Centennial records of PAHs and black carbon in Altay mountain peatlands, Xinjiang, China

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Black carbon (BC) and polycyclic aromatic hydrocarbons (PAHs) are potentially proxies of changes in natural and human activities during the past century. It is important to identify historical BC sources and differentiate human activities contribution to BC in the environment. In this study, a 30 cm peat profile from the Jiadengyu (JDY) peatland in Altay Mountain was dated by the $^{137}$Cs and $^{210}$Pb methods. BC, total PAHs content and $\delta^{13}$C$_{BC}$ in JDY peat were tested. The results showed that the TOC, BC and PAHS contents in JDY peat core were 17.09 ~ 47.16%, 1.14 ~ 67.138 mg/g and 260.58 ~ 950.98 ng/g, respectively. The value of $\delta^{13}$C$_{BC}$ ranged -31.5‰ ~ -27.43‰, with an average of -30.52‰. The range of total PAHs concentrations in JDY peat core were between 260.59 ng/g and 950.98 ng/g. The BC was significantly correlated with PAHs and regional population. The BC fluxes have slightly increased since 1900s with the increasing population and cultivate area, and more significantly in 1980s. The burning of biomass and yak dung, fossil fuels, and human activities (mining, coking coal) may have important effects on the BC emission of soil in the Altay region. The change of BC and $\delta^{13}$C$_{BC}$ reflected the change of local energy structure. With the regional reclamation increasing and environment- friendly industry developing, the BC source of JDY peatland is mainly the result of the interaction between biomass combustion and fossil fuel combustion.