Editorial

Toward an Environmentally Friendly and Healthier World

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We live in a world that is continuously evolving which comes with new challenges. With the advances in science and technology, particularly in the past century, unprecedent anthropogenic effects on the natural ecosystem have been reported. The ability of humankind to utilize energy, synthesize chemicals, produce tools and goods has greatly enhanced the human power and improved living standards. However, along with these great achievements, numerous natural and synthetic substances are released into the environments due to human activities, causing negative effects on nearly all types of environmental media, including air, water and soil. For instance, the combustion of fossil fuels and industrial activities cause air pollution of NO_x, SO_2, particulate matter, acid rain and photochemical smog. Moreover, water bodies are contaminated by agriculture runoff, wastewater from animal husbandry, and industrial discharges, introducing nutrients like phosphorus and nitrogen as well as harmful substances such as heavy metals like lead, mercury, and cadmium, into aquatic ecosystems. Soil is polluted by trace elements and organic contaminants from anthropogenic sources such as fertilizers, wastewater, industrial emissions, solid wastes, road dust and atmospheric deposition of various pollutants. These "traditional" pollutants have been extensively studied and regulated for many years and are well controlled in many domains of the world.

However, besides the "traditional" pollutants, contaminants of emerging concerns (CECs) pose a new and growing global threat but have only recently been identified and quantified in the environments. Numerous new chemicals are synthesized each year, as reflected by the increase in the number of chemicals registered in the Chemical Abstract Service (CAS) from 50 million in 2009 to over 200 million in 2024. CECs are mainly synthetic chemicals used and applied without prior evaluation of their effects on the environment and human health. These CECs include neurotoxicants, endocrine disruptors, chemical herbicides, novel insecticides, pharmaceutical wastes, and nanomaterials. The Ministry of Ecology and Environment of China defines CECs as being hazardous to the ecological environment and human health but have not been adequately regulated or controlled. The ministry has marked persistent organic pollutants (POPs), endocrine disruptors, antibiotics, and microplastics as the four priority CECs for regulation and control in the future. In addition, risks from other key pollutants such as environmental nanomaterials, pathogenic microorganism, and bioaerosols deserve attention.

Environmental pollution is no longer a local problem but its influence is expanded regionally or globally. At the early stage of industrialization, air pollution was mostly restricted to industrial sites. With the development of urban agglomeration and urbanization, pollution has become a regional issue affecting diverse geographical niches that range from hundreds to kilometers. Air pollution can even affect distant regions and nations via long-range transport. Chemicals such as pesticides, pharmaceutical and personal-care products, and various product additives are distributed and used worldwide through international and national trade networks, and are eventually dispersed across the global environment. Moreover, POPs, which are toxic, resistant to degradation, and bio-accumulative, can be transported through air, water, and migratory species and deposited far from their release point, even reaching remote areas such as Arctic and Antarctic environments. The radioactive cloud from the Chernobyl disaster covered an area of about 4000 km^2, and was transported by wind over Ukraine, Belarus, Russia, Scandinavia and other parts of Europe. Therefore, environmental pollution is a global problem that requires a global perspective to understand its scope and control.

Environmental pollution also poses a serious threat to human health. An estimated 9 million premature deaths, or 16% of all deaths worldwide, were caused by environmental pollution in 2015. Air pollution is one of

the largest environmental health risks globally, responsible for 7 million deaths annually, followed by water pollution, occupational exposure, and pollution of soils, chemicals and metals. More than 99% of the world's population breathes air exceeding World Health Organization (WHO) air quality guidelines. Understanding the emission, transport, and fate of pollution between different environmental media, pollution remediation and control mechanism, exposure routes, and health effects is essential to improve the environmental quality and protect human health. Despite many advances in expanding knowledge in this domain, there are still many gaps. The concept of One Health was proposed recently, which emphasizes the interconnectedness of human, animal, and environmental health, recognizing that the health of each is inextricably linked. Pollutants in the environment not only directly affect human health but also impact animals and ecosystems, which in turn can have feedback effects on human health. Addressing these complex interactions requires a multidisciplinary approach that bridges gaps in current knowledge and integrates the fields of environmental science, exposure science, toxicology, epidemiology, and public health, assisted by novel data analysis methodology such as advanced machine learning and AI-based methods.

The typical approach of "grow first, clean up later" adopted by many industrialized countries is no longer viable. A new balance between development and environmental protection must be developed, which is particularly important for developing and emerging economies. For instance, China proposed a "Beautiful China" initiative aiming at creating an environmentally friendly and healthier nation. By 2035, it is expected that a green industry and way of life will be formed, carbon emission will decline after reaching the peak, and the ecological environmental quality will fundamentally improve, and the goal of "Beautiful China" is achieved. This will also be an ambitious and key step toward a sustainable and healthy world.

By launching the new journal "Global Environment Science", we endeavor to build an interdisciplinary platform for scientists from environmental sciences and other disciplines, and to advance the knowledge and solutions to the environmental problems. The main scope of Global Environmental Science includes the emission source of pollutants into environment, the behaviors and fate of pollutants in and between various environmental matrixes, as well as control mechanism and remediation strategy, specifically:

- Air Quality and Atmospheric Chemistry
- Air Pollution Control Mechanism
- Water Pollution and Control Mechanism
- Soil Pollution and Remediation
- Environmental Geochemistry of Organics, Metals, and Biohazards
- Environmental Exposure Assessment
- Environmental Toxicity
- Environmental Risk Assessment
- Environmental Impact of Global Changes

Conflicts of Interest: The authors declare no conflict of interest.