

# **Levels, source diagnosis and risk assessment of polycyclic aromatic hydrocarbons (PAHs) in multimedia environment from Heshan coal district, Guangxi, south China**

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Over the past 150 years, coal, as one of the three most important fossil fuel in the world, has been indispensable for promoting economic development in China. However, the coal mining process with many complicated outcomes, especially soil and water pollution, makes the mining district and its surroundings more ecologically fragile due to emissions of organic compounds (PAHs primarily)

This study examined the levels, profiles and emission sources of 16 US-EPA priority PAHs in coal, coal gangue, soil, surface water and ground water of Heshan coal district, Guangxi, South China. The average concentrations of 16-PAHs in coal, coal gangue, soil, surface water and ground water were 5114.56 ng g<sup>-1</sup> dry weight (dw), 4551.10 ng g<sup>-1</sup> dw, 1280.12 ng g<sup>-1</sup> dw, 426.98 ng L<sup>-1</sup> and 381.20 ng L<sup>-1</sup>, respectively. The concentrations of 16-PAH showed a coal/coal gangue-soil-water gradient in all mines. Furthermore, higher soil and water PAH concentrations were found next to a coal mine or coal gangue pile. Phenanthrene was the most dominating compound at all sites. High correlations in the 16-PAHs occurred between different environmental media. Composition analysis, isomeric ratio and principal component analysis indicated that coal/coal combustion and coal gangue were the dominating sources of PAHs in soil and water. According to guidelines and toxic equivalent quantity, soil and water were partly heavily contaminated by PAHs, posing certainly health risks potential for local residents. Miners can be subjected to high healthy risk, which will demand more attention.