz, Writer