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

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8 **Abstract**

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

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