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EDITORIAL

China's environment: challenges and solutions

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In the past decades, China has experienced remarkable economic growth and rapid agricultural-to-industrial and rural-to-urban transitions. As a consequence, China, the most populous country in the world, now faces many daunting environmental challenges. They are significantly affecting human health and quality of life. The most serious environmental geological problems are depletion of potable water resource, groundwater contamination, loss of arable land, geological hazards induced by human activities.

According to the most recent statement of environment (Ministry of Environmental Protection 2009), all of the seven major rivers (the Yangtze River, Yellow River, Pearl River, Songhua River, Huaihe River, Haihe River and Liaohe River) were polluted by point and non-point sources. It was recommended that humans avoid direct contact with the water along 75% of the Huaihe River and Songhua River. China's major freshwater lakes are also polluted, with the water in half of China's 27 major lakes unsuitable for any uses. In June 2007, Lake Taihu, China's third largest, experienced an environmental catastrophe when an explosive outburst of toxic cyanobacteria, commonly known as pond scum, colored the lake fluorescent green. Newspapers reported that the drinking water supply of two million people was disrupted for several days.

With approximately 20% of the world's population but only about 5–7% of global freshwater resources, China draws heavily on groundwater. Groundwater is used to irrigate more than 40% of China's farmland, and for about 70% of the drinking water in the dry northern and northwestern regions. Those reserves are being depleted at an alarming rate in some regions and are badly polluted in many others. It is conventional to distinguish rechargeable shallow groundwater from non-rechargeable deep groundwater. Consuming deep groundwater is similar to mining a non-renewable resource since its recharge may take thousands of years. The World Bank (World Bank 2001), based on data from the Ministry of Water Resources in China, estimated that China consumes 25 billion m^3 of deep groundwater annually. In some parts of the North China plain, the deep groundwater table has dropped more than 50 m since 1960, and it continues to drop 2 m annually (World Bank 2001). Huge cones of depression in the underlying aquifers have emerged in North and East China. The depression area of Hengshui and Cangzhou in Hebei Province is one of the largest, covering 9,000 km^2 (MEP 2006). The groundwater-level drop has led to land subsidence and collapse on both regional and local scales. In southern and southeastern China, where rapid economic development takes place, groundwater is now laden with heavy metals and other pollutants. A China geological survey report presented at the 2010 International Groundwater Forum in Beijing shows that 90% of groundwater is polluted, 60% of it seriously so.

The economic growth has intensified mining of mineral resources. The most severe environmental problems often

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occur in mining areas. In a phosphate mine of Hubei Province, a collapse of 64,000 m^2 land that overlay an underground mine claimed 284 lives. According to a recent survey by the primary author of this paper, more than 10,500 mining-related geohazards, including groundwater contamination, land subsidence, earth fracturing, landslides, mining wastes, geological hazards, esthetic pollution, and ecological havoc, occurred in the year 2007. The amount of un-treated discharged from mines was approximately 4.5 billion m^3 in 2007. Environmental protection has become the key to achieve harmonious balanced economic growth in mining areas and in the country.

In order to understand China's environmental problems, to explore possible solutions, and to provide policy makers with recommendations on how to solve these problems, we have organized this special issue of Environmental Earth Science, in which some of specific environmental issues are discussed.

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