Climate change is likely to be manifested on societies around the world mainly through changes in extremes. As a result, the scientific community faces an increasing demand for regularly updated appraisals of evolving climate conditions and extreme weather. Such information would be immensely beneficial for adaptation planning.

A group of climate scientists representing the United Kingdom, the United States, Australia, Canada, and South Africa assembled on 26 January 2009 at the National Center for Atmospheric Research (NCAR), in Colorado, to discuss how to meet this challenge. This first meeting of the International Group on Attribution of Climate-Related Events (ACE) was sponsored by the Science and Innovation Network of the U.K. Foreign and Commonwealth Office (FCO) and NCAR and was organized in collaboration with the U.S. National Oceanic and Atmospheric Administration (NOAA), the Met Office Hadley Centre, and the University of Oxford.

Meeting participants concluded that research must be conducted to develop an attribution service sufficiently reliable and timely to be applied routinely. Extensive development and validation are required to produce models capable of reliably simulating and resolving processes at the appropriate scales for assessing climate effects. Intelligent use of homogenized observations, development of process understanding, and methods for generating risk estimates of extreme events are needed. Scientists must also make consistent use of terminology and close collaborative international teamwork to maintain an authoritative voice when explaining complex multifactorial events such as the catastrophic Australian wildfires of early 2009. Some other examples discussed at the meeting included the European heat wave of 2003, the prolonged drought in the southwestern United States, and the record minima in Arctic sea ice of 2007 and 2008.

The meeting participants discussed opportunities to coordinate efforts internationally, including through climate modeling experiments. They considered a variety of different modeling approaches. An analysis of European summer temperatures that compared an ensemble of typical “climate resolution” simulations with both anthropogenic and natural forcings to one with only natural forcings concluded that human influence had very likely doubled the probability of the high seasonal temperatures that were indeed observed in 2003 over this region. This serves as one example of how robust information can be presented in the face of continuing scientific uncertainty.

Scientists will likely need models with substantially higher resolution to capture the essential physical processes responsible for events such as floods. Atmosphere-only models, constrained by prescribed sea surface temperature patterns, could be used as part of a tool kit to address the causes of specific events, but atmosphere-ocean coupling and the causes of the sea surface temperatures also have to be addressed.

The group affirmed that attribution of the causes of evolving climate conditions and...
An Alaska Soil Carbon Database

**Database Collaborator’s Meeting:**

**Fairbanks, Alaska, 4 March 2009**

Soil carbon pools in northern high-latitude regions and their response to climate changes are highly uncertain, and collaboration is required from field scientists and modelers to establish baseline data for carbon cycle studies. The Global Change Program at the U.S. Geological Survey has funded a 2-year effort to establish a soil carbon network and database for Alaska based on collaborations from numerous institutions.

To initiate a community effort, a workshop for the development of an Alaska soil carbon database was held at the University of Alaska Fairbanks. The database will be a resource for spatial and biogeochemical models of Alaska ecosystems and will serve as a prototype for a nationwide community project: the National Soil Carbon Network (http://www.soilcarb.net). Studies will benefit from the combination of multiple academic and government data sets. This collaborative effort is expected to identify data gaps and uncertainties more comprehensively. Future applications of information contained in the database will identify specific vulnerabilities of soil carbon in Alaska to climate change, disturbance, and vegetation change.

Workshop attendees defined a protocol for cooperatively gathering, storing, and retrieving soils data that are important to soil carbon cycling studies. The attendees’ goal is to establish a “living” database in which easy archiving, accessing, and updating of relevant data will ensure its frequent use and revision. The design of the database will borrow from approaches already used by other ecodatabases (e.g., Natural Resources Conservation Service, FLUXNET, VegBank) but will be unique in that its structure will allow for rapid inquiries to estimate soil carbon pools at various spatial scales and soil depths. Thus, the database will be more than a simple repository of soils data because it will combine common measurements and site observations across data sets in a meaningful and usable way.

Much of the workshop discussion focused on identifying which parameters should be included in the database (e.g., percent carbon, bulk density, vegetation classification, stand maturity, landform, drainage class, geocoordinates, complete metadata, and contact information). This necessarily entailed clearly defining the parameters and using existing standards where available. Agreement on these key details facilitates a more effective compilation of the data and encourages its potential as a permanent resource.

To contribute to the Alaska Soil Carbon database, please contact Kris Johnson (ffkdj@uaf.edu). The full text of this meeting report and a list of participants can be found in the electronic supplement to this Eos issue (http://www.agu.org/eos_elec/).

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**Kris Johnson**, University of Alaska Fairbanks, Fairbanks, Alaska; E-mail: ffkdj@uaf.edu; and **Jennifer Harden**, U.S. Geological Survey, Menlo Park, Calif.

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**BOOK REVIEWS**

**Dynamic Planet: Mercury in the Context of Its Environment**

*Pamela Elizabeth Clark*  
*Springer*, 2007; xii + 219 pp.; ISBN 978-0-387-48210-1; $130.95

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Mercury, the Sun’s nearest neighbor, is tantalizingly close to the Earth yet is one of the least explored objects in our solar system. The planet’s proximity to the Sun makes Earth-based observations extremely difficult, and the harsh environment presents a significant challenge to spacecraft. Nevertheless, we are currently on the verge of a new era of exploration of this fascinating, mysterious, and largely uncharted world.

Much of our knowledge about Mercury has come from just three flybys by NASA’s Mariner 10 spacecraft in the mid-1970s. This mission sent back stunning images of about 45% of the planet’s surface and made the truly puzzling discovery of a magnetic field, the source of which is still unknown. Currently, NASA’s Mercury Surface, Space Environment, Geochemistry, and Ranging (MESSENGER) mission is beginning to explore Mercury and aims to answer many unresolved questions about the structure, composition, magnetic field, and history of this incredible world. To date, MESSENGER has conducted two flybys and is expected to go into orbit around Mercury in March 2011. Later, in 2013, the European Space Agency’s BepiColombo mission, which uses a twin spacecraft approach, will head for the planet to understand the detail of this dynamic system.

At the dawn of this new era of exploration and discovery, *Dynamic Planet* seeks to collate pre-MESSENGER knowledge about Mercury, lay the foundation for the next generation of scientific results, and contribute to the planning of future missions. The book walks the reader through an understanding of the Mercury environment, beginning by introducing the planet and the space missions, then discussing the physics of the interior, surface, exosphere, and magnetosphere. The book reviews the research in each of these areas, discusses key questions that remain unanswered, and places these questions in the wider context of solar system science. *Dynamic Planet* concludes by discussing future space missions and how these will attempt to advance our knowledge before the author argues eloquently for a further mission to conduct flybys of Mercury.

At just more than 200 pages, this book achieves its aims concisely and magnificently. The length precludes a detailed...