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Methane emission estimates in South Asia: Challenge of the atmospheric methane and agriculture in South Asia projectSachiko Hayashida¹, Naveen Chandra¹, Prabir K. Patra², Yukio Terao³, Shigeto Sudo⁴, Kazuyuki Inubushi⁵, Masayoshi Mano⁵ and Akinori Yamamoto⁶¹Nara Women's University, Japan²Japan Agency for Marine-Earth Science and Technology, Japan³National Institute for Environmental Studies, Japan⁴National Institute for Agro-Environmental Sciences, Japan⁵Chiba University, Japan⁶Tokyo Gakugei University, Japan

Methane (CH₄) is the second most significant anthropogenic greenhouse gas. In Asia, methane emissions are mostly attributable to ruminant animals and rice fields. However, accurately quantifying emissions from these sources still remains a challenge. In order to improve methane emission estimates, a project called "Atmospheric Methane and Agriculture in South Asia (AMASA)" was initiated. The project is sponsored by the Japanese Ministry of the Environment. The project goals are to improve local methane emission estimates in South Asia using remote sensing data from the Greenhouse Gases Observing Satellite (GOSAT) and *in situ* measurements from ground-based stations and to develop an emission mitigation proposal. Based on local experimental works on those measurements, we will arrange some mitigation scenarios; these will be inputted into an atmospheric transport model in order to examine their feasibility and the predicted methane pathways and concentrations. Very high concentrations of methane were detected over Asia in the satellite data; these seem to be caused by high methane emissions in this region. However, determining local emission is not straight forward because of complex atmospheric transport mechanisms. For instance, during the monsoon season, upwelling winds can lift methane from the foothills of the Himalayan Mountains up to the mid- and upper-troposphere. High columnar concentrations are indeed observed in GOSAT data. Presently, field measurements of atmospheric methane and cultivation experiments are being conducted by the Tamil Nadu Rice Research Institute in South India. Preliminary results demonstrated that methane emissions from rice cultivation can be reduced by half when applying proper cultivation management strategies. Following these new findings, similar mitigation approaches are being proposed in South Asia.

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