



Foreword

This special issue on halomethane biogeochemistry derives from the first meeting of the American Geophysical Union (AGU) to convene sessions under the new Biogeosciences section. A special session titled 'Halocarbons: Global Biogeochemistry and Contaminant Transformations' was held at the 2000 Fall AGU meeting in San Francisco. The session reflected the breadth of halocarbon science with 24 posters and talks, and a subset of those topics is presented here. The manuscripts in this issue encompass physical, earth, and life sciences. Such a multidisciplinary approach provides the synergy needed to elucidate biogeochemical processes, which likewise forms the core mission of this journal.

Halocarbons participate in numerous reactions, cycling at various timescales within and between the biosphere and the atmosphere. Sources of halocarbons are both natural and man-made, adding complexity to global cycles. The realization that halocarbons are significant to the status of atmospheric ozone motivates research and provides a legislative backdrop for scientific investigation. Imbalance in several atmospheric budgets has prompted scrutiny of the budget terms and exploration for possible unidentified sources. In turn, attention has focused on production and removal mechanisms and the effect of such processes on the fate of compounds and their stable isotopic composition.

In this issue, Laturus and others summarize the state of knowledge regarding natural sources of chloroform. Methyl halides are among the best studied of the halocarbons, and they are the subjects of the remaining manuscripts in the issue. Rhew and others review the state of knowledge regarding methyl halide emissions from salt marshes and provide original findings on the subject. Manley picks up a question posed by Rhew and others – 'Why do plants produce halomethanes?' His review of several hypotheses suggests that production of poly- and mono-halomethanes is fortuitous. It is noteworthy that bacterial *dehalogenation* during cometabolic reactions is a fortuitous consequence of certain oxygenase enzymes. Bacterial degradation of halomethanes, although not specifically represented in this issue, is a major focus of study of halocarbons in terms of biogeochemistry and contaminant transformation.

The final two papers report previously unpublished stable carbon isotope measurements. Used in conjunction with concentrations and flux measurements, stable isotopes provide a powerful tool to constrain global budgets. Bill and others report that bacterial, and possibly chemical, reactions during fumigation of soil result in the release of isotopically enriched methyl bromide. Thompson and others report the first stable carbon isotopic measurements for the chlorofluorocarbon CFC113 in background air. In addition, they report measurements for background methyl chloride in the troposphere and provide a model that constrains the global atmospheric budget of methyl chloride.

This special issue recognizes advances in halomethane biogeochemistry. The manuscripts printed here represent some of the diverse disciplines involved and illustrate the need to span scales from the enzymatic to the global in order to address biogeochemical issues.

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