DEVELOPMENT PROGRESS OF THE YANGTZE ENVIRONMENTAL SPECIMEN BANK (YESB), CHINA

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Introduction

After more than 30 years of rapid economic development, the environmental quality in China has been changed a lot. Compared with developed countries which have already stepped into the era of environmental quality monitoring, pollution source monitoring is still the dominant work in China. Although some routine monitoring works have been carried out on water and air quality from early 1980s, less attention has been paid to the long-term preservation of environmental samples, as well as research on human exposure to persistent toxic substances in the environment and their relevant health effects.

Environment Specimen Bank (ESB) is the systematic collection and storage of samples of representative types of specimens (from humans and from ecosystems) for their posterior analysis[1]. The main aim of an ESB is to allow retrospective studies to be carried out. In addition, ESB can also be used for periodic monitoring of environmental quality, or for retrospective control of legislative measures for environmental protection, etc[2].

Early development of ESBs occurred in a few countries in Europe, North America, and Asia, which was represented by Japan. Interest is now world-wide. Within the last five years, three new banking programs, two in France and one in Korea were developed. However, no symmetric and comprehensive ESB was built currently in China. In this study, we discussed our opinion on how to develop the ESB in China based on the ongoing research and global interests.

Materials and methods

The State Key Laboratory of Pollution Control and Resource Reuse (SKL-PCRR), located at the Yangtze River Delta (YRD), contributes itself, in the scientific datum accumulation and fundamental theories, to the national strategies and policies of resource conservation and sustainability of the environment. Accompany with its rapid economic development, the quality of various environmental media in the YRD are changing rapidly. The SKL-PCRR started to build an environmental specimen bank in the YRD region from 2010. The so called Yangtze Environmental Specimen Bank (YESB) is designed to collect, storage and analyze samples from the YRD and the Yangtze River Basin in China.

The YESB is basically constructed and developed in four aspects: (1) the aims on banking and research types, staff management and organization; (2) funds for routine operation, national and international research programmes, international ESB network; (3) standard operation protocols (SOPs) for sample collection, pretreatment, storage, analysis and management; (4) the ESB facilities and the relevant laboratory instruments. Figure 1 illustrates the four aspects of the YESB.

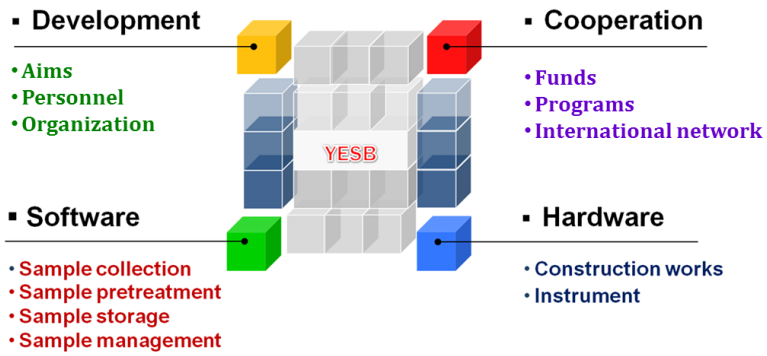

Fig. 1 The YESB and its four aspects

Results and discussion

(1) Aims, staff and organization

The aims of the YESB are to document and retrieve the environmental quality, reveal the human health effects of chemicals in the environment, and ultimately save our environment and improve the human life quality. Soil, sediment, biota and human tissues were selected as the most suitable species for storing in the YESB. The sample types and sampling area of YESB are shown in figure 2.

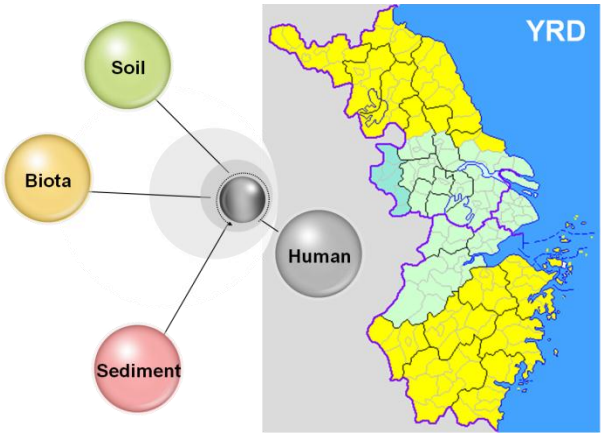

Fig. 2 The sample types and sampling area of YESB

Training programme was set for staffs working in the YESB. Currently we are collaborating with the Swedish Natural History Museum and Stockholm University for the ESB operation and sample analysis training.

(2) Funds, programmes and international network

The YESB has already got a 4.5 million RMB seed founding from the China Ministry of Finance for the FY 2012. More application for financial support from local and central government, as well as the United Nation's Environmental Progamme (UNEP) are undergoing. The YESB is going to join the international group of ESB (IGESB) network to better cooperate and communicate with other ESBs worldwide.

(3) Sample collection, pretreatment, storage and management

The YESB has recruited a student-volunteer group for sample collection and pretreatment. The soil and sediment sampling networks have been set for Shanghai City (figure 3 and 4). Over 500 soil and sediment samples have been collected. A larger scale soil collection activity will be carried out in the entire YRD region in summer of 2012.

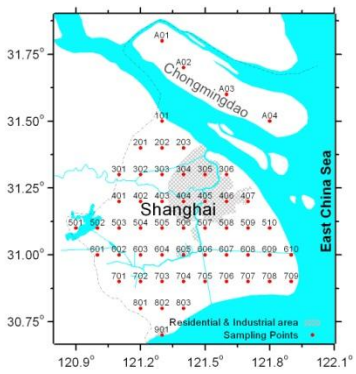

Fig. 3 Soil sampling locations in Shanghai

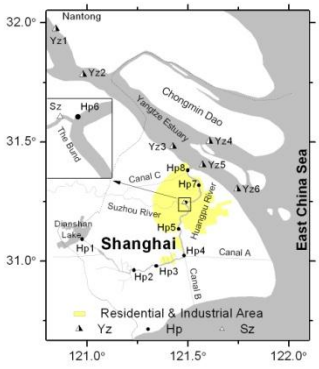

Fig. 4 Sediment sampling locations in Shanghai

(4) Construction works and instruments

The ESB facility is located in Jiaxing City, which is about 1 hour by train from Shanghai. The Jiaxing local government invested the ESB (500 m^2) and analytical lab (1000 m^2). The construction of the ESB and analytical lab (figure 5) were finished and the indoor decoration will be finished in July, 2012.

Fig. 5 ESB and analytical lab of the YESB

Acknowledgements

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