

## Tracers: Elements of Evidence in Environmental Research

### 2 Detective Work

#### Lead Article

#### 3 Tracers – Making the Invisible Visible

#### Research Reports

#### 6 Determination of the Compound-Specific Isotope Signature of Chemical Pollutants

#### 8 Biological Tracers in Ecotoxicology

#### 10 Sediments – Archives of Detergents

#### 12 RNA – A Tracer to Detect Microorganisms

#### 14 Silver as a New Tracer for Diatom Production

#### 16 Temperature Microstructure as a Tracer of Turbulence and Mixing

#### 18 Identification of Groundwater Habitats Using Radon as a Tracer

#### 20 Conservative Elements on New Trails

#### Forum

#### 22 “Emerging Water Contaminants” An Interview with Ruth Gonseth

#### In Brief

#### 24 Publications 2870–2987, Books

#### 27 In Brief

**Publisher** Distribution and © by: EAWAG, P.O. Box 611, CH-8600 Duebendorf  
Phone +41-1-823 55 11  
Fax +41-1-823 53 75  
<http://www.eawag.ch>

**Editor** Martina Bauchrowitz, EAWAG

**Translations** Norbert Swoboda, USA

**Linguistic revision** Patricia Colberg, USA; Helen Bruegger, Zurich

**Copyright** Reprinting in whole or in part is permitted, as long as the EAWAG and the authors are informed. The source must be identified.

**Publication** Three times yearly in English, German and French

**Cover Photos** Zurich city police; WWW; M. Sturm, EAWAG; S. Wey, Zurich

**Design** inform, 8005 Zurich

**Layout** Peter Nadler, 8700 Kuesnacht

**Printed** on original recycled paper

**Subscriptions and changes of address** New subscribers are welcome! The order form is in the middle of this issue.

# Detective Work



**Bernhard Wehrli, chemist and head of the department “Surface Waters”**

Sherlock Holmes, Philip Maloney, Guido Brunetti, Stoner McTavish and other famous figures from the world of detective stories baffle the reader with their abilities to solve cases by assembling the whole scenario of a crime by observing minute details. Although environmental research is usually far less spectacular, it likewise involves the collection of clues and use of circumstantial evidence. Many processes occurring in water cannot be readily observed. Colorless nitrate, for example, is transformed by bacteria to invisible and odorless nitrogen gas. Despite the fact that our analytical methods can prove that nitrate disappears from the water, it remains difficult to determine how, where and by which microorganisms this transformation is accomplished.

Detectives often have the options of arresting, interrogating or observing a suspect in the hope of catching him/her in the act of committing another crime. Environmental research is faced with similar choices: one can bring nature into the laboratory and perform experiments under controlled conditions or attempt to uncover relevant processes with intensive and elaborate observations in the natural setting. Tracers are often extremely useful tools in the latter case; they expose otherwise invisible processes and put researchers on the right track. Some of the “detective methods” employed in modern environmental research are documented in this issue of EAWAG news.

Over the past few years, EAWAG has invested heavily in the development of tracer methods. Our research interests cover a wide range of areas, including research on turbulence phenomena in aquatic physics, transport and degradation of environmental pollutants, and processes in molecular biology. This scientific detective work requires

modern analytical tools. We have developed collaboration with research groups at the ETH-Zurich and with laboratories of the Canton of Zurich in order to share available infrastructure. The stable isotope mass spectrometer at EAWAG, for example, was acquired jointly with ETH-Zurich.

The introduction of such new techniques requires for mutual information and discussion. During the last winter semester, the Friday seminar of EAWAG was therefore dedicated to the topic of isotopic tracers. I am sure that these initiatives will improve our detective work for the environment.

