

Joint BASIN- and MOLTER-sponsored conference
The Stable Isotope Composition of Biomarkers
Advances in analyses and applications of compound-specific stable isotopes
in ecology, ecosystem- and earth sciences (ISOCOMPOUND;
<http://isocompound2009.org>)

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Location: Potsdam (DE)

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Abstract

We propose a 3-day conference under the theme of recent advances in the analyses and application of compound-specific stable isotope data across various disciplines in the area of ecology, ecosystem- and earth sciences. Through joint organization and funding between the ESF-MOLTER (Molecular Structures as Drivers and Tracers of Terrestrial C Fluxes) networking programme and BASIN (Biosphere-Atmosphere Stable Isotope Network) we will, for the first time, bring together a suite of European and international scientists from the biological and geological sciences to further exchanges and future interdisciplinary projects.

Scientific Summary

Stable isotope analyses have become established as indispensable tools in the ecological and environmental sciences. Traditionally, CO₂ and H₂O as well as bulk samples of plants, soil or animal tissue have been analyzed for tracing the origin of materials or to integrate over biotic or abiotic processes. Analytical advances in the measurement of stable isotope ratios on individual organic compounds **provide a new set of tools for ecology, ecosystem- and earth sciences** where the molecular specificity and the isotopic signature of compounds can be explored concomitantly.

The scope of applications of compound-specific stable isotope analyses (CSIA) is enormous. It does not only provide **new levels of precision for the biochemical understanding** of bulk sample stable isotope signals but will also allow for **new mechanistic research directions in ecology, ecosystem- and the earth sciences.**

During the last decades CSIA has become an established method in the field of organic geochemistry. In particular for the reconstruction of paleoclimates from terrestrial or marine sedimentary archives CSIA have been proven extremely valuable. Adoption of the approach to other related fields of environmental science is, however, surprisingly slow, possibly due to the unfamiliarity of scientists with the molecular techniques that underlie CSIA. Given the enormous potential of CSIA **we believe it is the right time to assemble scientists across the traditional scientific disciplines with strong interests in CSIA in a multi-day workshop** that would allow the discussion of recent developments and future applications of CSIA in ecology, ecosystem- and earth sciences. **Bringing together the scientific communities from different fields** is critical at this point to exchange expertise on the advances in CSIA **across scientific disciplines and to stimulate new and interdisciplinary research** and therefore allow exploiting the full power of CSIA for ecology, ecosystem- and earth sciences.

The goal of the workshop will be placed on identifying the state-of-the-art in terms of instrumentation, sample preparation and application of CSIA in various fields of ecology, ecosystem- and earth sciences. Further emphasis will be on novel application of CSIA and facilitating interaction among researchers specializing in each of these areas of inquiry. The intellectual outcomes of this activity will be improved coordination of research efforts among groups, consensus understandings of the relative merits and limitations of current analytical methods and applications, and prioritization of future research directions according to their potential benefit to the research community and society.

Two tangible outcomes of the workshop could be:

- 1) An edited volume that will document the current state of research and chart directions for the future. Contributions would be requested from invited participants.
- 2) A workshop report will be submitted to an internationally top-ranked peer reviewed journal within 1 month of the workshop summarizing the outcomes of breakout group and whole-group discussions.

Meeting Programme:

The proposed workshop duration is three days. Morning sessions and early afternoon sessions will introduce focal topics for the day through mid-length (20-30 min) talks by invited speakers.

Afternoon sessions will involve poster presentations and discussions in breakout groups and whole-group syntheses and discussion. Short summary reports from each breakout group will be presented to the re-convened conference to motivate general discussion and will be compiled in electronic form as the basis for the workshop report.

In addition, selected young scientists (PhD students and Post-docs) will have the opportunity to present their research in 15-min talks during the afternoon sessions. We will strongly encourage young scientists (PhD students and Post-docs) to register for the conference and apply for available travel grant fellowships.

Registration will be limited to 150 people to provide a workshop character during the meeting.