
EDITORIAL



The discipline environmental chemistry arose in the 1960s as a response to problems such as petroleum spills, smog formation, and nondegradable agrochemicals. A major milestone was the book *'Silent Spring'* by Rachel Carson, which appeared in 1962 and triggered a vigorous discussion on the problems of persistent and bioaccumulating pesticides. Ever since it started, environmental chemistry took great profit from the progress of analytical chemistry. Many of the discoveries relied heavily on the separation efficiency and sensitivity of gas chromatography in combination with selective detection such as electron capture detection or directly coupled mass spectrometry. Typical examples are the recognition of the ubiquitous occurrence of polychlorinated pollutants such as DDT, PCBs, polychlorinated dibenzodioxins, etc. For a long time, however, environmental chemists were not fully recognized by their established colleagues. I still remember my highly respected thesis advisor using the notion 'flower pickers' for environmental chemists.

In addition to measuring residual trace concentrations in the environment, process-oriented thinking was introduced into environmental chemistry. The goal is to understand the physicochemical, chemical, and biochemical reactions going on in the environment in such a way that predictions on the environmental fate of contaminants become feasible. This part of environmental chemistry experienced a major highlight when the Nobel Prize in Chemistry in 1995 was awarded to Paul Crutzen, Mario Molina, and Sherwood Rowland for their pioneering prediction of decreasing ozone levels in the stratosphere. Eventually, their forecast was verified by analytical scientists, who managed to detect and quantitatively measure the stratospheric ozone depletion in the Antarctic.

Now at the beginning of the 21st century, environmental chemistry has become a relatively well-established discipline based on two essential competences: understanding environmental processes and environmental analysis. The latter is the topic of this CHIMIA issue, in which fourteen contributions report on current research projects. The targeted analytes include classical pollutants such as persistent organic pollutants (POPs), which can still be used to observe environmental processes. In addition, the focus is on emerging contaminants such as polybrominated flame retardants and pharmaceuticals. Investigations of the aquatic environment are emphasized, *i.e.* the studies are based on the analyses of wastewaters, sewage sludges, ambient waters, lake sediments and fish. This CHIMIA issue is a contribution to the *International Year of Freshwater 2003*, an action program sponsored by several UN organizations and the WHO.

Swiss analytical chemists, in particular on the organic side, have traditionally been key players during the development of environmental analysis. High-resolution gas chromatography and its application to environmental samples was and still is performed at a highly sophisticated and forefront level in many laboratories in Switzerland. Swiss environmental research laboratories are also educating analytical environmental chemists, doing either their dissertations or postdoctoral work. This CHIMIA issue contains contributions from four different institutions in Switzerland (EAWAG, EMPA, EPFL and the Agricultural Research Station at Wädenswil) and from nine international research groups in six different countries. The senior authors of the international papers have all previously worked for some time in Swiss laboratories. Two articles report on cooperations between Swiss laboratories (EAWAG, EPFL) and research groups in Vietnam.

Currently, the regulation of industrial chemicals is a very much debated issue in the European Union. In order to assess the environmental risk of a chemical, exposure data have to be compared to potential hazards in so-called environmental risk assessments. In many cases, environmental exposure is assessed by predicting environmental concentrations from mathematical models applying available knowledge on inputs and environmental behavior. For important and high-volume chemicals, however, environmental concentrations should be measured by chemical analysis. As several articles in this CHIMIA issue show, environmental analysts are today able to measure trace concentrations of a large number of contaminants. The basis for this achievement is a combination of efficient enrichment procedures with the enormous potential of gas and liquid chromatography directly coupled to high-resolution or tandem mass spectrometry.

I hope that this CHIMIA issue on *Environmental Analysis* will contribute to the progress of environmental science and will improve our ability to accomplish reliable exposure assessments of environmental contaminants. In addition, I hope that the readers of CHIMIA will enjoy learning about the activities of Swiss and Swiss-connected analytical environmental chemists.



Prof. Walter Giger
Head Division of Analytical Chemistry
Swiss Chemical Society
E-Mail: giger@eawag.ch

It is with great appreciation that the Editorial Board of CHIMIA warmly thanks the coordinating guest editor Prof. Walter Giger for his efforts in planning and collating the present attractive variety of contributions and authors as well as the successful realization of the present issue on 'Environmental Analysis'.