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Preface

The 2002 SEDI meeting, “Geophysical and Geochemical Evolution of the Deep Earth,” convened 22–26 July at Granlibakken, Tahoe City, California. Cathy Constable and Guy Masters (Scripps Institution of Oceanography, U.C. San Diego) organized this eighth symposium for the Study of the Earth’s Deep Interior, a Union Committee of the International Union of Geology and Geophysics.

As always, the biennial SEDI meeting provided scientists from different disciplines and from around the world an intimate and informal forum to present results and exchange ideas on the lower mantle, core-mantle boundary, and outer and inner cores. Because the meetings cut across traditional disciplines, they are an excellent place to both review fundamental topics and catch the most recent results in geochemistry, geodynamics, geomagnetism, mineral physics, paleomagnetism, and seismology that bear on the most remote parts of our planet.

The meeting consisted of seven half day sessions: (1) formation and composition of the core; (2) mineral physics: properties of iron and alloys, and of the lowermost mantle; (3) thermal and magnetic evolution of the core; (4) inner core: structure and dynamics; (5) outer core: structure and dynamics; (6) dynamos and the deep Earth; and (7) stealth layers, D'' , and core-mantle interactions. Each session began with two invited overview talks, followed by discussion of the topic and the relevant posters, which were available for viewing throughout the week (along with time dedicated to poster viewing).

An old issue, the presence of radioactivity in the core and its role in the thermal history of the core, was revisited in light of better knowledge of the relevant parameters. This led to discussion on the age of the inner core and the nature of the Earth’s magnetic field during the Earth’s first 4 billion years. But not

all is old—new experiments and new first-principles calculations continue to advance our understanding of iron and silicon alloys under deep Earth conditions. Similarly, new experiments and new numerical simulations deepen our understanding of dynamos. New geomagnetic and paleomagnetic data help constrain these dynamo models and tell us what parameters and approximations make a difference. For both the inner core and D'' , seismologists work to infer detailed structure while geodynamicists struggle to construct a geophysically plausible framework.

In addition to the science, the meeting provided a chance to hike, bike, and raft in the tall pines and clear waters of the Sierra Nevada. There was also an opportunity to celebrate—this year’s Doornbos Memorial Prize recipients were: (1) Dario Alfe, “for his work on theoretical properties of iron under core conditions”; (2) Richard Holme, “for outstanding work in geomagnetic field modeling and interpretation;” and (3) Stephane Labrosse, “for his work on the thermal evolution of the Earth’s core.” On a sad note, we observed the untimely passing of Stephen Zatman shortly before the meeting began. Stephen was a promising geophysicist and a close colleague for many of us.

This special SEDI 2002 volume of PEPI is a collection of some of the invited and contributed work presented at the Tahoe meeting. True to the spirit of SEDI, it contains papers from a wide variety of disciplines with different approaches (though we do note the lack of experimental work, hopefully due to relatively small sampling). We would like to thank the reviewers for their speedy yet careful and thorough work, Cathy and Guy for their excellent job putting the meeting together, and Dave Gubbins, Patricia Massar, and the staff at Elsevier for their assistance. The ninth SEDI meeting will be held

at Garmisch-Partenkirchen, Germany, from 4 to 9
July 2004.

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