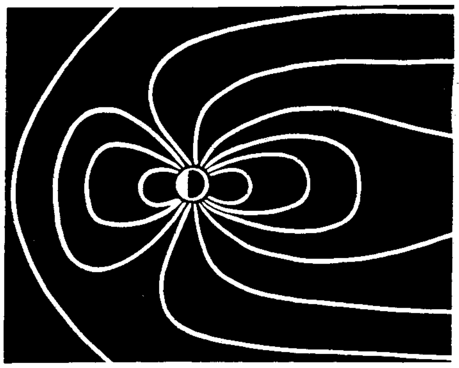
electrical resistivity, to delineate leachate plume and clay layers was illustrated with an application to the Mallard Landfill, DuPage County, Ill. According to the speaker (P. J. Carpenter, Northern Illinois University, De Kalb), electrical resistivity may be reliably used as a cost-efficient and environmentally sound alternative to drilling wells under some site-specific conditions. In the third paper, Cynthia Nevison (Stanford University, Stanford, Calif.) described a mass balance approach that permitted the estimation of recharge rates in Cape Cod, Mass., on the basis of precipitation and groundwater concentrations of selected chlorofluorocarbons. Nevinson argued that this technique is reliable and competitive with isotope-based approaches to recharge estimation. One attendee indicated that the low concentration of chlorofluorocarbons (of the order of parts per trillion) should be a matter of concern in data interpretation.

Modeling

Two interesting modeling papers were presented. First, Michael Celia (Massachusetts Institute of Technology, Cambridge, Mass.) proposed a topological network of (randomly sized) spherical modes and (randomly sized) cylindrical nodes to model a porous medium. The displacement of multiphase interphases through the network simulates the processes of imbibition and drainage typical of unsaturated flow. The model generated a lively discussion around the choice of the network's geometry and probabilistic size of nodes and links, the influence of external force fields, and experimental verification. In the second paper, the wetting of soils by trickle irrigation was modeled by finite differences. The interface and advance of the saturated surface was visualized as a moving boundary value problem. The parameterization of the numerical scheme allows for anisotropic and layered soils. Field experiments appeared to demonstrate the validity of the numerical scheme, and according to the speaker (François Lafolie, Station de Science du Sol, France), the results compared favorably with those published in previous works by researchers at Princeton University (Princeton, N.J.).

This report was contributed by Hugo A. Loaiciga, *Wright State University, Dayton, Ohio.*

SPR News



SPR News: *The focal point for scientists studying solar-planetary relationships.*

Editor: Patricia H. Reiff, Department of Space Physics and Astronomy, Rice University, Houston, TX 77251–1892. Telephone: 713-527-8101, ext. 2650; telemail: [PREIFF/EDUNET] MAIL/USA; SPAN: RICE::EOS.

Information Report

The CEDAR Data Base

PAGES 35–36

The Coupling, Energetics, and Dynamics of Atmospheric Regions (CEDAR) program is an international cooperative effort within the aeronomy community to further our understanding of Earth's upper atmosphere [*Romick et al.*, 1987]. This program will be highlighted by numerous multi-instrument measurement campaigns, and global simulations of the magnetosphere-ionosphere-atmosphere system. The results obtained from these studies promise a great leap forward in our understanding of the physics and chemistry of the atmosphere. To achieve these results, however, will require the ability to access large amounts of data from many different instruments and models. Meeting this challenge will require an unprecedented degree of cooperation among aeronomic scientists, in addition to well-planned data management systems and techniques.

The CEDAR Steering Committee, recognizing that the data management problems for a program of this scope are of the scale of several satellite projects, appointed a Data Base Committee to begin the task of attacking this problem. The Data Base Committee has completed the "First CEDAR Data Base Report" [*Sica et al.*, 1987]. This report describes the unique needs of an aeronomic data base, including data base organization, formats, browsing, and graphics. The short- and long-range objectives of the data base are also discussed. Major conclusions of the report include the following:

- The CEDAR Data Base Committee is responsible for providing an interface between the Central Data Facility (the National Center for Atmospheric Research, hence NCAR, in Boulder, Colo.), data suppliers, and data users, whose responsibilities are discussed in this report.
- Software resources should be shared throughout the CEDAR community. This sharing involves the use of networks to access various software tools (and ultimately instruments) at remote sites.
- The CEDAR Data Base will at first store only basic geophysical and derived parameters that cannot be easily obtained from the basic geophysical parameters. Raw and basic data will be available from the data supplier.
- The suggested initial data format is the NCAR tape format.
- To begin data base activities, a dedicated minicomputer will be obtained and operated at NCAR. Connections to SPAN (the Space Physics Analysis Network) and NSFnet are considered essential and will be a priority item. The data base machine should be easy to access and productive for users. Investigations into interactive user interfaces and graphics will be pursued.
- Data sharing with the National Aeronautics and Space Admnistration (NASA), National Oceanic and Atmospheric Administration (NOAA), Department of Defense (DOD), and other government agencies will be useful to the community and should be fostered.
- The CEDAR Data Base Committee will investigate alternative forms of storage media (in addition to 9-track magnetic tape) and commercial graphics and data base management systems that may be of use to the CEDAR community.

It should be self-evident to the geophysics community that when sophisticated multisite and multi-instrument campaigns are undertaken, uniformity of measurement calibration, analysis, and formatting is paramount. The sharing of software avoids unnecessary duplication of effort. One key to a successful scientific program is rapid electronic communications among the participating universities and research centers. Therefore networking of many locations in the United States and abroad is desirable. Accessing remote machines and communicating with electronic mail, once interesting curios, are now necessary tools for cooperative scientific programs. Ultimately, the CEDAR network may expand to allow experimenters to control their equipment at remote observatories, in addition to analyzing the measurements and making them available to other users of the data base.

The initial plans for the data base call for a dedicated minicomputer to be available at NCAR. Graphics and data base software will be acquired to allow users to access the system through SPAN or NSFnet, in addition to being able to obtain large amounts of data via magnetic media. In the future, optical disk technology may be used to handle large volume data sets, such as those produced by imaging devices.

Group leaders have been chosen to represent spectroscopy (C. Deehr, University of Alaska, Fairbanks, and S. Chakrabarti, University of California, Berkeley), incoherent scatter radar (V. Wickwar, SRI International, Menlo Park, Calif.), Lidar (C. Gardner, University of Illinois, Urbana-Champaign), modeling (C. Fesen, University of Colorado, Boulder), interferometry (C. Tepley, Arecibo Ionospheric Observatory, Arecibo, Puerto Rico), Middle Atmospheric Radars (J. Forbes, Boston University, Boston, Mass.), and imaging (M. Mendillo, Boston University). The group leaders are given the difficult task of ensuring that high-quality measurements and model outputs are provided to the data base. These group leaders are responsible for organizing the members of their disciplines and for formulating calibration and analysis criteria for the various instruments. They will also define time lines for submission of data to the data base.

The "First CEDAR Data Base Report" discusses in detail many of the aspects of the proposed data base system. We are soliciting comments from the community on whether the proposed data base system will support the CEDAR science objectives adequately. Copies of the report can be obtained from A. Richmond at NCAR (HAO, Box 3000, Boulder, CO 80307). Comments on the report should be forwarded to the CEDAR Data Base Committee (R. Sica, Chairman; Utah State University, UMC 34, Logan, UT 84322).

References

Romick, G. J., T. L. Killeen, D. G. Torr, B. A. Tinsley, and R. A. Behnke, CEDAR: An aeronomy initiative, *Eos Trans. AGU, 68*, 19, 1987.

Sica, R. J., A. D. Richmond, B. A. Emery, S. Chakrabarti, and V. B. Wickwar, The First CEDAR Data Base Report, Natl. Ctr. for Atmos. Res., Boulder, Colo., 1987.

This report was contributed by R. Sica.

Meetings

Meeting Report

Pre-Drilling Data Review and Synthesis for the Long Valley Caldera, California

PAGES 43–45

Introduction

A 2-day symposium was held at the Lawrence Berkeley Laboratory (LBL) on March 17–18, 1987, to review a large body of scientific investigations for the Long Valley Caldera and to discuss concepts and models for the present-day magmatic-hydrothermal system. Speakers at the symposium also addressed the problem of where to locate future scientific drill holes in the caldera.

Deep scientific drilling projects such as those being contemplated by the U.S. Department of Energy (DOE) Geothermal Technologies Division (GTD), under the Magma Energy Program, and by the DOE Office of Basic Energy Sciences (OBES) along with the U.S. Geological Survey (USGS) and the National Science Foundation (NSF), under the Continental Scientific Drilling Program (CSDP), will be major and expensive national undertakings that will require strong support from geoscientists and engineers and from industry and government-supported laboratories. DOE/OBES is sponsoring a program of relatively shallow core holes (less than 1 km) in the caldera, and DOE/GTD is considering the start of a deep (6-km) hole for geophysical observations and sampling of the near-magmatic environment as early as fiscal year (FY) 1988.

The Long Valley caldera (Figure 1), whose main stage of volcanism was the eruption of the Bishop Tuff (0.73 Ma), has been selected as a prime candidate area for thermal regimes scientific drilling. Long Valley is among the most intensively studied Quaternary ash flow volcanos in the world, and it exhibits evidence for magma at depths accessible to the drill. The caldera is also being studied and monitored by USGS because of potential seismic and volcanic hazards to the nearby town of Mammoth Lakes.

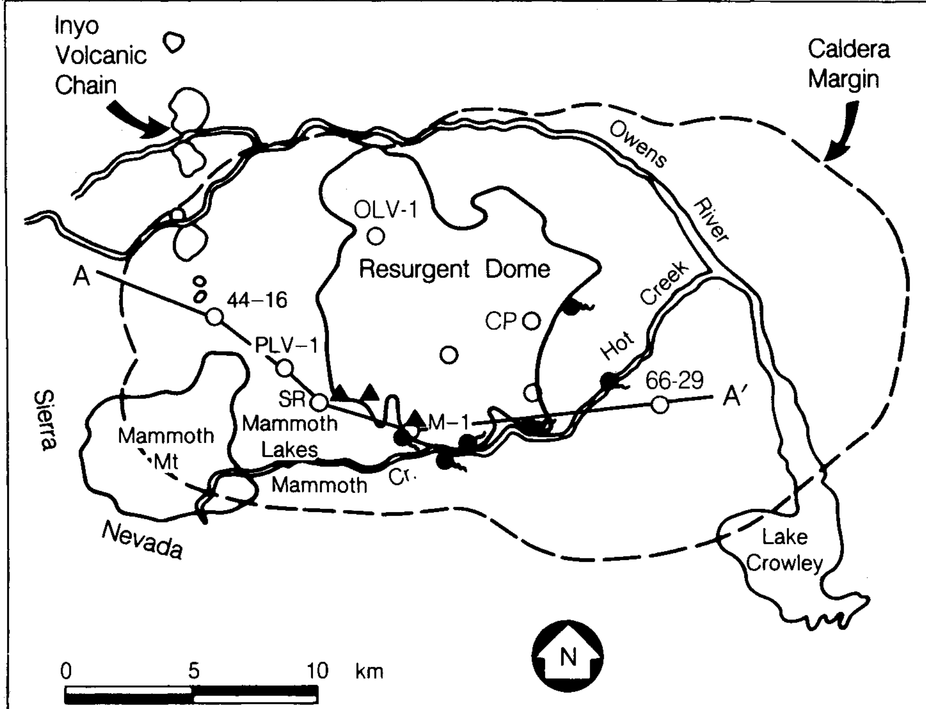


Fig. 1. Map of Long Valley Caldera showing major geologic features and locations of deep test wells (open circles) and active thermal features (hot springs are indicated by solid circles with tails, fumaroles by solid triangles). SR designates the Shady Rest hole, and M-1 locates Casa Diablo Hot Springs. Cross section A–A′ is shown in Figure 3.

The arguments for a crustal body of magma have been reinforced by the intense earthquake activity, crustal deformation within the caldera, and soil gas and steam discharges that have occurred since 1978 [*Savage and Clark*, 1982]. Some investigators have attributed the unrest to the injection of magma at depths as shallow as 5 km.

One site proposed for a hole to magma is near the center of the resurgent dome. This suggestion is based the site's proximity to a number of geophysical anomalies [*Rundle et al.*, 1985, 1986]. Other candidate drill sites are in the western part of the caldera, which is closer to the youngest volcanic eruption centers and to the highest measured subsurface temperatures in the caldera.

Because of the wide interest in organizing and distributing the fundamental data needed to select a suitable drill site, OBES and GTD funded a "Pre-Drilling Data Review" at LBL. Identification of research work in progress and data sets that need evaluation was done through meetings of three working groups (Seismology, Electrical-Gravity-Magnetics, and Geology-Geohydrology-Geochemistry) composed of people doing research in Long Valley. Two geothermal developers, Unocal and Chevron, provided a great deal of previously proprietary geological and geophysical data. About 100 people attended the concluding symposium to hear 31 papers organized by the three study groups.

Geology-Geohydrology-Geochemistry

Roy Bailey (USGS, Menlo Park, Calif.) presented new ideas on the relationship between precaldera structures, faulting, and volcanism. The caldera developed in a region of unusual crustal disruption, expressed by local en echelon faults that bound the eastern front of the Sierra Nevada (Figure 2). It is possible that caldera subsidence was controlled in part by the Hilton Creek, Hartley Springs, and Fern Lake–Silver Lake faults. The two major frontal faults, the Hilton Creek and the Hartley Springs, run into and predate the caldera.

The precaldera terrain probably consisted of a depressed area east of the Hilton Creek fault and a mountainous Sierran terrain in what is now the southern and western part of