

## Urban soil environmental quality in the Yangtze River Economic Zone, China

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The Yangtze River Economic Zone is one of the key regions to China's economy and a densely populated area. The National Multi-Purpose Regional Geochemical Survey (NMPRGS) has been carried out in China since 1999. Generally, top soils at 0-20cm depth were collected symmetrically at a density of 1 sample/km<sup>2</sup>, while deep soils at 150-180cm depth were collected at a density of 1 sample/4km<sup>2</sup>. Using the existing top and deep soil data, the  $I_{geo}$  values were calculated for each city individually and all together, where city scope was based on the urban planning area.

Overall, the different elements can be ranked in descending order by  $I_{geo}$  as follows: Hg (0.82) > Cd (0.35) > Pb (- 0.20) > Zn (- 0.27) > Cu (- 0.32) > As (- 0.57) > Cr (- 0.63) > Ni (- 0.68). The results imply that, on a regional scale, urban soils in Yangtze River Economic Zone are uncontaminated to moderately contaminated by Hg and Cd.

$I_{geo}$  of Hg of each city shows that 4 cities are at the level of moderately to heavily contaminated, namely Shaoxing (2.82), Ningbo (2.39), Suzhou (2.12) and Wuxi (2.28), and 23 cities appear moderately contaminated. Hg contamination is concentrated in economically developed provinces such as Zhejiang and Jiangsu, and the high-value areas of top soil Hg are mainly concentrated in the old or central urban areas. Long-term industrial development and human activities could be the main causes of urban mercury contamination.

The results of Cd of each city show that Zhuzhou is the city with the most serious Cd contamination and reach the heavily contaminated level(3.42). Chenzhou (2.91), Huangshi (2.56), Xiangtan (2.41), and Hengyang (2.31) are at the moderately to heavily contaminated level. In addition, 18 cities appear moderately contaminated. Further analysis shows that urban soil cadmium contamination is mainly related to mining activities and geological background.