

## Original Paper

# Study of C<sub>2</sub>–C<sub>5</sub> Non-methane Hydrocarbons and Their Ozone Formation Potential at Bhubaneswar, an Eastern Coastal Site in India

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## Abstract

A preliminary study has been taken up to evaluate the NHHCs concentration and their effect on atmospheric chemistry at Bhubaneswar for the very first time during winter months when pollution load is prevalent. For this purpose ambient air samples were collected during a period of 3 months (Dec 2013–Feb 2014). The samples were analyzed for C<sub>2</sub>–C<sub>5</sub> light non-methane hydrocarbons (NMHCs) using a gas chromatograph with a thermal desorption system. It was observed that level of NMHCs over the measurement site was lower in comparison to other urban locations within India but higher in comparison to Bay of Bengal. Statistical interpretation suggests a non-significant variation of NMHCs concentration between the observation months. Diurnal observations revealed a higher concentration of both *n*-pentane and *i*-pentane which was mostly attributed to solvent evaporation. Liquefied petroleum gas usage is believed to be a major contributor to the mixing ratios of propane (1.5 ppbv) and butane (0.027 ppbv) while ethane and ethylene emissions were attributed to traffic volume and vehicular exhausts. The propylene-equivalent and ozone formation potential of NMHCs have also been calculated in order to find out their OH reactivity and contribution to the photochemical ozone formation. Relative humidity was also observed to have a significant correlation with NMHCs concentration. Variation of total non-methane

hydrocarbons (TNMHCs) with ozone and CO suggest the role of TNMHC as precursor for ozone formation.

## **Keywords**

NMHCs – Precursor relationship – Diurnal variation – Ozone – Ozone formation potential