

# MEETINGS

## Global Bio-optical Algorithms for Ocean Color Satellite Applications

***Inherent Optical Properties Algorithm Workshop at Ocean Optics XIX; Barga, Italy, 3–4 October 2008***

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Ocean color measured from satellites provides daily global, synoptic views of marine inherent optical properties (IOPs). IOPs, namely, the spectral absorption and scattering characteristics of ocean water and its dissolved and particulate constituents, describe the contents of the upper ocean mixed layer, information critical to furthering scientific understanding of biogeochemical oceanic processes such as carbon exchanges, phytoplankton dynamics, and responses to climatic disturbances. As such, the international ocean color community has invested significant effort in improving the regional and global quality of satellite-derived IOP products.

Recently, NASA proposed to provide the data sets, processing framework, and international forum within which a new generation of global IOP products can be developed and evaluated. To initiate this effort, NASA organized an international IOP algorithm workshop, conducted in conjunction with the Ocean Optics XIX conference.

Semianalytical algorithms (SAAs) provide one mechanism for inverting the “color” of the water observed by a satellite into IOPs through a combination of empiricism and radiative transfer theory (other approaches include purely statistical and neural network approaches). For a review, see the fifth report of the International Ocean-Colour Coordinating Group (IOCCG; <http://www.ioccg.org/reports/report5.pdf>). The fourfold purpose of the workshop was to (1) extend the IOCCG effort to explicitly define the state of the art with regard to the application of SAAs to satellite radiometry; (2) deconstruct the SAAs to identify similarities and uniqueness; (3) identify strategies to provide uncertainties to SAAs; and (4) achieve community-wide consensus on a unified SAA with which to generate global satellite IOP products.

The workshop culminated 8 months of collaborative effort from 23 international researchers, with all dialog conducted and all analyses presented in a public forum (see <http://oceancolor.gsfc.nasa.gov/MEETINGS/OOXIX/IOP/>). Preworkshop

accomplishments included the implementation of seven SAAs into the NASA ocean color processing environment, the dissection of these approaches, and the execution of sensitivity studies on input parameters, inherent assumptions, and model parameterization. The workshop featured 10 presentations covering six overarching themes, including (1) physical understanding of the IOP–water color relationship; (2) end-user requirements for SAA products and accuracies; (3) implementation strategies for the satellite data processing paradigm; (4) regional adjustment of SAAs; (5) consideration of uncertainties in input parameters, assumptions, and data products; and (6) definition of metrics to quantify SAA performance.

Participants ultimately reached consensus on a processing framework within which NASA will start producing SAA data products for community evaluation. A preliminary unified SAA was proposed to initiate this process, with alternative model parameterizations and features defined for subsequent evaluation. In the next 6 months, NASA will produce IOP data products using the unified algorithm for the ocean color missions for which they maintain responsibility. In tandem, workshop participants will continue their public, online dialog on SAA development and performance in preparation for a second workshop, tentatively scheduled for September 2009.

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## Impact Cratering and Its Planetary and Environmental Effects

***Large Meteorite Impacts and Planetary Evolution IV; Vredefort Dome, South Africa, 17–21 August 2008***

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The Fourth Conference on Large Meteorite Impacts and Planetary Evolution (LMI IV) was held near the town of Parys in the Vredefort Dome, the center of Earth’s oldest and largest preserved impact structure. The Vredefort Dome, approximately 120 kilometers southwest of Johannesburg, South Africa, presents a superb cross section through deep levels of the impact structure. The Dome also provides exposures of the exceptionally well preserved Archean and Paleoproterozoic (>3.1 to 2.1 billion year old) rocks of the Kaapvaal craton. In July 2005, the northwestern part of the Dome was declared a World Heritage Site. Work is under way to strengthen the tourism infrastructure at the site, including construction of a visitor center.

Hosted by the University of the Witwatersrand, Johannesburg, and coconvened by Roger Gibson (University of the

Witwatersrand) and Wolf Uwe Reimold (Humboldt University Berlin), LMI IV underscored important advances in the study of impact cratering and effects, including major drilling and field projects on terrestrial impact structures and ongoing space programs to our neighboring planets, asteroids, and comets. LMI IV was sponsored by a diverse group of organizations, including the Lunar and Planetary Institute, NASA, Barringer Family Fund, South African Council for Geoscience, Geological Society of South Africa, Geological Society of America, National Research Foundation of South Africa, South African Mint, and other civic organizations of the South African Free State and North West Provinces. More than 100 scientists from over 65 institutions in 21 countries attended the conference. Field excursions allowed attendees to examine the spectacular impact and regional geologies of the Vredefort Dome and also the smaller

Tswaing (Salt Pan) impact crater, approximately 40 kilometers north of Pretoria.

Symposia during LMI IV focused on the record of large impact events, potential newly discovered terrestrial impact craters, the drilling of impact structures, extraterrestrial cratering, geoparks/world heritage impact sites, modeling impact cratering, the structural geology of impact craters at macroscopic to microscopic levels, and impact ejecta. Highlights included (1) new data on the geochemistry and geophysics of the largest terrestrial impact structures (Vredefort, Sudbury, and Chicxulub); (2) reports on two recently identified impact craters in India and Jordan; (3) new geophysical, geochemical, petrologic, stratigraphic, rock-magnetic, and postimpact thermal alteration data from three recent crater-drilling projects led by the International Continental Scientific Drilling Program (ICDP), which cored into impactites of the Chicxulub, Bosumtwi (Ghana), and Chesapeake Bay impact structures; (4) new data on craters and cratering effects on Venus, Mars, and the Moon; (5) advances in computer code modeling of impact crater, melt, and ejecta formation; and (6) new data on craters formed by oblique impact.