

## Supplementary Information

# Correlation between paddy rice growth and satellite-observed methane column abundance does not imply causation

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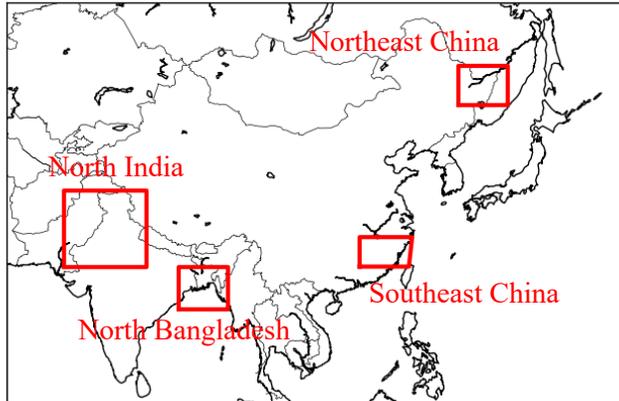
**Supplementary Figure 1.**

**Supplementary Figure 2.**

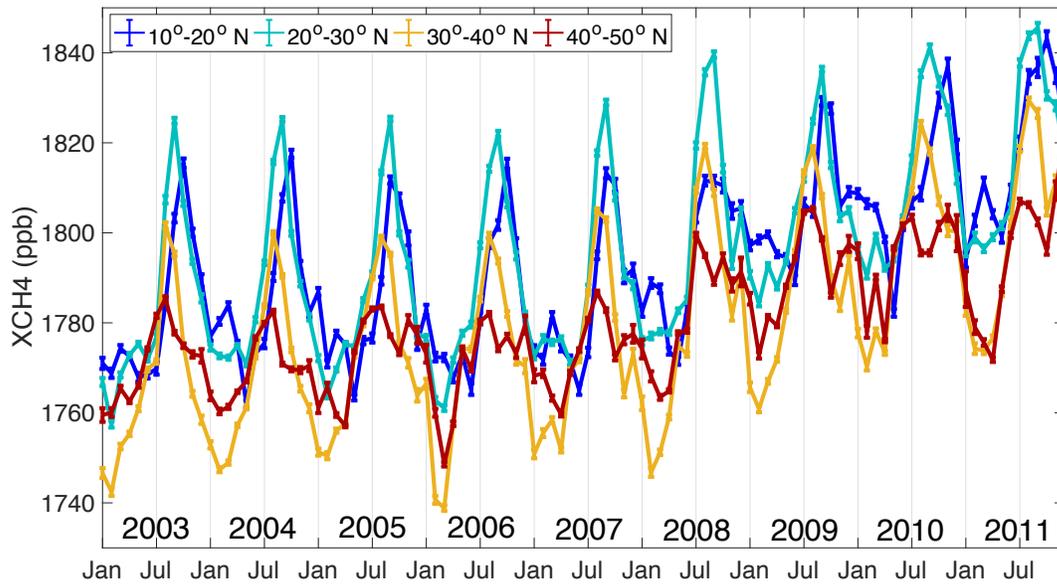
**Supplementary Figure 3.**

**Supplementary Figure 4.**

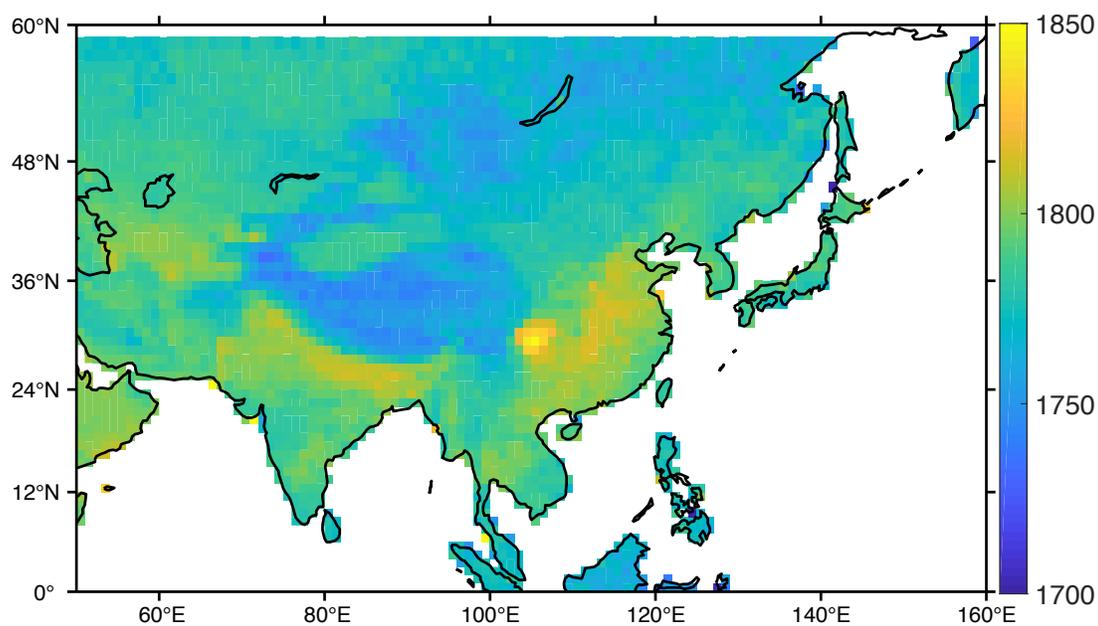
**Supplementary Figure 5.**



**Supplementary Figure 1.** The bounding boxes for the ROIs in model simulations. The Northeast China box is bounded by  $45^{\circ}$ - $59^{\circ}$  N and  $128.75^{\circ}$ - $136.25^{\circ}$  E; The North India is bounded by  $25^{\circ}$ - $35^{\circ}$  N,  $68.75^{\circ}$ - $81.25^{\circ}$  E; The North Bangladesh is bounded by  $19^{\circ}$ - $25^{\circ}$  N and  $86.25^{\circ}$ - $93.75^{\circ}$  E; and the Southeast China is bounded by  $25^{\circ}$ - $29^{\circ}$  N and  $113.75^{\circ}$ - $121.75^{\circ}$  E.

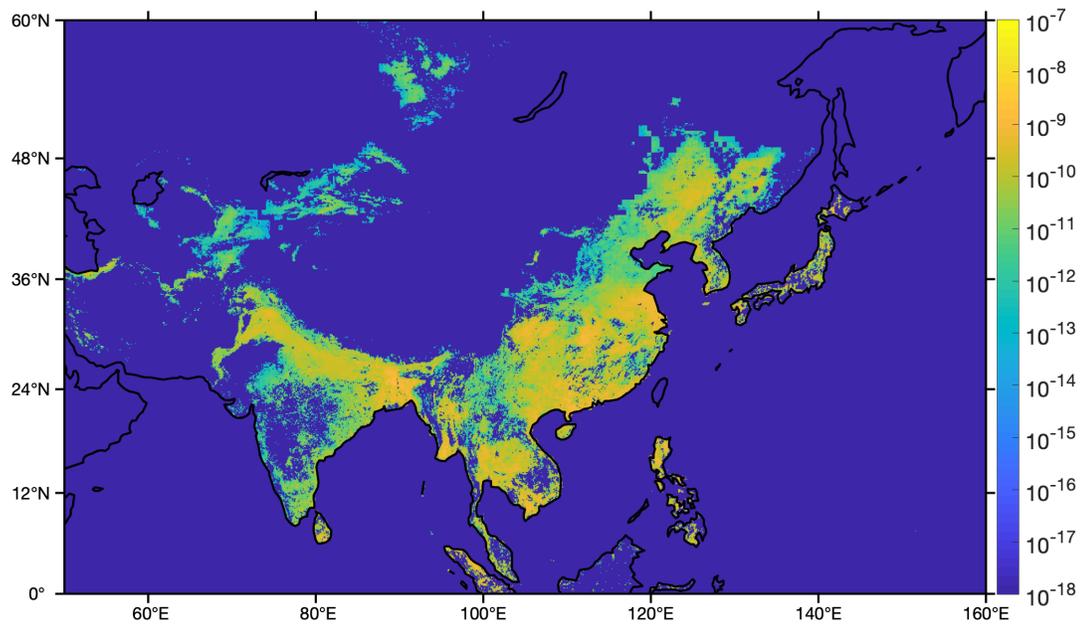


**Supplementary Figure 2.** The monthly mean XCH<sub>4</sub> from SCIAMACHY retrievals in Monsoon Asia for different latitude zones from 10° to 50° N. The error bars are the monthly uncertainties calculated by error propagation from the uncertainties in XCH<sub>4</sub> retrievals in a certain month.

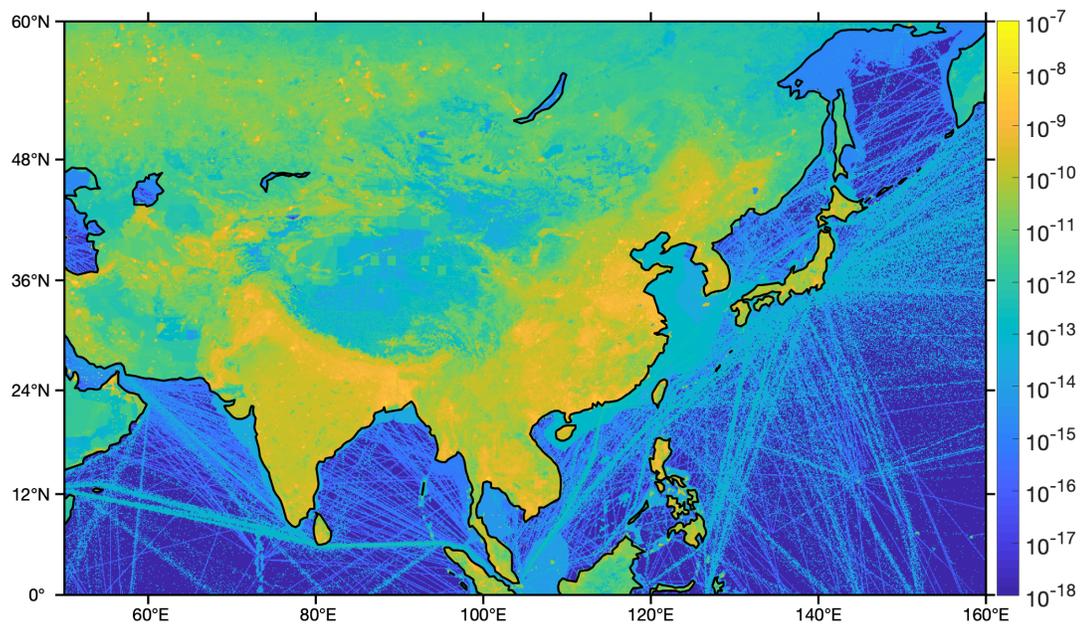


**Supplementary Figure 3.** Averaged XCH<sub>4</sub> (in unit of ppb) from SCIAMACHY retrievals in Monsoon Asia in 2010. The original retrievals were averaged into 1° × 1° grids in latitude and longitude.

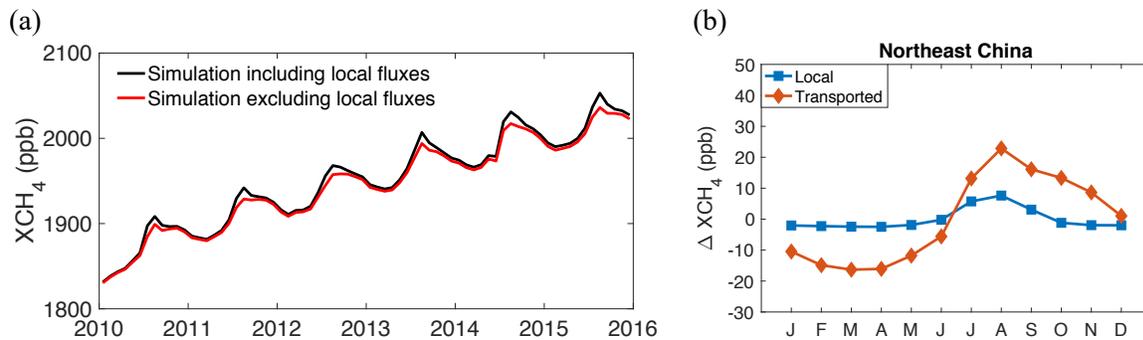
(a)



(b)



**Supplementary Figure 4.** CH<sub>4</sub> emissions (in unit of kg m<sup>-2</sup> s<sup>-1</sup>) from EDGAR bottom-up inventory for agriculture soil flux in (a) and total flux in (b) for the year of 2010.



**Supplementary Figure 5.** GHGF-Flux simulated XCH<sub>4</sub> over Northeast China. (a) Monthly mean XCH<sub>4</sub> time series over six years for simulations including (black) and excluding (red) local fluxes; (b) The detrended six-year monthly mean time series of local (blue) and transported (red) contributions to the seasonal cycle of XCH<sub>4</sub>, where the transported contribution is obtained from the simulation excluding local fluxes and the local contribution is the difference between detrended simulations with and without local fluxes.