Severe aromatic hydrocarbon pollution in the Arctic town of Longyearbyen (Svalbard) caused by snowmobile emissions.

Abstract
The aromatic hydrocarbons benzene, toluene and C2-benzenes (ethyl benzene and m,p,o-xylene) (BTEX) were measured during a 2-month monitoring campaign in 2007 in the Arctic town of Longyearbyen (Spitsbergen, Svalbard). Reflecting the remoteness of the location, very low mixing ratios were observed during night and in windy conditions. In late spring (April-May), however, the high frequency of guided snowmobile tours resulted in "rush-hour" maximum values of more than 10 ppb of BTEX. These concentration levels are comparable to those in European towns and are caused predominately by the outdated 2-stroke engines, which are still used by approximately 30% of the snowmobiles in Longyearbyen. During summer, peak events were about a factor of 100 lower compared to those during the snowmobile season. Emissions in summer were mainly caused by diesel-fueled heavy duty vehicles (HDVs), permanently used for coal transport from the adjacent coal mines. The documented high BTEX mixing ratios from snowmobiles in the Arctic provide an obvious incentive to change the regulation practice to a cleaner engine technology.

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