Elemental composition, morphology and sources of atmospheric fine particulates (PM2.5) in Tongling City, China

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Besides atmospheric particulates concentrations and the associated hazardous trace elements, source tracing is critically important for decision-makers to curb source emissions. We use a qualitative source apportionment method using elemental compositions, and morphological of PM2.5.

Elemental composition and morphology were studied for atmospheric fine particles (PM2.5) collected from a mining industrial Tongling City, Anhui Province, China, with an aim of tracing the potential emission sources. The sampling was conducted at two urban sites between July and October 2015. We used X Ray Fluorescence (XRF) to determine the elemental composition, and Scanning Electron Microscope (SEM) and Transmission electron microscope (TEM) to characterize the particle. Our results show that PM2.5 contains large fractions of particles likely derived from fuel burning, construction and automobile emissions, and is highly enriched in S and Zn. Aggregation of particles suggests a strong secondary reaction under high SO_2 level. Some discrepancies in elemental composition at two sampling sites were observed, which are attributed to the difference of traffic density and construction fugitive dust emissions. A negative correlation exists between the polluted elements in PM2.5 and the ambient temperature, likely causing by a reduction in the height of terrestrial boundary layer and reaction rates of elements.