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长白山温带森林挥发性有机物的排放通量

Volatile organic compound emission fluxes from a temperate forest in Changbai Mountain

关键词: [挥发性有机物](#) [单萜烯](#) [排放通量](#) [温带森林](#)

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摘要: 2010年夏季,在长白山温带森林开展了挥发性有机物(VOC)排放通量以及气象参数、PAR的综合测量.VOC排放通量采用松弛涡度积累(Relaxed Eddy Accumulation)技术在森林冠层上进行测量.初步发现长白山阔叶林主要排放 α -蒎烯、 β -蒎烯、苧烯、香桉烯、月桂烯、萝烯、柠檬烯、罗勒烯、松油烯、繖花烯、萜品油烯、三环烯等.研究表明,长白山阔叶混交林VOC排放有明显的日变化——早晚较低和中午前后较高.2010年夏季,单萜烯总排放通量的平均值为 $0.242 \text{ mg} \cdot \text{m}^{-2} \cdot \text{h}^{-1}$,其变化范围为 $0.005 \sim 1.668 \text{ mg} \cdot \text{m}^{-2} \cdot \text{h}^{-1}$;各成分排放通量的平均值(和最大值)分别为 α -蒎烯 $0.072(0.234)$ 、苧烯 $0.028(0.356)$ 、月桂烯 $0.027(0.433)$ 、萝烯 $0.023(0.173)$ 、柠檬烯 $0.037(0.197)$ 、罗勒烯 $0.016(0.168)$ 、萜品油烯 $0.053(0.320)$ 、繖花烯 $0.067(0.755) \text{ mg} \cdot \text{m}^{-2} \cdot \text{h}^{-1}$.研究还发现VOC排放通量与气温之间存在一定的联系.

Abstract: Measurements of volatile organic compound (VOC) emission fluxes, meteorological parameters, solar global radiation and photosynthetically active radiation (PAR) were carried out in a temperate forest, Changbai Mountain, China during the summer season in 2010. VOC flux measurements were made by using relaxed eddy accumulation (REA) technique on an above canopy tower. It was found that the dominate monoterpenes emitted from this mixed forest were α -pinene, β -pinene, camphene, sabinene, myrcene, carene, limonene, ocimene, terpinene, cymene, terpinolene, and tricyclene. VOC emission and air temperature were correlated and there were evident diurnal variations, i.e., lower emissions in the morning and late evening, and the highest emissions around the noon. During the summer of 2010, the mean monoterpene emission flux was $0.242 \text{ mg} \cdot \text{m}^{-2} \cdot \text{h}^{-1}$, and ranged from 0.005 to $1.668 \text{ mg} \cdot \text{m}^{-2} \cdot \text{h}^{-1}$. The average and maximum of emission fluxes ($\text{mg} \cdot \text{m}^{-2} \cdot \text{h}^{-1}$) were 0.072 and 0.234 for α -pinene, 0.028 and 0.356 for camphene, 0.027 and 0.433 for myrcene, 0.023 and 0.173 for limonene, 0.037 and 0.197 for terpinene, 0.016 and 0.168 for ocimene, 0.053 and 0.320 for terpinolene, and 0.067 and 0.755 for cymene, respectively.

Key words: [volatile organic compounds](#) [monoterpene](#) [emissions flux](#) [temperate forest](#)

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