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## Sources of air pollution in Karkonosze Mountains (SW Poland) using a peat record spanning for 300 years.

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### Abstract

In this study, we present a reconstruction of the changes in air quality and sources (distal vs. local) of the Karkonosze holiday area using a 63-cm long peat core from Śnieżka mountain (Karkonosze) spanning the last 300 years.

We measured concentrations of Pb and Zn using ICP-MS after HNO<sub>3</sub>, HF and HCl digestion. The chronology of the core was obtained using <sup>210</sup>Pb age-depth modeling. Stable lead isotopes values were obtained by TIMS after ion chromatographic separation. Isotope composition obtained for the peat profile was compared with measurements of local bedrock samples as well as with literature data. The mineralogical composition of the core was also studied using x-ray diffraction of ashed peat and scanning electron microscopy of dry samples.

Total concentrations of lead and zinc vary from 1 to 131 mg g<sup>-1</sup> and from 5-104 mg kg<sup>-1</sup>, respectively. Maximum values are reached at 32 cm (1970), together with a maximum of mullite (3Al<sub>2</sub>O<sub>3</sub>·2SiO<sub>2</sub>), an anthropogenic marker originating from coal-based power stations which is found starting from the 40cm upwards. The highest concentrations correspond with suggested ecological catastrophe caused by power plants from black triangle. The observations conducted by SEM confirm the occurrence of spheroidal aluminosilicate particles (SAP) in the upper 40 cm (cal AD 1805), what suggest a supply of lead mainly from coal. The overall <sup>206</sup>Pb/<sup>207</sup>Pb signature is ranged from 1.160 to 1.173, indicating a main contribution of lead anthropogenic sources while a contribution of the local rocks (<sup>206</sup>Pb/<sup>207</sup>Pb = 1.252 - 1.298) seems negligible.