

Editorial:**Trace Metal Pollution in China**

Rapid economic development in China over the last several decades has resulted in many environmental problems, one of which is metal pollution. Such large scale industrial activities and fast urbanization processes have released very substantial amounts of pollutants into the environment and exerted tremendous pressure on local ecosystems. Metal pollution is often considered as a ‘traditional’ environmental problem in China, but, with such rapid industrialization and often ‘uncontrolled’ releases of industrial wastes, has led to further recent deterioration in many local environments, and is now considered a new challenge for environmental regulators, scientists and engineers. The impact upon many environmental components, including air, water, soil, and biota, has been well recognized, but there are very few reports to systematically review such environmental pollution. Over the past few years, there have been a few Special Issues on environmental pollution of China in international journals (Zhu et al., 2007; Zeng and Tao, 2008), but collectively in-depth critical reviews are scarce, especially regarding the broad metal pollution issues.

This Special Issue on environmental metal pollution in *Science of the Total Environment* fills such a gap with seven comprehensive reviews on important trace metal pollution in China. The authors were invited to provide a holistic view on the selected topics of trace metal pollution based on their longstanding researches in the field. The review papers generally present three major components in selected research fields, namely ‘retrospective’, ‘current status’, and ‘prospective’. In the ‘retrospective’ part, the reviews normally provide the historical evolution of the research topics in China within the last few decades. The ‘current status’ of metal pollution in China is compiled and critically reviewed from key literature, including some brief comparisons

with other countries in the world. In the end, some important future research directions are often highlighted in the ‘prospective’ section.

In the first part of the Special Issue on multi-metal pollution, there are three papers dealing with metal pollution in different environmental media. Pan and Wang (2011) review metal pollution in estuarine and coastal environments in China, including major pollution sources, marine sediments quality, accumulation of metals in marine bivalves and Hg in marine fish (ecological impacts and seafood safety). The review provides an overall picture of metal pollution in coastal waters of China. Luo et al. (2011) present another comprehensive review on metal pollution in urban soils at a national scale. Rapid urbanization processes in China have put great pressure on these human-dominant ecosystems. The paper summarizes the characteristics of metal accumulation, spatial and temporal distribution, and major pollution sources in urban soils of China. Some potential future research areas are also discussed, including a possible risk assessment framework integrating land use type and environmental availability for urban ecosystems. Li et al. (2011) give an in-depth review of As, Se and Tl in China, especially on endemic diseases as a result of natural geochemical processes and/or related anthropogenic activities. The paper highlights the large areas affected by these three elements in the country, and discusses the potential relationship between human health and geochemical environments. Some possible future research fields on this topic are also discussed, including specific biomarkers for the endemic diseases, multi-element interactions in the environmental exposures, and health effects on children.

The second part of the Special Issue contains four reviews on specific metal pollutants in China. He et al. (2011) review the environmental pollution of Sb in China, which has the largest Sb ore reserve in the world. The review covers the major pollution source and the distribution of Sb in various environmental compartments. Xiao et al. (2011) provide a critical review on Tl in the Chinese environment, in particular the geo-environmentally-induced Tl pollution and its associated health impacts. The paper discusses the source, mobility, transportation pathway, and health exposure of Tl in China, especially in the southwest part of the country. Qiu et al. (2011) review Hg pollution in the areas of geologic resource extraction contaminated sites and typical aquatic ecosystems of China. The critical review provides detailed accounts on Hg distribution, transportation, methylation, and bioaccumulation in these study areas. Fu et al (2011) review the atmospheric Hg pollution in China, such as the distribution and transport of Hg in the atmospheric environment, including the anthropogenic and natural sources of Hg. Seasonal effects on Hg discharges and atmospheric transport and deposition are also discussed.

The selected review papers in this Special Issue were first developed during the First Workshop of Metal Environmental Research Consortium in China (MERC), held during 1st-2nd March 2009 in Xiamen, China. The mission of MERC is to promote environmental research on metals in China, to facilitate research collaboration among Chinese researchers, and to provide important scientific information for governments in formulating strategies on environmental control and pollution remediation in China. We hope that this Special Issue of collective critical reviews in STOTEN will offer some in-depth summaries on key metal pollution research fields in China, and shed some lights on important research topics in the future. We consider this special issue is particularly timely. The first year of China's 12th 5-Year Planning started in 2011,

and the first plan document released by the State Council was on heavy metal pollution remediation, highlighting the seriousness of metal pollution in the country, and the determination of the government to reduce such risk. With this plan and the huge spending by the government (at least 10 billion RMB (~1.6 billion USD)), it is required that the releases of major metal pollutants (e.g., Pb, Hg, Cd, Cr and As) will be reduced by 15% by the end of 2015 as compared with 2007. This will be a tremendous opportunity for Chinese scientists to embark on metal pollution and remediation research. Environmental metal research in China has suffered from a lack of vision since many consider that organic pollutants are far more important, and have shifted their researches to these emerging pollutants. We hope that, with the recent reports of widespread and phenomenal metal pollution as well as the government attention outlined above, environmental metal research in China will gain a new momentum leading to more fundamental and applied researches, aimed at greater understanding of the fundamental processes governing metal release and behaviour in the environment, and the development of cost-effective and green remediation technologies.

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