

The LIP Reader

Newsletter of the Commission on Large-Volume Basaltic Provinces
IAVCEI International Association of Volcanology and Chemistry of the Earth's Interior



Number 8 November 1996

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Newsletter Production

Janelle L. Berry, Lisa Gahagan
and Toni Lee Mitchell

Three upcoming meetings promise strong and exciting LIP components. The 1997 IAVCEI General Assembly in Puerto Vallarta, Mexico, 19-24 January 1997, will have at least one symposium and one special session of direct relevance to students of LIPs: 1) *Large-Volume Basaltic Provinces*, and 2) *Remote Sensing of Volcanoes on Earth and the Planets*. More imminently, the program of the American Geophysical Union (AGU) 1996 Fall Meeting in San Francisco, USA, 15-19 December 1996, contains four special sessions focusing on LIPs research: 1) *Volcanic Rifted Margins and Other Large Igneous Provinces*, 2) *The Ontong Java Plateau*, 3) *Alternatives to Mantle Plume Theory*, and 4) *Mantle Dynamics*. Early next year, the European Union of Geosciences EUG9 in Strasbourg, France, 23-27 March 1997, will include at least five special sessions and symposia addressing LIP issues: 1) *Large Igneous Provinces and Earth's Evolution*, 2) *Core and Lower Mantle: Structure, Composition and Dynamics*, 3) *Global Seismic Tomography, Mineral Physics and Geodynamics*, 4) *Hot Spots and Mantle Plumes*, 5) *Volcanic Eruptions: Causes and Consequences*.

In this issue, summaries of recent meetings in Australia, USA, France, and the Faeroe Islands are highlighted. Contributions to *The LIP Reader*, including recent research results, are welcomed. Please inform your colleagues about the CLVBP and our activities.

IAVCEI News

The Second Circular for the IAVCEI General Assembly is available (see below), and the scientific program includes eleven symposia: Explosive Volcanism, Mitigation of Volcanic Disasters, A WOVO Symposium, Volcanic Gases, Volcanogenic Sediments, Large-Volume Basaltic Provinces, Volcanism and the Atmosphere, Remote Sensing, Granites, Volcanic Eruptions and Archaeology, and Volcano Seismology. In addition, three courses—Volcanic Gases, Physics of Explosive Volcanism, and Gravity Driven Flows of Volcanic Origin: Avalanches, Debris Flows, Lahars and Pyroclastic Flows from Dome Collapse—are being offered, as well as 18 field excursions. This promises to be an exciting meeting, and we hope to see you in Puerto Vallarta.

CLVBP News

Volume on Large Igneous Provinces

All accepted papers are in or close to the final stages of preparation (i.e., camera-ready). The American Geophysical Union is publishing the LIP volume as part of their Geophysical Monograph series; publication is now expected in the first third of 1997.

Steering Committee

An updated list of Steering Committee members and their addresses follows:

Nick Arndt (Univ. of Rennes, France) arndt@univ-rennes1.fr
Hans Barschus (Univ. of Montpellier, France) barschus@dstu.univ-montp2.fr
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Full addresses and contact numbers for the above are available over the internet, on diskette, or as hard copy (see below) from Mike Coffin.

Recent Research Summary

Seismic images of the Iceland plume have recently been posted on the World Wide Web (WWW); see

<http://www.ciw.edu/cecily/>

PREVIOUS MEETINGS

Geochemical Earth Reference Model Workshop, Lyon, France, 28-30 March 1996

The objectives of geochemical dynamics are: 1) to identify terrestrial geochemical reservoirs (mantle, crust, ocean, etc.), 2) to evaluate their chemical composition and the fluxes of material between them conforming to the geological processes that are known to rule their interaction, 3) to relate geochemical observations to time constraints provided by radioactive decay systems. The Geochemical Earth Reference Model (GERM) initiative focuses on geochemical dynamics at geological time scales characteristic of geological processes (>1 My), and as such is expected to provide the background secular evolution of Quaternary global models. We propose to concentrate international efforts on building an integrated model of the Earth consisting of the following components: 1) establish a broad consensus on the definition of one or several sets of reservoirs, 2) constrain the composition of these reservoirs, and 3) determine the elemental fluxes among reservoirs. Points 2 and 3 should

require the collection of many high-quality field, geochemical, and geophysical data, and their critical evaluation by panels of experts. The fluxes should be those associated with "slow" geological processes, and assessing their variability in time should have a high-priority in the layout of GERM. Finally, codes of standard models including box, circulation, and convection models should be made available and therefore be testable by a large community. A working model of GERM has been initiated on the Internet (<http://www.ep.es.llnl.gov/germ/germ-home.html>), and the earth science community is encouraged to participate in its establishment. Coordination with existing international programs such as InterRidge, ODP, and JGOFS should avoid duplication of efforts.

contributed by Francis Albarede (Ecole Normale Supérieure Lyon, France), Hubert Staudigel (Scripps Institution of Oceanography, California, USA), & William M. White (Cornell University, New York, USA)



The Ocean Lithosphere & Scientific Drilling into the 21st Century, Woods Hole, Massachusetts, USA, 26-28 May 1996

The ~110 scientists in attendance at this workshop considered current and past progress in understanding the evolution of ocean lithosphere, and present and future needs for scientific drilling in the oceans. The meeting represented the culmination of a series of meetings and workshops on the study of the evolution of the ocean lithosphere held over several years by InterRidge and IAVCEI's Commission on Large-Volume Basaltic Provinces (CLVBP). Thus, recommendations of the workshop represent the considerations of a far larger group of scientists than those attending this single meeting.

Workshop participants emphasized that drilling is essential, in fact the only means, to provide continuous sampling and directly determine the stratigraphy of the oceanic lithosphere. Only drilling provides ground truth for geophysical interpretations, and boreholes for *in situ* measurements and long-term experiments in the ocean crust. It was recognized, however, that for the foreseeable future, drilling has to be focused, and must address the most important questions. Moreover, drilling legs must be part of larger integrated studies, involving other types of experiments organized in the framework of major global initiatives and groups such as InterRidge, IAVCEI CLVBP, MARGINS, and the ION program.

To discuss scientific problems and set up specific experiments, workshop participants split into five thematic working groups for detailed discussions and planning: 1) Fast Spreading Ridges, 2) Slow Spreading Ridges, 3) Active Ridge Processes, 4) Large Igneous Provinces, and 5) The Arc Environment. The final workshop report is now being prepared and should be available from Joint Oceanographic Institutions (<http://www.joi.org>) in early 1997.

contributed by Henry Dick (Woods Hole Oceanographic Institution, Massachusetts, USA) & Catherine Mével (Université Pierre et Marie Curie, Paris, France)

Long Basalt Flow Workshop, Townsville, Australia, 11-21 July 1996, and Western Pacific Geophysics Meeting, Brisbane, Australia, 23-27 July 1996

Lava flows were recently the topic of two focused sessions Down Under—one a Chapman Conference on Long Lava Flows (organized by J.P. Stephenson and P.W. Whitehead) and one a special session on lava flow emplacement mechanisms at the Western Pacific Geophysics Meeting. Interest in lava flow emplacement has been sparked by detailed observations of sheet flow inflation during recent activity in Hawaii. New ideas about lava flow emplacement have given rise to broader questions of rates and mechanisms

operative during the emplacement of very long lava flows on Earth and the terrestrial planets. Discussion focused on ways to combine evidence from (1) measurements of flow mechanics and rheology in active lava flows, (2) textural and morphological measurements on solidified flows with well-documented emplacement histories, and (3) rheology experiments:

- to constrain numerical models of lava flow in channels and lava tubes,
- to understand emplacement conditions of komatiite lavas,
- to interpret beautifully-preserved flow morphologies on planetary surfaces, and
- to address important issues concerning the emplacement of flood basalts in LIPs.

Participants of both sessions enjoyed the chance to share ideas with the diverse communities interested in this topic. As a consequence, it was decided to establish an email group for lava flow discussions. Anyone wishing to be added to this group should contact Harry Pinkerton (h.pinkerton@lancaster.ac.uk) or Kathy Cashman (cashman@oregon.uoregon.edu).

contributed by Kathy Cashman (University of Oregon, USA)

Controls of Synrift Tectonics and Magmatism on Basin and Reservoir Structures Workshop, Faeroe Islands, 31 August-6 September 1996

This conference brought together 86 scientists and petroleum industry representatives to discuss the structure and evolution of sedimentary basins influenced by magmatism. The meeting was divided into four themes: 1) stress, rheology, basin formation and evolution, 2) magmatism, plumes and North Atlantic margin processes, 3) tectonics, deposition and structures of the North Atlantic margins, and 4) analogues.

Theme 1 focused on fault mechanics and basin modeling. The magmatic aspect was well represented in themes 2 and 3, where topics varied from magmatic influence on basin evolution, seismic properties of flood basalts, to petrology of sills offshore Norway and basalts onshore/offshore the Faeroes and Greenland. Speakers and poster presentations reviewed the geology of the mid-Norwegian margin (Vøring and Møre basins), and offshore areas of the Shetlands and Faeroes. The interest in these areas is directly related to the recent or imminent petroleum licensing rounds in Norway, United Kingdom and the Faeroes. These basins, related to the formation of the North Atlantic LIP, are commonly covered by thick basalt flows. Thick basalt layers have proven to be a major obstacle in imaging basin structures. Several papers addressed this problem using results from recently acquired wide-angle seismic studies. The analogues presented were largely from sedimentary



basins that have not experienced substantial magmatism, but gave the participants an overview of geology in Central Europe, Russia and the Ukraine (Peri-Caspian Basin), Turkey, Sicily, and offshore South Africa.

The conference was followed by a two-day field trip, giving the participants a chance to experience the local geology and see the spectacular landscape, when the fog did not obscure it. The field trip started in the southwest in the Lower Basalt Series, characterized by massive, up to 50-70 m thick flows, and progressed through the Middle Basalt Series, with flows up to a few meters thick, and the Upper Basalt Series, which resemble the Lower Series. Weathering of the thin, Middle Series sequences gives rise to characteristic gentle and smooth sloped hillsides, in stark contrast with the thick flows of the Lower and Upper Series, which yield step-like hillsides in the east, and sea cliffs in the west.

Field trip highlights included a stop by the Lopra well

site (TD 2178 m), where drilling recommenced in August 1996 in an attempt to drill through the basalt sequence or at least reach a deep prominent seismic reflector. A coal mine was visited, where the ≤ 1.5 m thick coal seam is still hand-mined, represents a long period of quiescence and sediment deposition, and marks the boundary between the Lower and Middle Basalt Series.

Conference participants are particularly grateful to Martin Heinesen, Lis Mortensen and Bjørn T. Larsen for organizing the program and logistics, running the conference and the field trip. Lengthy discussions among the participants were enhanced by the inclement weather, and the hospitality of the bartenders at the Café Natur.

contributed by Tadeusz Gladczenko (University of Oslo, Norway)

Synopses of recent meetings are welcomed—please send your ≤ 200 word review to Mike Coffin or John Mahoney.

LIPS and the Ocean Drilling Program

A proposal for basement drilling of the Kerguelen Plateau and Broken Ridge has been proceeding through the JOIDES proposal review and maturation process for several years, and in August cleared a major hurdle when it was selected for inclusion in the 1998-1999 drilling prospectus by the JOIDES Planning Committee. Subsequently, the JOIDES Lithosphere Panel (meeting Oct. 7-9, Kanazawa, Japan) rated this proposal #1 among those in the prospectus. Thus, drilling on the Kerguelen Plateau and Broken Ridge is one critical step

closer to fruition. For information on what the rankings mean and on ODP's current panel structure and procedures, see *The LIP Reader* #4 or #5. John Mahoney represents our Commission in the ODP advisory structure as a member of the Lithosphere Panel. Note, however, that the current panel structure and proposal review process are undergoing a fundamental transformation, beginning in January 1997. Stay tuned for more information in the next issue of *The LIP Reader*. As always, we welcome input from Commission members.

Commission Products and Services

LIPs on Internet

LIPs have an Internet presence, accessible via standard Internet tools. The Commission's LIP bibliography of ~2750 references, directory of ~500 members, and digital database of LIP areas (Figure 1 of Coffin & Eldholm, *Reviews of Geophysics*, 1994) are available, as well as the calendar of events and text versions of *The LIP Reader*. The Internet site is currently set up as a Gopher server, which allows users to log in with anonymous ftp or WWW tools, such as Netscape, Internet Explorer, or NCSA Mosaic. As time allows, the site will be enhanced for WWW users. Ideas on how the site could be improved are most welcome. For copies of materials on Macintosh diskette, please send a blank 3.5-inch diskette to Mike.

Anonymous FTP

With ftp, open "utig.ig.utexas.edu", use the login name "anonymous" and your Internet address as the password. Change directory to "outgoing/lips".

Gopher

Using your Gopher client software, open "gopher.utexas.edu". Navigate to "UT-Austin", to "Colleges and Departments", to "Institute for Geophysics", to "Research Projects", and then to "Commission on Large Igneous Provinces".

World Wide Web

The Universal Resource Locator (URL) is <http://www.ig.utexas.edu/research/projects/lips.html>



Upcoming Meetings

- 6-13 December: **Economic Deposits Associated with Carbonatites**, Amba Dongar Workshop, India. Information: Dr. Keith Bell, Dept. of Earth Sciences, Carleton Univ., Ottawa, Ontario K1S 5B6, Canada. Internet: kbell@ccs.carleton.ca; Drs. Tony Simonetti and Shrinivas Viladkar, Max-Planck-Institut für Chemie, Postfach 3060, D-55020 Mainz, Germany. Internet: tsimonet@geobar.mpch-mainz.mpg.de; viladkar@geobar.mpch-mainz.mpg.de
- 15-19 December: **American Geophysical Union Fall Meeting**, San Francisco, California, USA. Information: AGU Meetings Dept., 2000 Florida Ave., Washington, D.C., USA. Special sessions: *Volcanic Rifted Margins and Other Large Igneous Provinces*, *The Ontong Java Plateau*, *Alternatives to Mantle Plume Theory*, and *Mantle Dynamics*. Telephone 1.202.462.6900. Facsimile: 1.202.238.0566. WWW: <http://www.agu.org>
- 1997
- 19-24 January: **IAVCEI General Assembly**, Puerto Vallarta, México. Symposium: *Large-Volume Basaltic Provinces*, convened by S.P. Verma, M. Coffin, & J. Mahoney. Special Session: *Remote Sensing of Volcanoes on Earth and the Planets*, convened by R. Lopes-Gautier, P. Mouginiis-Mark, & A. Ocampo. Information: IAVCEI General Assembly 1997, 9051-C Siempre Viva Road, Suite 37-011, San Diego, California 92173, USA. Internet: iavcei97@tonatiuh.igeofcu.unam.mx. WWW: <http://charro.igeofcu.unam.mx/iavcei97/iavcei97.html>
- 3-16 February: **Flood Basalts, Rifting and Paleoclimates in the Ethiopian Rift and the Afar Depression**, Addis Ababa, Ethiopia. Information: Sofia Nadir, INSU-CNRS, 3 rue Michel-Ange, BP 287, 75766 Paris cedex 16, France. Telephone: 33.1.44964372. Facsimile: 33.1.44964965. Internet: sofia.nadir@cnrs-dir.fr
- 23-27 March: **European Union of Geosciences (EUG9)**, Strasbourg, France. Special Session: *Large Igneous Provinces and Earth's Evolution*. Union Symposia: *Core and Lower Mantle: Structure, Composition and Dynamics*; *Global Seismic Tomography, Mineral Physics and Geodynamics*; *Hot Spots and Mantle Plumes*; *Volcanic Eruptions: Causes and Consequences*. Information: <http://sparc.ipgp.jussieu.fr/EUG/EUG9.html>
- 14-19 April: **Plumes, Plates, and Mineralisation '97**, Pretoria, South Africa. Information: PPM'97, c/o Prof. S.A. de Waal, Department of Geology, University of Pretoria, Pretoria 0002, South Africa. Telephone: 27.12.4202454. Facsimile: 27.12.433430. Internet: ppm97@scientia.up.ac.za
- 19-21 May: **Ottawa '97: Joint Annual Meeting of the Geological Association of Canada and Mineralogical Association of Canada**, Ottawa, Canada. Special Session: *New Developments in Paleogeographical Reconstruction*, convened by R.E. Ernst (rernst@gsc.emr.ca), I.W.D. Dalziel (ian@utig.ig.utexas.edu), & K.L. Buchan (kbuchan@gsc.emr.ca). Information: C. Vodden, Geological Survey of Canada, Room 757, 601 Booth St., Ottawa, Ontario, K1A 0E8. Telephone 1.613.947.7649. Facsimile 1.613.947.7650. Internet: Ottawa97@emr.ca
- 17-22 June: **The History and Dynamics of Global Plate Motions**, Marshall, California, USA. Information: M. Richards (markr@seismo.berkeley.edu) or J. Stock (jstock@seismo.gps.caltech.edu)
- 2-6 June: **Seventh Annual V.M. Goldschmidt Conference**, Tucson, Arizona, USA. Symposium: *Large Igneous Provinces and Their Relation to Plumes and Climate*. Information: M.J. Drake (goldconf@lpl.arizona.edu). WWW: <http://cass.jsc.nasa.gov/lpi.html>
- 1-9 July: **Earth - Ocean - Atmosphere Forces for Change**, Melbourne, Australia. Information: IAMAS/IAPSO Secretariat, Convention Network, 224 Rouse Street, Port Melbourne, Victoria 3207, Australia. Telephone: 61.3.9646.4122. Facsimile: 61.3.9646.7737. Internet: mscarlett@peg.apc.org
- 15-18 September: **Volcanism and Volcanic Hazards in Immature Intraplate Oceanic Islands**, La Palma, Canary Islands, Spain. Information: W.J. McGuire, Dept. of Geological Sciences, University College London, Gower Street, London WC1E 6BT, UK. Internet: w.mcguire@ucl.ac.uk



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