

## **Estimation of the Natural and Anthropogenic Components of Heavy Metal Fluxes in River Water**

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Metal concentrations in the river water originates from a natural rocks weathering source as well as from anthropogenic sources. To estimate the anthropogenic inputs, this study proposes an approach based on mass balance of heavy metal fluxes, including the estimate of the natural component using a natural tracer. This approach is synthesized in the following equation:  $AC = (MeO - MeI) - [(EiO - Eil) \times (MeOB/EiOB)]$ , where all quantities are expressed as fluxes for drainage basin area above the measurement point, AC is the anthropogenic component of the total metal flux increase in the river segment considered; MeO is the outflow of the metal from the river segment considered; MeI is the inflow of the metal into the river segment considered; (MeO - MeI) is the total metal flux increase (i.e., total metal balance) in the river segment considered; EiO is the natural tracer outflow from the river segment considered; Eil is the natural tracer inflow into the river segment considered; (EiO - Eil) is the total tracer flux increase (i.e., total tracer balance) in the river segment considered; MeOB is the metal outflow from the natural background river segment; EiOB is the natural tracer outflow from the natural background river segment (so that their ratio is identical to the metal:tracer concentration ratio in the water leaving the background segment); and thus  $[(EiO - Eil) \times (MeOB/EiOB)]$  is the natural component of the total metal flux increase in the river segment considered.