

Composition and quality of coals in the Huaibei Coalfield, Anhui, China

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Abstract

The Huaibei Coalfield, Anhui Province, China, is one of the largest coalfields in China. The coals of Permian age are used mainly for power generation. Coal compositions and 47 trace elements of the No. 10 Coal of the Shanxi Formation, the No. 7, 5, and 4 Coals of the Lower Shihezi Formation, and the No. 3 Coal of the Upper Shihezi Formation from the Huaibei Coalfield were studied. The results indicate that the Huaibei coals have low ash, moisture, and sulfur contents, but high volatile matter and calorific value. The ash yield increases stratigraphically upwards, but the volatile matter and total sulfur contents show a slight decrease from the lower to upper seams. Magmatic intrusion into the No. 5 Coal resulted in high ash, volatile matter, and calorific value, but low moisture value in the coal. Among the studied 47 trace elements, Ba, Co, Cr, Cu, Hg, Mo, Ni, Pb, Sb, Th, U, V, and Zn are of environmental concerns. Four elements Hg, Mo, Zn, and Sb are clearly enriched in the coals as compared with the upper continental crust.

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1. Introduction

Coal is an important energy resource in the world. In China, due to limited domestic petroleum and natural

gas resources and abundant coal reserves (1000 billion Mt), coal has been and will continue to be relied upon as a dominant primary energy source (Xu et al., 2000; Liu et al., 2004). Guan et al. (2006) predicted that coal will constitute about 55% of primary energy source in China in 2015, decreasing from the present 67%. The coal production in 2006 is 2.3 billion tons. With the use of a huge amount of coal, the growing impact on the environment and human health occurs during the course of coal exploitation, coal cleaning, transportation, and combustion (Zheng et al., 1999; Finkelman et al., 2002;

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Dai and Ren, 2006; Liu et al., 2007a). In fact, some of these environmental problems could be reduced if coal quality information is available and adequate clean coal technologies are used. Therefore, information about the characteristics of chemical properties, such as minerals and trace elements in coals, are urgently needed for coal utilization in an environmentally acceptable manner (Finkelman and Gross, 1999; Liu et al., 2003, 2005a).

In general, coal chemical properties include proximate and ultimate analysis, calorific value, sulfur content, ash composition, and minor and trace element contents. These

data not only provide information about the behavior of coal during combustion, but also information about the emissions of sulfur dioxide, carbon dioxide, nitrogen oxides, and hazardous trace elements (such as Hg, As, F and Se) into the atmosphere, which may result in environmental problems, such as acid rain and global climate change, and in human health problems (Finkelman and Gross, 1999; Finkelman et al., 2002; Liu et al., 2007a, 2007b; Zheng et al., 2006a, 2007a).

The Huaibei Coalfield, located in Northern Anhui Province, is one of the major coalfields in China (Fig. 1). Some studies on trace elements (especially some potential

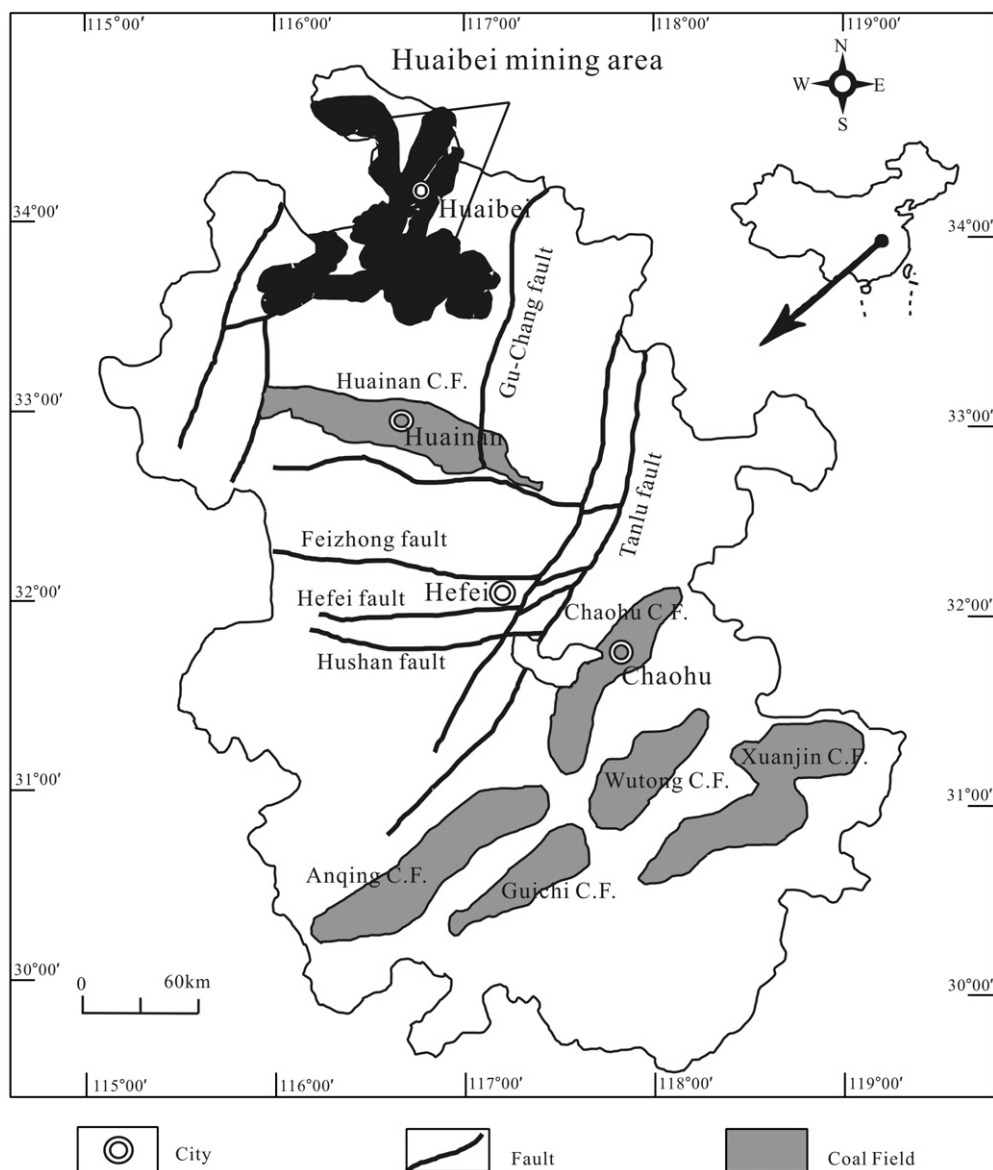


Fig. 1. Location of the Huaibei coalfield in Anhui Province, China.

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