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Simultaneous Assessment of Sources, Processes, and Factors Influencing Herbicide LOSSES to Surface Waters

Chromium and Sediment Toxicity

**Adsorptive and Absorptive Contributions to the
Gas-Particle Partitioning of PAHs**

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Critical Review

3793

Adsorptive and Absorptive Contributions to the Gas-Particle Partitioning of Polycyclic Aromatic Hydrocarbons: State of Knowledge and Recommended Parametrization for Modeling

Rainer Lohmann and Gerhard Lammel

The ambient gas-particle partitioning of PAHs is best described by a combination of absorption into octanol-like organic matter and adsorption onto diesel soot-like black carbon.

Characterization of Natural and Affected Environments

3804

Polybrominated Diphenyl Ethers and Organochlorines in Archived Northern Fur Seal Samples from the Pacific Coast of Japan, 1972–1998

Natsuko Kajiwara, Daisuke Ueno, Atsushi Takahashi, Norihisa Baba, and Shinsuke Tanabe

Because peak concentrations of PBDEs in fur seals from the North Pacific occurred later than OCs did, prolonged and chronic marine pollution by PBDEs is suggested.

■ 3810

Physical and Kinetic Speciation of Copper and Zinc in Three Geochemically Contrasting Marine Estuaries

Martin M. Shafer, Stephen R. Hoffmann, Joel T. Overdier, and David E. Armstrong

Physical and kinetic speciation of copper, zinc, and dissolved organic matter in estuaries shows that colloidal and nonlabile species are significant for copper but not zinc.

3820

Influence of an Industrial Waste Incinerator as Assessed by the Levels and Congener Patterns of Polychlorinated Dibenzop-dioxins and Polychlorinated Dibenzofurans

Soyoung Park, Su-Jin Kim, Kyoung Sim Kim, Dong Soo Lee, and Jong Guk Kim

Influence of an industrial waste incinerator appears more clearly in the congener pattern than in the level of PCDD/Fs in soil and human blood.

■ 3827

Simultaneous Assessment of Sources, Processes, and Factors Influencing Herbicide Losses to Surface Waters in a Small Agricultural Catchment

Christian Leu, Heinz Singer, Christian Stamm, Stephan R. Müller, and René P. Schwarzenbach

A controlled herbicide application in a small agricultural catchment reveals the dominance of diffuse losses and astonishingly similar concentrations of neutral herbicides in waters.

3835

Variability of Herbicide Losses from 13 Fields to Surface Water within a Small Catchment after a Controlled Herbicide Application

Christian Leu, Heinz Singer, Christian Stamm, Stephan R. Müller, and René P. Schwarzenbach

A controlled herbicide application on several fields within a small agricultural catchment demonstrates that field characteristics cause much larger load differences than do substance properties.

■ 3842

Characterizing Dependence of Pesticide Load in Surface Water on Precipitation and Pesticide Use for the Sacramento River Watershed

Lei Guo, Craig E. Nordmark, Frank C. Spurlock, Bruce R. Johnson, Linying Li, J. Marshall Lee, and Kean S. Goh

A watershed model for pesticide loading in the Sacramento River was established that showed pesticide use and precipitation as the dominating factors controlling pesticide transport into the river.

3853

Levels and Toxicokinetic Behaviors of PCDD, PCDF, and Coplanar PCB Congeners in Common Cormorants from Lake Biwa, Japan

Akira Kubota, Hisato Iwata, Shinsuke Tanabe, Kumiko Yoneda, and Sachiko Tobata

Influence of life-stage, tissue, and residue concentration on accumulation patterns of PCDD/DFs and dioxin-like PCBs in wild cormorant populations are extensively investigated.

Environmental Processes

3860

Maternal and Fetal Mercury and *n*-3 Polyunsaturated Fatty Acids as a Risk and Benefit of Fish Consumption to Fetus

Mineshi Sakamoto, Machi Kubota, Xiao Jie Liu, Katsuyuki Murata, Kunihiko Nakai, and Hiroshi Satoh

Methylmercury and docosahexaenoic acid in fetal circulation originating from fish consumption reflect those levels in maternal circulation and are positively correlated in fetal circulation.

3864

Quantification of Bacterial Chemotaxis in Porous Media Using Magnetic Resonance Imaging

Mira Stone Olson, Roseanne M. Ford, James A. Smith, and Erik J. Fernandez

The chemotactic response of *Pseudomonas putida* to the environmental contaminant trichloroethylene in a packed column using magnetic resonance imaging is quantified.

3871

Fractionation of Stable Isotope-Labeled Organic Pollutants as a Potential Tracer of Atmospheric Transport Processes

Rebecca M. Dickhut, Tirupponithura V. Padma, and Alessandra Cincinelli

Fractionation of D₁₀- versus ¹³C₂-labeled semivolatile organic compounds is examined as a technique for assessing atmospheric transport and air/earth exchange.

3877

Role of Speciation in Organotin Toxicity to the Yeast *Candida maltosa*

Jane S. White and John M. Tobin

Organotin chemical speciation under varying environmental conditions and the relationship to biological phenomena associated with organotin toxicity to a model microorganism is studied.

■ 3885

On the Origin of the Optical Properties of Humic Substances

Rossana Del Vecchio and Neil V. Blough

Absorption and fluorescence spectroscopy and laser photo-bleaching experiments are used to probe the origin of the optical properties of humic substances.

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

► This issue contains a news story about this research.

■ 3892

Exchange of Polychlorinated Biphenyls (PCBs) and Polychlorinated Naphthalenes (PCNs) between Air and a Mixed Pasture Sward

Jonathan L. Barber, Gareth O. Thomas, Rebekah Bailey, Gerhard Kerstiens, and Kevin C. Jones

Plant-side resistance to diffusion controls the air/plant exchange of PCBs and PCNs with grass-covered pastures, or swards.

3901

Rapid Release of Mercury from Intertidal Sediments Exposed to Solar Radiation: A Field Experiment

João Canário and Carlos Vale

Mercury concentration in anoxic inter-tidal sediments decreases considerably when exposed to solar radiation between high tides, and release is independent of the degree of contamination.

■ 3908

Role of Dissolved Organic Matter, Nitrate, and Bicarbonate in the Photolysis of Aqueous Fipronil

Spencer S. Walse, Stephen L. Morgan, Li Kong, and John L. Ferry

A multivariate kinetic model of aqueous fipronil photodegradation is generated as a function of dissolved organic matter, bicarbonate, and nitrate at concentrations bracketing those commonly observed in natural waters.

■ 3916

Experimental Visualization of Solute Transport and Mass Transfer Processes in Two-Dimensional Conductivity Fields with Connected Regions of High Conductivity

Brendan Zinn, Lucy C. Meigs, Charles F. Harvey, Roy Haggerty, William J. Peplinski, and Claudius Freiherr von Schwerin

Detailed visualization of solute transport through water-saturated porous-media chambers shows that solute tailing behaves very differently for different degrees of spatial variability in hydraulic conductivity.

3927

Contribution of Natural Organic Matter to Copper Leaching from Municipal Solid Waste Incinerator Bottom Ash

André van Zomeren and Rob N. J. Comans

Binding of copper to fulvic acids enhances leaching of this heavy metal from MSWI bottom ash and is adequately described by the NICA-Donnan model.

■ 3933

Photochemical Fate of Sulfa Drugs in the Aquatic Environment: Sulfa Drugs Containing Five-Membered Heterocyclic Groups

Anne L. Boreen, William A. Arnold, and Kristopher McNeill

The aqueous photochemical degradation mechanisms of five sulfa drug antibiotics with varying five-membered heterocyclic substituents are investigated.

Environmental Modeling

3941

Thermodynamic Properties of Multifunctional Oxygenates in Atmospheric Aerosols from Quantum Mechanics and Molecular Dynamics: Dicarboxylic Acids

Chinghang Tong, Mario Blanco, William A. Goddard, III, and John H. Seinfeld

A method based on atomistic simulations combined with the Clausius-Clapeyron equation predicts liquid-vapor pressure, vaporization enthalpies, and heats of sublimation of atmospheric organic compounds.

Environmental Measurements Methods

3950

Estimation of Diffusion Coefficient of Chromium in Colloidal Silica Using Digital Photography

Netnapid Tantemsapya and Jay N. Meegoda

Diffusion coefficients of chromium are measured using a method based on digital photography to evaluate the effectiveness of treating chromium-contaminated soils using silica gel.

3958

Optimizing Detection Limits for the Analysis of Petroleum Hydrocarbons in Complex Environmental Samples

Gregory S. Douglas, William A. Burns, A. Edward Bence, David S. Page, and Paul Boehm

The interpretive power of forensic PAH measurements is greatly improved by optimizing method detection limits of the alkylated PAH homologues.

■ 3965

Potential Contamination of Shipboard Air Samples by Diffusive Emissions of PCBs and Other Organic Pollutants: Implications and Solutions

Rainer Lohmann, Foday M. Jaward, Louise Durham, Jonathan L. Barber, Wendy Ockenden, Kevin C. Jones, Regina Bruhn, Soenke Lakaschus, Jordi Dachs, and Kees Booij

Great care is needed to ensure that shipboard ambient measurements of persistent organic pollutants are not contaminated.

3971

Aesthetics of Simulated Soiling Patterns on Architecture

Carlota M. Grossi and Peter Brimblecombe

Soiling patterns, in addition to the soiling amount, influence the public acceptability of soiled building facades.

3977

Comparison between Acetic Acid and Landfill Leachates for the Leaching of Pb(II), Cd(II), As(V), and Cr(VI) from Cementitious Wastes

Cheryl E. Halim, Jason A. Scott, Helena Natawardaya, Rose Amal, Donia Beydoun, and Gary Low

Use of acetic acid (a toxicity characteristic leaching procedure leaching fluid) and municipal and nonputrescible landfill leachates for leaching heavy metals from cement is compared.

Remediation and Control Technologies

3984

Formate Ion Decomposition in Water Under UV Irradiation at 253.7 nm

Gonca F. Talu and Vasil Diyamandoglu

Formate decays in water under UV irradiation (253.7 nm) in the presence of dissolved oxygen to form CO₂ following split-rate pseudo-zero-order kinetics.

3994

Radiation Chemistry of Methyl *tert*-Butyl Ether in Aqueous Solution

Stephen P. Mezyk, Jace Jones, William J. Cooper, Thomas Tobien, Michael G. Nickelsen, J. Wesley Adams, Kevin E. O'Shea, David M. Bartels, James F. Wishart, Paul M. Tornatore, Kimberley S. Newman, Kellie Gregoire, and Daniel J. Weidman

Determination of rate constants for methyl *tert*-butyl ether destruction in water using advanced oxidation technology-based free radicals.

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