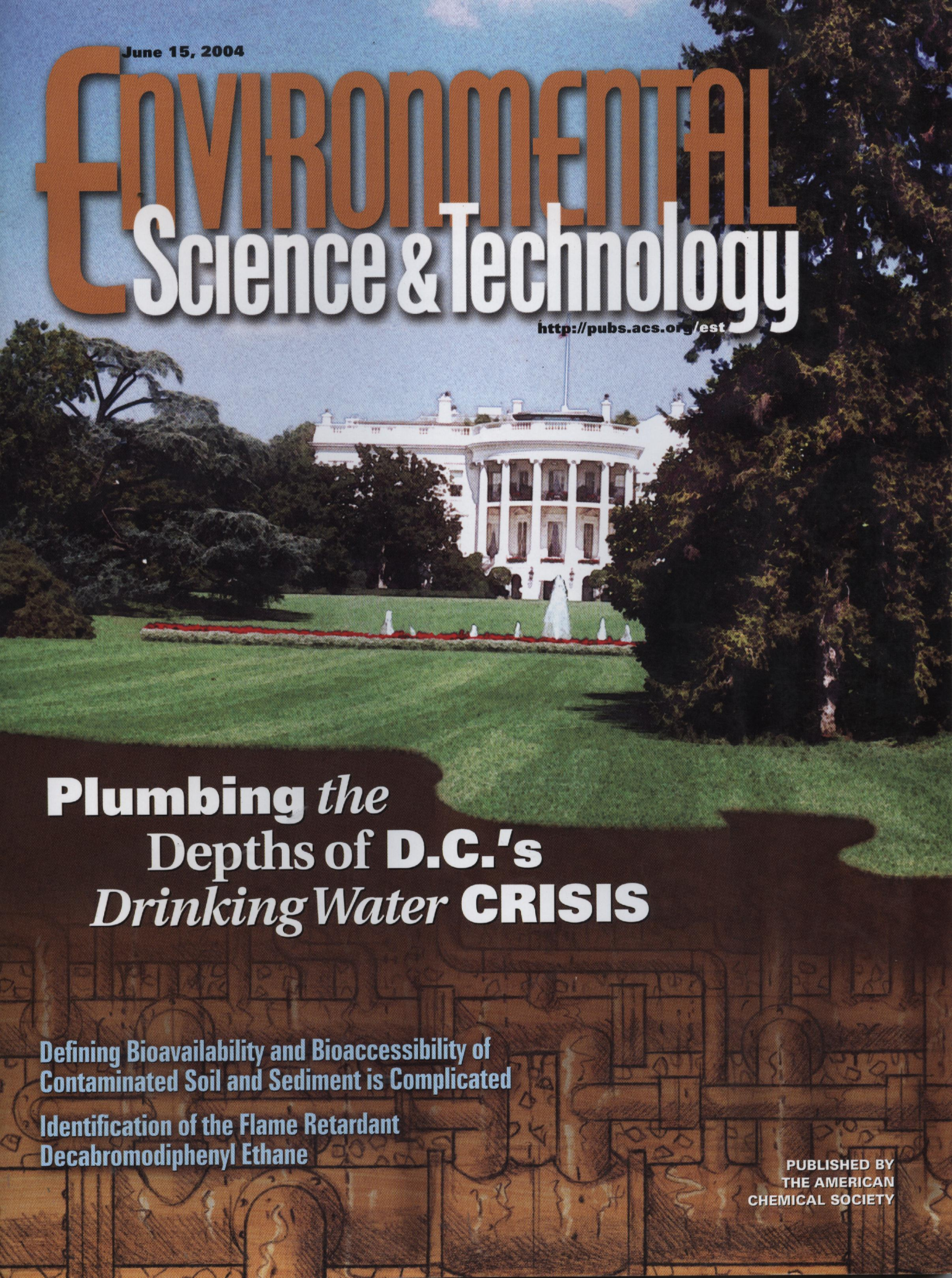


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ENVIRONMENTAL Science & Technology

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Plumbing the Depths of D.C.'s *Drinking Water* **CRISIS**

Defining Bioavailability and Bioaccessibility of
Contaminated Soil and Sediment is Complicated

Identification of the Flame Retardant
Decabromodiphenyl Ethane

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THE AMERICAN
CHEMICAL SOCIETY

Policy Analysis

■ 3217 CO₂ Emission Benefit of Diesel (versus Gasoline) Powered Vehicles*

J. L. Sullivan, R. E. Baker, B. A. Boyer, R. H. Hammerle, T. E. Kenney, L. Muniz, and T. J. Wallington

The well-to-wheels CO₂ emission benefit of diesel cars and light trucks vehicles over equivalent gasoline vehicles is estimated to be 24–33% for the 2001 model year.

Characterization of Natural and Affected Environments

3224 Estimation of the Production, Consumption, and Atmospheric Emissions of Pentabrominated Diphenyl Ether in Europe between 1970 and 2000

K. Prevedouros, K. C. Jones, and A. J. Sweetman

Atmospheric emissions of BDE-47, a major congener, peaked around 1997 and declined by 2000; time trends of human blood and milk concentrations followed similar patterns.

■ 3232 PCB Loading from Sediment in the Hudson River: Congener Signature Analysis of Pathways

Jonathan B. Butcher and Edward A. Garvey

Congener signatures identify mixed porewater and non-scour flux of sediment, likely from bioturbation, as the source of PCB loading in the Upper Hudson River.

3239 Landscape-Level Approach To Assess Aquatic Exposure via Spray Drift for Pesticides: A Case Study in a Mediterranean Area

Laura Padovani, Ettore Capri, and Marco Trevisan

The paper presents results from a pesticide surface water exposure assessment based on a combination of field studies and monitoring/modeling studies with GIS-based methodologies.

3247 ► Identification of the Flame Retardant Decabromodiphenyl Ethane in the Environment

Amelie Kierkegaard, Jonas Björklund, and Ulrika Frién

A new brominated flame retardant (decabromodiphenyl ethane) is identified for the first time in sediment, sewage sludge, and indoor air.

3254 Fertilizer Characterization: Isotopic Data (N, S, O, C, and Sr)

Laura Vitòria, Neus Otero, Albert Soler, and Àngels Canals

Isotopic characterization (N, S, O, C, and Sr) of synthetic fertilizers is considered by means of their raw material source and their use as contamination tracers.

■ 3263 Herbicide Runoff along Highways. 1. Field Observations

Xinjiang Huang, Theresa Pedersen, Michael Fischer, Richard White, and Thomas M. Young

Runoff of five herbicides at two northern California field sites is controlled by the time elapsed since application and the timing and intensity of storms.

3272 Herbicide Runoff along Highways. 2. Sorption Control

Xinjiang Huang, Theresa Pedersen, Michael Fischer, Richard White, and Thomas M. Young

Linear equilibrium sorption models effectively describe field transport of herbicides despite long soil–herbicide contact times following application and short water–soil contact times during storms.

3279 Quantitative Source Identification of Dioxin-like PCBs in Yokohama, Japan, by Temperature Dependence of Their Atmospheric Concentrations

Isamu Ogura, Shigeki Masuogawa, and Junko Nakanishi

The sources and environmental behavior of PCBs and dioxins are evaluated by analysis of variations in their atmospheric concentrations.

■ 3286 Polybrominated Diphenyl Ethers in the Sediments of the Great Lakes. 1. Lake Superior

Wenlu Song, Justin C. Ford, An Li, William J. Mills, Dave R. Buckley, and Karl J. Rockne

The inventory and flux of PBDEs from Lake Superior are estimated, and the congener patterns are compared with those in PBDE products, air, fish, and water.

■ 3294 Sources of Polycyclic Aromatic Hydrocarbons and Hexachlorobenzene in Spruce Needles of Eastern Alaska

Timothy S. Howe, Shane Billings, and Richard J. Stolberg

A major source of PAHs is the city of Fairbanks, and a major sink for HCB is vegetation.

Environmental Processes

■ 3299 Arsenite Retention Mechanisms within Estuarine Sediments of Pescadero, CA

Benjamin C. Bostick, Cynthia Chen, and Scott Fendorf

Arsenic in reduced estuarine sediments is bound through both sorption to and precipitation of sulfidic mineral phases, which may be susceptible to oxidation.

3305 Modeling Maximum Adsorption Capacities of Soot and Soot-like Materials for PAHs and PCBs

Paul C. M. van Noort, Michiel T. O. Jonker, and Albert A. Koelmans

Maximum capacities for adsorption of organic compounds onto soot are related to soot-specific surface area, organic carbon content, and sorbate dimensions.

3310 Evidence of Uranium and Associated Trace Element Mobilization and Retention Processes at Oklo (Gabon), a Naturally Radioactive Site

Ignasi Casas, Joan de Pablo, Isabel Pérez, Javier Giménez, Lara Duro, and Jordi Bruno

Dissolution rates of uranium and minor elements from Oklo uraninites are studied under oxidizing conditions as a function of bicarbonate concentration and temperature.

3316 ► Degradation of Fluorotelomer Alcohols: A Likely Atmospheric Source of Perfluorinated Carboxylic Acids

David A. Ellis, Jonathan W. Martin, Amila O. De Silva, Scott A. Mabury, Michael D. Hurley, Mads P. Sulbaek Andersen, and Timothy J. Wallington

Atmospheric degradation pathways, kinetics, and products of fluorotelomer alcohols provide a plausible route for transport, dissemination, and delivery of perfluorocarboxylic acids to remote regions.

3322

Sorption of 17 β -Estradiol and 17 α -Ethinylestradiol by Colloidal Organic Carbon Derived from Biological Wastewater Treatment Systems

R. David Holbrook, Nancy G. Love, and John T. Novak

Colloidal sorption coefficients between 17 β -estradiol and 17 α -ethinylestradiol and size-fractionated colloidal organic carbon derived from two biological wastewater treatment facilities are quantified by fluorescence quenching.

3330

Identifying the Sources of Subsurface Contamination at the Hanford Site in Washington using High-Precision Uranium Isotopic Measurements

John N. Christensen, P. Evan Dresel, Mark E. Conrad, Kate Maher, and Donald J. DePaolo

Uranium contamination of groundwater is isotopically linked to decades-old vadose zone uranium contamination, revealing a nonvertical path for contaminant migration within the vadose zone.

■ 3338

Thermodynamics of Peat-, Plant-, and Soil-Derived Humic Acid Sorption on Kaolinite

Elham A. Ghabbour, Geoffrey Davies, Melissa E. Goodwillie, Kelly O'Donoghue, and Tammy L. Smith

Linearly correlated enthalpy and entropy changes for coating of kaolinite with aqueous humic acids imply hydration and dehydration as key factors in the sorption mechanism.

3343

Secondary Organic Aerosol Formation from Cyclohexene Ozonolysis: Effect of OH Scavenger and the Role of Radical Chemistry

M. D. Keywood, J. H. Kroll, V. Varutbangkul, R. Bahreini, R. C. Flagan, and J. H. Seinfeld

Secondary organic aerosol yields from cyclohexene ozonolysis are found to depend on choice of radical scavenger, highlighting the importance of radical chemistry in SOA formation.

3351

Environmental Risk Assessment of Paroxetine

Virginia L. Cunningham, David J. C. Constable, and Robert E. Hannah

Environmental risk assessment of paroxetine using the PhATE model indicates that predicted environmental concentrations will be orders-of-magnitude lower than the predicted no-effects concentration.

3360

Depolymerization of Chromophoric Natural Organic Matter

James Thomson, Adele Parkinson, and Felicity A. Roddick

The products of UV (G254 nm) irradiation of natural organic matter suggest a simple trimer depolymerization model, indicating that it has repeating structural units joined by photolabile chemical bonds.

Environmental Modeling

3370

Estimating Potential Environmental Loadings of *Cryptosporidium* spp. and *Campylobacter* spp. from Livestock in the Grand River Watershed, Ontario, Canada

Sarah M. Dorner, Peter M. Huck, and Robin M. Slawson

A probabilistic model is used to estimate potential environmental loadings of *Cryptosporidium* spp. and *Campylobacter* spp. from livestock sources in the Grand River Watershed, Ontario, Canada.

Environmental Measurements and Methods

■ 3381

Equilibrium-Based Sampler for Determining Cu²⁺ Concentrations in Aquatic Ecosystems

David B. Senn, Sarah B. Griscom, Christopher G. Lewis, Jennifer P. Galvin, Martha W. Chang, and James P. Shine

This paper describes an in situ sampler for determining Cu²⁺ concentrations in aquatic ecosystems.

3387

Identification of Black Carbon Derived Structures in a Volcanic Ash Soil Humic Acid by Fourier Transform Ion Cyclotron Resonance Mass Spectrometry

Robert W. Kramer, Elizabeth B. Kujawinski, and Patrick G. Hatcher

Black carbon-derived molecules are identified as significant components in highly aromatic humic acids using electrospray ionization with ultrahigh-resolution mass spectrometry.

3396

Laboratory and Field Measurements of Dry Deposition of Sulfur Dioxide onto Chinese Loess Surfaces

Atsuyuki Sorimachi, Kazuhiko Sakamoto, Mio Sakai, Hidekazu Ishihara, Tsutomu Fukuyama, Masahiro Utiyama, Hongjie Liu, Wei Wang, Dagang Tang, Xuhui Dong, and Hao Quan

The results from laboratory and field measurements of dry deposition of SO₂ onto Chinese loess surfaces are reported.

3405

Contribution to the Structural Elucidation of 10 Isomers of Technical *p*-Nonylphenol

Bjoern Thiele, Volkmar Heinke, Einhard Kleist, and Klaus Guenther

The complete structures of nonylphenol isomers from the technical mixture are elucidated.

Remediation and Control Technologies

3412

▶ Phytofiltration of Arsenic from Drinking Water Using Arsenic-Hyperaccumulating Ferns

Jianwei W. Huang, Charissa Y. Poynton, Leon V. Kochian, and Mark P. Elless

Hydroponically cultivated ferns (*Pteris* spp.) rapidly remove arsenic from water to achieve the new drinking water limit of 10 μ g/L.

3418

Thermal Wet Oxidation Improves Anaerobic Biodegradability of Raw and Digested Biowaste

Geert Lissens, Anne Belinda Thomsen, Luc De Baere, Willy Verstraete, and Birgitte K. Ahring

Thermal wet oxidation pretreatment or intermediate treatment considerably increases the methane yield from biowaste and permits lignin conversion into biogas.

3425

Influence of Electrostatics on the Oxidation Rates of Organic Compounds in Heterogeneous Fenton Systems

Wai P. Kwan and Bettina M. Voelker

Electrostatic effects influence oxidation rates of charged dissolved organic compounds in systems where hydroxyl radical is produced by the iron oxide-catalyzed decomposition of hydrogen peroxide.

■ Supporting Information is available free of charge via the Internet at <http://pubs.acs.org>.

▶ This issue contains a news story about this research.

3432

Inhibition of Pyrite Oxidation by a Phospholipid in the Presence of Silicate

David M. Kargbo, George Atallah, and Sabyasachi Chatterjee

The presence of sodium silicate diminishes the ability for the diacetylene-containing phospholipid (23:2 diyne PC) to suppress pyrite oxidation.

■ 3442

Performance of a Household-Level Arsenic Removal System during 4-Month Deployments in Bangladesh

Zhongqi Cheng, Alexander van Geen, Chuanyong Jing, Xiaoguang Meng, Ashraf Seddique and Kazi Matin Ahmed

The performance of the "bucket" household arsenic removal system was evaluated over a four-month period for six families in Bangladesh and compared with model predictions.

3449

MtBE Biodegradation in a Gravity Flow, High-Biomass Retaining Bioreactor

Maher M. Zein, Makram T. Suidan, and Albert D. Venosa

A gravity-flow biomass-retaining reactor affected excellent MtBE mineralization with treated effluent quality meeting drinking water standards.

■ Supporting Information is available free of charge via the Internet at <http://pubs.acs.org>.