

## Contents in Context

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#### **Something in the air: connections between global warming, ozone depletion, POPs and particulates**

**Ian D. Rae**

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The release of chemical substances to the environment was long seen simply as a way to get rid of them from the immediate vicinity of their generation. Until recently there was little consideration that regional or global problems might result. Further, the various releases were studied by specialists who lacked the breadth of knowledge to understand that many of their specialties were linked and that chemical identity, toxicity, bio-accumulation, regional and global weather patterns and some arcane physical chemistry would need to be involved in a comprehensive analysis of the impact of chemicals on the environment.

#### **Leaf cutter ants: a possible missing source of biogenic halocarbons**

**M. I. Mead, M. A. H. Khan, G. Nickless, B. R. Grealley, D. Tainton, T. Pitman and D. E. Shallcross**

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With large reductions in anthropogenic emissions of many ozone-depleting gases in response to the Montreal Protocol, gases with biogenic sources have become relatively more important in recent years. The global budgets of the biogenic halocarbons are unbalanced with known sinks outweighing sources, suggesting that additional natural sources are required to balance the budgets. In the present study, an investigation has been carried out to determine the importance of leaf cutter ants as a missing source of the biogenic halocarbons, which will reduce the discrepancy of the global budget of the halocarbons.

#### **Methyl and ethyl nitrate saturation anomalies in the Southern Ocean (36–65°S, 30–70°W)**

**Claire Hughes, Adele L. Chuck, Suzanne M. Turner and Peter S. Liss**

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The alkyl nitrates are a group of organic compounds that are known to be produced naturally in seawater. The sea-to-air flux of alkyl nitrates is believed to contribute significantly to the 'odd nitrogen' reservoir of the atmosphere and to play an important role in regulating tropospheric ozone levels in remote marine regions. Here we expand our knowledge of alkyl nitrate concentration distributions and saturation anomalies to Southern Ocean waters.

#### **Diurnal variation of non-methane hydrocarbons in the subantarctic atmosphere**

**Bernard Bonsang, Amine Al Aarbaoui and Jean Sciare**

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The ocean surface is known to be supersaturated in some non-methane hydrocarbons and particularly alkenes. This oceanic source, though small on a global scale, can be a dominant component of the background atmosphere in remote areas. Attempts have been made to quantify this source, in order to estimate its magnitude in the budgets of these gases in the water column and the atmosphere. A main difficulty is to determine the production processes involved under the effects of plankton activity and solar and UV radiation penetration in the water column.

#### **Trace metal dynamic speciation studied by scanned stripping chronopotentiometry (SSCP)**

**Rute F. Domingos, Rocio Lopez and José P. Pinheiro**

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Natural aquatic systems are subject to changing conditions and practically never reach chemical equilibrium. Therefore, a quantitative understanding of the interaction of the trace metals with heterogeneous samples and their kinetic characteristics requires the dynamic characterisation of trace metal speciation. We show that scanned stripping chronopotentiometry (SSCP) is able to discriminate the dynamic nature of the complexes, although it still overestimates the average stability constants obtained from the SSCP wave characteristics using the Freundlich isotherm to account for the chemical heterogeneity.

#### **How does acid treatment to remove carbonates affect the isotopic and elemental composition of soils and sediments?**

**Milena Fernandes and Evelyn Krull**

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The ability to accurately determine the elemental and isotopic composition of soils and sediments has important implications to our quantitative understanding of global biogeochemical cycles. However, the analysis of organic carbon in solid matrices is a time-consuming task that requires the selective removal of carbonates, a treatment that has the potential to significantly alter the composition of the original sample. In the present work, we compare three of the most common acid treatments used for carbonate removal, and critically evaluate their effect on the content and isotopic signature of organic carbon and nitrogen in both soils and sediments.

**Sequestration and retention of uranium(VI) in the presence of hydroxylapatite under dynamic geochemical conditions**

*Dawn M. Wellman, Julia N. Glovack, Kent Parker, Emily L. Richards and Eric M. Pierce*

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Contamination of surface and subsurface geologic media by heavy metals and radionuclides is a significant problem within the United States Department of Energy complex as a result of past nuclear operations. Numerous phosphate-based remediation strategies have been proposed to introduce hydroxylapatite directly or indirectly (i.e. through in situ precipitation) into subsurface regimes to act as an efficient sorbent for sequestration of metals and radionuclides such as uranium. Results presented here illustrate the importance of variable geochemical conditions on the mechanism of sequestration and long-term retention of uranium in the presence of hydroxylapatite.

**Distributions and fluxes of contaminant metals in the North Sea: comparisons between field measurements and model simulations using NOSTRADAMUS**

*A. D. Tappin, P. J. Statham, J. D. Burton and S. Gellers-Barkmann*

*Environ. Chem.* **2008**, 5, 51

The North Sea, which is of significant ecological, economic and recreational value to NW Europe, has for many years received enhanced inputs of contaminant metals arising from human activity around its shores. Fluxes of copper, nickel, zinc, chromium and other constituents throughout the southern North Sea were estimated using a numerical model in order to identify the main sources and sinks for these metals. Comparison of model output with independent and other data showed good agreement in general. The results indicate that models of the kind developed here can be used to provide useful information on contaminant metal transport in coastal waters.

**Fluoride removal from aqueous solution by Ca-pretreated macrophyte biomass**

*Patricia Miretzky, Carolina Muñoz and Alejandro Carrillo-Chávez*

*Environ. Chem.* **2008**, 5, 68

Fluoride concentrations in drinking water above  $1.5 \text{ mg L}^{-1}$  may be detrimental to human health. Many methods have been developed for removing excessive fluoride from drinking water. The use of an aquatic macrophyte biomass (*Eleocharis acicularis*) pretreated with  $\text{Ca}^{2+}$ , a low-cost natural material, could be a technique for rural populations in developing countries that cannot afford treated or bottled water for daily consumption.

**Aluminoborosilicate waste glass dissolution under alkaline conditions at 40°C: implications for a chemical affinity-based rate equation**

*E. M. Pierce, E. L. Richards, A. M. Davis, L. R. Reed and E. A. Rodriguez*

*Environ. Chem.* **2008**, 5, 73

The production of nuclear materials has generated a very large amount of highly radioactive wastes that need to be disposed of in a manner that will keep them from posing a danger for millions of years until the radioactivity decays. The process being considered for this daunting task is to contain the wastes in glass. Although studies with ancient and natural glass suggest the weathering of glass is slow, experiments are being conducted to determine the impact of this material on the natural environment and attempt to predict its long-term behaviour. The present paper briefly discusses three models that are being considered for implementing this process and the one that appears to hold the most promise.