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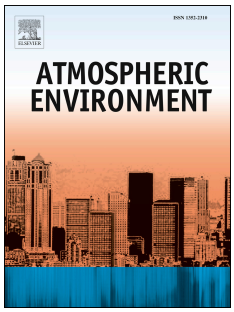

SCIAMACHY observed changes in the column mixing ratio of methane over the Indian region and a comparison with global scenario

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SCIAMACHY observed changes in the column mixing ratio of methane over the Indian region and a comparison with global scenario

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Abstract

The trends in the column averaged mixing ratio of methane (XCH_4) over the Indian region during 2003-2009 periods were studied using the SCanning Imaging Absorption spectroMeter for Atmospheric CHartographY (SCIAMACHY) observations. Considering the sensor degradation, the trends were analyzed for 2003 to 2005 and 2006 to 2009 separately. Over India, the trend in XCH_4 varied from 5.2 to 7.6 ppb per year after 2005, exhibiting a 2-4 fold increase compared to 2003-2005. While the increase over Northern parts of India is attributed to increasing CH_4 emissions from rice cultivation and livestock population, those over Southern regions are due to increased oil and gas mining activities. A comparison of these trends with those over most of the hotspot regions over the globe revealed that those regions exhibited higher growth rates of XCH_4 compared to Indian regions during 2006-2009. The seasonal patterns of XCH_4 and near-surface CH_4 at selected global network stations were also examined in detail. This analysis revealed hemispheric difference and varying seasonal patterns suggesting the inhomogeneous vertical distribution of CH_4. The observed differences in the seasonal patterns of near-surface CH_4 and XCH_4 suggest that the surface emissions need not replicate at higher