



## **Passive satellite remote sensing of carbon dioxide and methane: SCIAMACHY, GOSAT, CarbonSat**

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Carbon dioxide ( $\text{CO}_2$ ) and methane ( $\text{CH}_4$ ) are the two most important anthropogenic greenhouse gases causing global climate change. Global satellite observations of  $\text{CO}_2$  and  $\text{CH}_4$  can provide important missing global information on regional  $\text{CO}_2$  and  $\text{CH}_4$  surface sources and sinks. A better understanding of the surface sources and sinks and the underlying processes is important in order to reliably predict the future climate of our planet. Such an application requires highly precise and accurate satellite  $\text{CO}_2$  and  $\text{CH}_4$  retrievals and high sensitivity to near-surface greenhouse gas concentration changes. With passive satellite remote sensing this is possible using reflected solar radiation in the near-infrared/shortwave-infrared (NIR/SWIR) spectral region. SCIAMACHY on ENVISAT is the first satellite instrument performing these type of measurements (launch 2002). The SCIAMACHY time series is currently being continued with the Japanese GOSAT satellite which has been successfully launched in January 2009. In order to fill a likely observational gap in the post-GOSAT time period and to provide important additional greenhouse gas information the Institute of Environmental Physics (IUP) of the University of Bremen in collaboration with many partners is currently conducting studies for a future greenhouse gas satellite mission called "Carbon Monitoring Satellite" (CarbonSat). CarbonSat will be proposed to ESA by IUP as an Earth Explorer Opportunity Mission. In this talk an overview about the latest achievements of SCIAMACHY and GOSAT will be given and the mission goals and mission concept of CarbonSat will be presented.