

CONTENTS

Volume 159 Issue 12 2011

Reviews

3269 A review of biochars' potential role in the remediation, revegetation and restoration of contaminated soils

L. Beesley, E. Moreno-Jiménez, J.L. Gomez-Eyles, E. Harris, B. Robinson, T. Sizmur

Biochars can reduce the mobility and impact of some soil pollutants but, if applied alone, may fail to support soil restoration, revegetation and hence ecologically circumspect remediation.

3283 Ethylenediurea (EDU): A research tool for assessment and verification of the effects of ground level ozone on plants under natural conditions

W.J. Manning, E. Paoletti, H. Sandermann Jr., D. Ernst

EDU is a verified and effective tool for the assessment of the effects of ozone on plants.

Regular Papers

3294 Does the stress tolerance of mixed grassland communities change in a future climate? A test with heavy metal stress (zinc pollution)

J. Van den Berge, K. Naudts, I.A. Janssens, R. Ceulemans, I. Nijs

This study is the first to examine plant responses to a heavy metal (Zn) in a changing climate, and shows that the tolerance of plants to Zn stress will not be altered in a future climate.

3302 Mercury exposure in terrestrial birds far downstream of an historical point source

A.K. Jackson, D.C. Evers, S.B. Folsom, A.M. Condon, J. Diener, L.F. Goodrick, A.J. McGann, J. Schmerfeld, D.A. Cristol

Blood mercury levels of forest songbirds remain elevated above reference levels for at least 137 km downstream of historical point source.

3309 The efficiency of tobacco Bel-W3 and native species for ozone biomonitoring in subtropical climate, as revealed by histo-cytochemical techniques

E.S. Alves, B.B. Moura, A.N.V. Pedroso, F. Tresmondi, M. Domingos

Nicotiana tabacum 'Bel-W3' is better than native species for O₃ biomonitoring in the subtropics, as revealed by histo-cytochemical techniques.

3316 Historical estimation of carbonaceous aerosol emissions from biomass open burning in China for the period 1990–2005

Y. Qin, S.D. Xie

Chinese multi-year carbonaceous aerosol emission inventories from biomass open burning were established for the period of 1990–2005 for the first time.

3324 The internal microstructure and fibrous mineralogy of fly ash from coal-burning power stations

P. Brown, T. Jones, K. BéruBé

Chinese CFA possessed a greater crystalline mineral content and smaller particle size than UK and Polish CFA, the fibrous mullite present displayed a high aspect-ratio and thus is likely to be a respiratory hazard in vivo.

3334 Evaluation of alternative PCB clean-up strategies using an individual-based population model of mink

C.J. Salice, B.E. Sample, R. Miller Neilan, K.A. Rose, S. Sable

An individual-based model of mink showed strong population-level effects of PCB contamination and provided insight into optimal PCB remediation strategies.

3344 Pesticide pollution in agricultural areas of Northern Vietnam: Case study in Hoang Liet and Minh Dai communes

P.M. Hoai, Z. Sebesvari, T.B. Minh, P.H. Viet, F.G. Renaud

Pollution with recently used and banned pesticides was observed in the environment and food products in Northern Vietnam and is discussed in context of human exposure.

CONTENTS—Continued from outside back cover

- 3351 Application of silicone rubber passive samplers to investigate the bioaccumulation of PAHs by *Nereis virens* from marine sediments**
K. Yates, P. Pollard, I.M. Davies, L. Webster, C.F. Moffat
*Silicone rubber samplers provide data on availability of PAHs from marine sediments which improves determination of bioaccumulation potential in *Nereis virens*.*
- 3357 Regulation (EC) No. 1107/2009 and upcoming challenges for exposure assessment of plant protection products – Harmonisation or national modelling approaches?**
E. Erlacher, M. Wang
The results of this study show that harmonisation is hardly achievable based on the current exposure assessment approaches in the EU.
- 3364 Anthropogenic and naturally occurring polybrominated phenolic compounds in the blood of cetaceans stranded along Japanese coastal waters**
K. Nomiya, A. Eguchi, H. Mizukawa, M. Ochiai, S. Murata, M. Someya, T. Isobe, T.K. Yamada, S. Tanabe
Specific differences in the distribution of anthropogenic and naturally occurring polybrominated phenolic compounds and the relationships were found among the cetacean species.
- 3374 Uptake of 17 β -estradiol and biomarker responses in brown trout (*Salmo trutta*) exposed to pulses**
J.J.G. Knudsen, H. Holbech, S.S. Madsen, P. Bjerregaard
The threshold concentration for induction of estrogenic effects in brown trout upon short term (6 h) exposure is in the range 150–200 ng E2 L⁻¹.
- 3381 Bioavailability of particulate metal to zebra mussels: Biodynamic modelling shows that assimilation efficiencies are site-specific**
A. Bourgeault, C. Gourlay-Francé, C. Priadi, S. Ayrault, M.-H. Tusseau-Vuillemin
The interpretation of metal bioaccumulation in transplanted zebra mussels with biodynamic modelling highlights the need for site-specific assimilation efficiencies of particulate metals.
- 3390 Bioaccumulation and trophic transfer of dioxins in marine copepods and fish**
Q. Zhang, L. Yang, W.-X. Wang
Biokinetic calculation showed that dietary accumulation was the predominant pathway for dioxin accumulation in marine copepods and fish.
- 3398 Interactions of arsenic and phenanthrene on their uptake and antioxidative response in *Pteris vittata* L.**
L. Sun, X. Yan, X. Liao, Y. Wen, Z. Chong, T. Liang
**Pteris vittata* L. not only efficiently accumulate arsenic but also enhance phenanthrene dissipation under the arsenic and phenanthrene co-exposure.*
- 3406 Using stable lead isotopes to trace heavy metal contamination sources in sediments of Xiangjiang and Lishui Rivers in China**
G.-X. Sun, X.-J. Wang, Q.-H. Hu
Lower ²⁰⁶Pb/²⁰⁷Pb and higher ²⁰⁸Pb/²⁰⁶Pb ratio in the Xiangjiang sediment in China suggest that the contamination of heavy metals was from extensive ore-mining activities in the region.
- 3411 Effect of surfactant-coated iron oxide nanoparticles on the effluent water quality from a simulated sequencing batch reactor treating domestic wastewater**
S. Hwang, D. Martinez, P. Perez, C. Rinaldi
Stable presence of surfactant-coated engineered iron oxides nanoparticles deteriorated the effluent water quality at a statistically significant level ($p < 0.05$).
- 3416 Planting woody crops on dredged contaminated sediment provides both positive and negative effects in terms of remediation**
W. Hartley, P. Riby, N.M. Dickinson, B. Shutes, S. Sparke, M. Scholz
Soil biological quality improves in a woody crop stand eight years after a phytoremediation trial.
- 3425 Outdoor and indoor cadmium distributions near an abandoned smelting works and their relations to human exposure**
D.J. Spurgeon, A. Lawlor, H.L. Hooper, R. Wadsworth, C. Svendsen, L.D.K. Thomas, J.K. Ellis, J.G. Bundy, H.C. Keun, L. Jarup
Measured and modelled environmental cadmium concentrations provide limited additional explanation of human urinary cadmium concentrations.
- 3433 PBDEs, PCBs, and DDE in eggs and their impacts on aplomado falcons (*Falco femoralis*) from Chihuahua and Veracruz, Mexico**
M.A. Mora, C. Baxter, J.L. Sericano, A.B. Montoya, J.C. Gallardo, J.R. Rodríguez-Salazar
PBDEs, PCBs, and p,p'-DDE were not elevated in eggs and not likely to impact aplomado falcons in eastern and northern Mexico.
- 3439 Engineered nanomaterials in rivers – Exposure scenarios for Switzerland at high spatial and temporal resolution**
F. Gottschalk, C. Ort, R.W. Scholz, B. Nowack
Environmental concentrations and risk potential for engineered nanomaterial in rivers were predicted by combining probabilistic material flow analysis and graph theory.

ENVIRONMENTAL POLLUTION

CONTENTS—Continued from inside back cover

- 3446 The oxidative potential and biological effects induced by PM₁₀ obtained in Mexico City and at a receptor site during the MILAGRO Campaign**
R. Quintana, J. Serrano, V. Gómez, B. de Foy, J. Miranda, C. Garcia-Cuellar, E. Vega, I. Vázquez-López, L.T. Molina, N. Manzano-León, I. Rosas, A.R. Osornio-Vargas
Mexico City ventilation patterns had little effect on the intrinsic PM₁₀ composition and toxicological potential, which suggests a significant involvement of local sources as opposed to downwind transport.
- 3455 Effects of high atmospheric CO₂ concentration on root hydraulic conductivity of conifers depend on species identity and inorganic nitrogen source**
T. Gebauer, H. BassiriRad
Root water transport responses to rising atmospheric CO₂ concentration depends on species identity and inorganic N sources.
- 3462 Relationship between ²¹⁰Pb_{ex} activity and sedimentary organic carbon in sediments of 3 Chinese lakes**
L. Xu, F. Wu, G. Wan, H. Liao, X. Zhao, B. Xing
The algal productivity may affect the distribution of ²¹⁰Pb_{ex} and sediment dating in lake sediments.
- 3468 The effect of γ -Fe₂O₃ nanoparticles on *Escherichia coli* genome**
S. He, Y. Feng, N. Gu, Y. Zhang, X. Lin
*Mutations of *Escherichia coli* were induced by γ -Fe₂O₃ nanoparticles.*
- 3474 Long-term mercury dynamics in UK soils**
E. Tipping, R.A. Wadsworth, D.A. Norris, J.R. Hall, I. Ilyin
Atmospherically-deposited anthropogenic mercury, mostly of local origin, has accumulated in UK soils, and is now a significant source of Hg⁰ to the global circulation.
- 3484 Thallium in the hydrosphere of south west England**
S. Law, A. Turner
Concentrations of dissolved thallium in waters of south west England span two orders of magnitude and are greatest in water from an abandoned mine.
- 3490 Uptake and translocation of arsenite by *Pteris vittata* L.: Effects of glycerol, antimonite and silver**
S. Mathews, B. Rathinasabapathi, L.Q. Ma
*AsIII uptake in *P. vittata* was via unusual aquaglyceroporins or other novel transporter proteins, which was not affected by glycerol or SbIII but was sensitive to 0.01 mM AgNO₃.*
- 3496 Products and stability of phosphate reactions with lead under freeze–thaw cycling in simple systems**
E.G. Hafsteinsdóttir, D.A. White, D.B. Gore, S.C. Stark
Pyromorphite, formed from Pb phosphate fixation, is stable during multiple freeze–thaw cycles but the efficiency of the fixation depends on the phosphate source and the type of Pb mineral.
- 3504 An evaluation of the toxicity and bioaccumulation of cisplatin in the marine environment using the macroalga, *Ulva lactuca***
C. Easton, A. Turner, G. Sewell
*The cytotoxic drug, cisplatin, is accumulated and internalised by the marine macroalga, *Ulva lactuca*, but is not phytotoxic up to concentrations of 150 nM.*
- 3509 XAFS study of starch-stabilized magnetite nanoparticles and surface speciation of arsenate**
M. Zhang, G. Pan, D. Zhao, G. He
The presence of starch leads to the formation of more effective adsorbing sites and stronger adsorption affinity of arsenate on magnetite nanoparticle surfaces.
- 3515 Polychlorinated naphthalenes (PCNs) in riverine and marine sediments of the Laizhou Bay area, North China**
X. Pan, J. Tang, Y. Chen, J. Li, G. Zhang
A systematic sampling of riverine and marine sediments was conducted in Laizhou Bay area to investigate the distribution and possible sources of PCNs.
- 3522 Concentrations and assessment of exposure to siloxanes and synthetic musks in personal care products from China**
Y. Lu, T. Yuan, W. Wang, K. Kannan
Dermal application of several personal care products is a major source of human exposure to cyclic and linear siloxanes.
- 3529 On-site and off-site atmospheric PBDEs in an electronic dismantling workshop in south China: Gas-particle partitioning and human exposure assessment**
T. An, D. Zhang, G. Li, B. Mai, J. Fu
The findings of this study may serve as a valuable reference for future risk assessment and environmental management in Guiyu, South China.

- 3536 Contamination and source differentiation of Pb in park soils along an urban–rural gradient in Shanghai**
H.-b. Li, S. Yu, G.-l. Li, H. Deng, X.-s. Luo
Coal combustion emission was identified as the main anthropogenic source of soil Pb contamination affecting Shanghai parks.
- 3545 Vertical distribution of hydrocarbons in the low troposphere below and above the mixing height: Tethered balloon measurements in Milan, Italy**
G. Sangiorgi, L. Ferrero, M.G. Perrone, E. Bolzacchini, M. Duane, B.R. Larsen
Vertical transport and photochemical loss of HCs below and above the mixing height were studied by means of a novel and simple approach.
- 3553 Mechanisms of purple moor-grass (*Molinia caerulea*) encroachment in dry heathland ecosystems with chronic nitrogen inputs**
U. Friedrich, G. von Oheimb, C. Dzionek, W.-U. Kriebitzsch, K. Selbmann, W. Härdtle
The present study indicates that the heath's pioneer phase is the crucial tipping point at which a shift to dominance of purple moor-grass occurs under increased N availability.
- 3560 Trees as bioindicator of heavy metal pollution in three European cities**
T. Sawidis, J. Breuste, M. Mitrovic, P. Pavlovic, K. Tsigaridas
*Oriental plane (*Platanus orientalis* L.) and Austrian pine (*Pinus nigra* Arn.), widespread in urban northern and southern Europe, are suitable for comparative biomonitoring of urban air pollution.*
- 3571 Reduced European emissions of S and N – Effects on air concentrations, deposition and soil water chemistry in Swedish forests**
G. Pihl Karlsson, C. Akselsson, S. Hellsten, P.E. Karlsson
Reduced European emissions have led to decreased acidic deposition and a slow recovery of soil water but nitrogen deposition remains the same in Swedish forests.
- 3583 Transfer functions for solid–solution partitioning of cadmium for Australian soils**
W. de Vries, M.J. McLaughlin, J.E. Groenenberg
Linear adsorption constants best describe cadmium behaviour in Australian soils, when accounting for variation in pH, SOM contents and DOC concentrations.
- 3595 The effect of metal pollution on the population genetic structure of brown trout (*Salmo trutta* L.) residing in the River Hayle, Cornwall, UK**
C.J. Durrant, J.R. Stevens, C. Hogstrand, N.R. Bury
Aquatic metal pollution does not affect the gene flow between brown trout resident below and above a metal mining waste discharge point in the River Hayle, Cornwall, UK.
- 3604 Assessment of organochlorine pesticide residues in Atlantic Rain Forest fragments, Rio de Janeiro, Brazil**
N.S. Quinete, E.d.S. de Oliveira, D.R. Fernandes, A.d.S. Avelar, R.E. Santelli
The occurrence of organochlorine pollutants in soils of the Atlantic rainforest fragments in Rio de Janeiro, Brazil demands a monitoring program of its compartments.
- 3613 Long term remediation of highly polluted acid mine drainage: A sustainable approach to restore the environmental quality of the Odiel river basin**
M.A. Caraballo, F. Macías, T.S. Rötting, J.M. Nieto, C. Ayora
A high permeable alkaline reactive substrate offers a sustainable option to remediate severely polluted acid mine drainage in the Odiel basin
- 3620 Metabolic responses of *Eisenia fetida* after sub-lethal exposure to organic contaminants with different toxic modes of action**
J.R. McKelvie, D.M. Wolfe, M.A. Celejewski, M. Alaei, A.J. Simpson, M.J. Simpson
*¹H NMR metabolomics was used to identify potential biomarkers of organic contaminant exposure in *Eisenia fetida* earthworms.*
- 3627 Screening of Cd tolerant genotypes and isolation of metallothionein genes in alfalfa (*Medicago sativa* L.)**
X. Wang, Y. Song, Y. Ma, R. Zhuo, L. Jin
Two Cd tolerant alfalfa genotypes were screened and their metallothionein genes were cloned which showed that MsMT2a was universally expressed but MsMT2b was Cd inducible expression.
- 3634 Biogeochemical dynamics of perfluorinated alkyl acids and sulfonates in the River Seine (Paris, France) under contrasting hydrological conditions**
P. Labadie, M. Chevreuil
PFOA, PFOS and PFHxS levels in the River Seine negatively correlated with river flow rate, suggesting that point sources were predominant for these major PFCs.
- 3640 New DDT inputs after 30 years of prohibition in Spain. A case study in agricultural soils from south-western Spain**
J. Muñoz-Arnanz, B. Jiménez
Based on the isomeric ratio $R_{p,p'/p,p'}$, a plausible recent input of technical DDT was found in agricultural soils from south-western Spain after more than 30 years of DDT ban.
- 3647 Tissue distribution of Dechlorane Plus and its dechlorinated analogs in contaminated fish: High affinity to the brain for anti-DP**
Y. Zhang, J.-P. Wu, X.-J. Luo, J. Wang, S.-J. Chen, B.-X. Mai
The anti-DP showed higher affinity to the brain compared to the liver in the contaminated fish.

CONTENTS—Continued from page V

- 3653 Levels and distribution of organophosphorus flame retardants and plasticizers in fishes from Manila Bay, the Philippines**
J.-W. Kim, T. Isobe, K.-H. Chang, A. Amano, R.H. Maneja, P.B. Zamora, F.P. Siringan, S. Tanabe
Occurrence and bioaccumulation of organophosphorus compounds (OPCs) were determined in fishes from Manila Bay.
- 3660 Organophosphorus flame retardants and plasticizers in the atmosphere of the North Sea**
A. Möller, Z. Xie, A. Caba, R. Sturm, R. Ebinghaus
Organophosphorus flame retardants, in particular tris(2-chloroisopropyl) phosphate, are emitted into the North Sea atmosphere by Western European countries.
- 3666 Polybrominated diphenyl ethers (PBDEs) in soils along a rural-urban-rural transect: Sources, concentration gradients, and profiles**
B. Gevao, A.N. Ghadban, S. Uddin, F.M. Jaward, M. Bahloul, J. Zafar
PBDE concentrations in soil samples collected along a rural-urban-rural transect provide evidence that urban centers are sources to the surrounding environment.
- 3673 2,4,6-Trinitrotoluene mineralization and bacterial production rates of natural microbial assemblages from coastal sediments**
M.T. Montgomery, R.B. Coffin, T.J. Boyd, J.P. Smith, S.E. Walker, C.L. Osburn
The capacity to mineralize TNT ring carbon to CO₂ is a common feature of natural bacterial assemblages in coastal sediment.
- 3681 Vertical fluxes of aromatic and aliphatic hydrocarbons in the Northwestern Mediterranean Sea**
R. Deyme, I. Bouloubassi, M.-H. Taphanel-Valt, J.-C. Miquel, A. Lorre, J.-C. Marty, L. Méjanelle
Vertical fluxes of aliphatic and aromatic hydrocarbons in the Ligurian Sea show ample seasonal and inter-annual variability and are controlled by mass flux dynamics.
- 3692 Recalcitrance of polycyclic aromatic hydrocarbons in soil contributes to background pollution**
R. Posada-Baquero, J.-J. Ortega-Calvo
Background soil PAHs are highly resistant to biodegradation.
- 3700 Inputs of antifouling paint-derived dichlorodiphenyltrichloroethanes (DDTs) to a typical mariculture zone (South China): Potential impact on aquafarming environment**
H.-Y. Yu, R.-L. Shen, Y. Liang, H. Cheng, E.Y. Zeng
The potential impact from the use of DDT-containing antifouling paints on aquafarming environment is examined.
- 3706 Levels and sources of brominated flame retardants in human hair from urban, e-waste, and rural areas in South China**
J. Zheng, X.-J. Luo, J.-G. Yuan, J. Wang, Y.-T. Wang, S.-J. Chen, B.-X. Mai, Z.-Y. Yang
BFR levels in hair from different areas in South China were determined and endogenous pathway was found to be the major source of hair BFRs.
- 3714 Decrease in catalase activity of *Folsomia candida* fed a Bt rice diet**
Y. Yuan, X. Ke, F. Chen, P.H. Krogh, F. Ge
*The catalase of the collembolan (*Folsomia candida*) was decreased when fed Bt-rice, Kemingdao.*
- 3721 Mercury in United Kingdom topsoils; concentrations, pools, and Critical Limit exceedances**
E. Tipping, J.M. Poskitt, A.J. Lawlor, R.A. Wadsworth, D.A. Norris, J.R. Hall
Mercury contents of 898 UK and 868 European rural soils are largely lower than Critical Limit values, but appreciable numbers of soils in UK urban and industrial areas show exceedance.
- 3730 The effect of mycorrhiza on the growth and elemental composition of Ni-hyperaccumulating plant *Berkheya coddii* Roessler**
E. Orłowska, W. Przybyłowicz, D. Orłowski, K. Turnau, J. Mesjasz-Przybyłowicz
*Inoculation of Ni-hyperaccumulating plant *Berkheya coddii* with arbuscular mycorrhizal fungi significantly enhanced plant growth and increased Ni uptake.*
- 3739 Phytoremediation of arsenic contaminated paddy soils with *Pteris vittata* markedly reduces arsenic uptake by rice**
W.-L. Ye, M.A. Khan, S.P. McGrath, F.-J. Zhao
*Phytoremediation with *P. vittata* significantly reduced arsenic uptake by rice from contaminated paddy soils.*
- 3744 Enhanced removal of pentachlorophenol by a novel composite: Nanoscale zero valent iron immobilized on organobentonite**
Y. Li, Y. Zhang, J. Li, X. Zheng
NZVI immobilized on CTMA-Bent showed enhanced efficiency on removing pentachlorophenol, indicating synergetic effect between NZVI and CTMA-Bent.
- 3750 Adverse effects of fullerenes (nC₆₀) spiked to sediments on *Lumbricus variegatus* (Oligochaeta)**
K. Pakarinen, E.J. Petersen, M.T. Leppänen, J. Akkanen, J.V.K. Kukkonen
Exposure to fullerene-spiked sediment decreased black worms' feeding and depuration efficiency, but fullerenes did not appear to be absorbed into the microvilli.
- 3757 Influence of dissolved oxygen on aggregation kinetics of citrate-coated silver nanoparticles**
W. Zhang, Y. Yao, K. Li, Y. Huang, Y. Chen
This work emphasized the importance of accounting dissolved oxygen into the assessment of the stability of AgNPs in aqueous environments.

CONTENTS—Continued from page IV

- 3763 Influence of activated carbon amendment on the accumulation and elimination of PCBs in the earthworm *Eisenia fetida***
P. Paul, U. Ghosh

Addition of activated carbon to PCB impacted soil reduces equilibrium aqueous concentrations and uptake at the base of the terrestrial food chain.

- 3769 Bioremediation of benzene-, MTBE- and ammonia-contaminated groundwater with pilot-scale constructed wetlands**
E.M. Seeger, P. Kusch, H. Fazekas, P. Grathwohl, M. Kaestner

Gravel bed constructed wetlands and a plant root mat system efficiently eliminated fuel hydrocarbons (benzene, MTBE) and ammonia-N from groundwater at a pilot-scale.

- 3777 The biodegradation of cable oil components: Impact of oil concentration, nutrient addition and bioaugmentation**
M.G. Towell, G.I. Paton, K.T. Semple

Cable oil concentration and bioaugmentation strongly influence cable oil biodegradation in soils.

- 3784 The changes of nitric oxide production during the growth of *Microcystis aeruginosa***
X. Tang, J. Chen, W.-H. Wang, T.-W. Liu, J. Zhang, Y.-H. Gao, Z.-M. Pei, H.-L. Zheng

*NO produced by *M. aeruginosa* has an promoting effect on cyanobacterial growth.*

Short Communication

- 3793 Testing the resistance of fullerenes to chemothermal oxidation used to isolate soots from environmental samples**
D.X. Flores-Cervantes, T.D. Bucheli

The chemothermal oxidation at 375 °C method partially isolates C60 fullerenes from soils and sediments.