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The Chemical Time Bomb: How to Predict when it Will Go off

A. C. M. Bourg[1] and C. M.-L. Hamilton[2]

[1] Georesources and Environment EA4592, Dept. Geosciences, University of Pau, BP 1155, 64013 Pau Cedex, France
[2] Department of Geological Sciences, California State University Bakersfield, Bakersfield, CA 93311-1022, USA

Abstract. The Chemical Time Bomb Concept (CTB) refers to "events resulting in the delayed occurrence of harmful effects due to the mobilization of chemicals stored in soils and sediments". Why do some ecosystems accept contaminants with no (little) impact? If soils and sediments are sinks for metallic contaminants it is because their hydrogeochemical environment is favorable. Why do they release them at some point? Oversaturation of the ecosystem is often suggested as the cause. We propose here a new approach to this now well accepted concept. The soil or sediment retains its metallic pollutants as long as the controlling parameters, i.e. mostly pH and Eh, are stable. The pH or Eh buffer capacity of the solid is therefore the controlling parameter to avoid the release of metallic contaminants to the hydrosphere. Examples of natural and contaminated systems will be presented.

Keywords: Heavy metals, chemical time bomb, soils, sediments, risk assessment