

Applications of passive sampling devices in environmental monitoring, assessment, research and testing (J)

Conveners: Foppe Smedes (the Netherlands) and Ian Davies (UK)

The development of passive sampling devices for marine applications has been followed over the past few years by MCWG, WGBEC, and (particularly) WGMS. All of these groups have recognized the high potential of these techniques to directly address the availability of organic (and inorganic) contaminants in water and sediment. Passive sampling tools were initially developed for application to hydrophobic organic contaminants. Devices have subsequently been developed for sampling more polar organic compounds, and also metals. The application of these techniques can provide valuable links between the interests of several WGs, for example:

Passive samplers can directly address the (bio)availability of contaminants in sediment, and provide information on both the available amounts in sediment samples, and also equivalent available aqueous concentrations of contaminants. In the partition theory, which applies to most hydrophobic contaminants, the free dissolved concentration in the water-phase is considered to be the driving force for diffusive transport and uptake by aquatic organisms. Contaminant levels in sediments can be expressed in terms of equivalent concentrations in water. This suggests the possibility of a unification of assessments of the sediment and water quality.

Passive samplers can be used to assess contaminant concentrations in seawater (i.e. they might replace discrete water samples). Passive samplers can accumulate the bioavailable fraction of chemicals in water during prolonged exposures and estimate the time-weighted average exposure to environmental pollutants. This is of major importance in assessing the long-term exposure to pollutants, as well as increasing the probability of detecting episodic pollution events, which may be overlooked by spot sampling.

Extracts from passive samplers applied in water or sediment may then be used as sources of toxicants for *in vitro* bioassays. This approach could be used to detect the presence of new chemicals in areas selected for such monitoring, or be used in combination with TIE systems to identify the cause of toxicity.

The theme session will welcome reports of the field application of passive sampling tools in monitoring and assessment programmes, their use in laboratory studies, and technical papers on the development or validation of samplers. It is anticipated that contributions will include studies addressing the QA/QC strategies for passive samplers, validation of samplers in relation to other measurements, links between measurements derived from passive samplers and biological responses, the use of contaminants held in passive samplers in TIE or other *in vitro* toxicity assessment, etc.

Foppe Smedes, Nat. Inst. for Coastal and Marine Management, RIKZ, P.O. Box 207, NL-9750 AE Haren, the Netherlands, e-mail: f.smedes@rikz.rws.minvenw.nl

Ian Davies, Fisheries Research Services, Marine Laboratory, P.O. Box 101, 375 Victoria Road, Aberdeen AB11 9DB, United Kingdom, e-mail: daviesim@marlab.ac.uk