



*Supplement of*

## **Top-down estimate of regional carbon sinks over East Asia for 2010–2019 using satellite observations**

**Mina Kim et al.**

*Correspondence to:* Rokjin J. Park ([rjpark@snu.ac.kr](mailto:rjpark@snu.ac.kr))

The copyright of individual parts of the supplement might differ from the article licence.

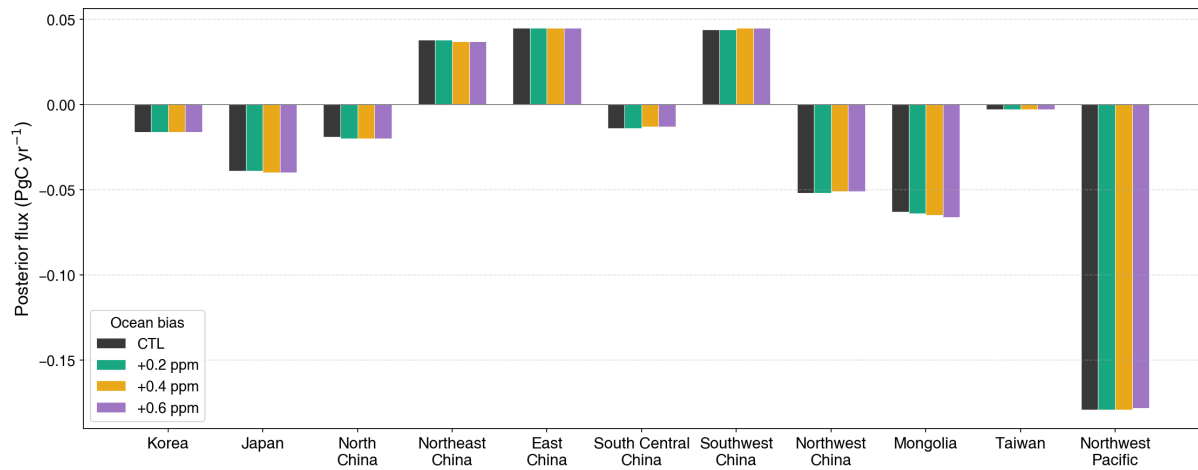


Figure S1. Regional posterior CO<sub>2</sub> fluxes for 2019 under four ocean observation scenarios. The control (CTL) is compared with sensitivity tests applying +0.2, +0.4, and +0.6 ppm biases to ocean XCO<sub>2</sub>, consistent with the range of residual seasonal biases in GOSAT ACOS v9.

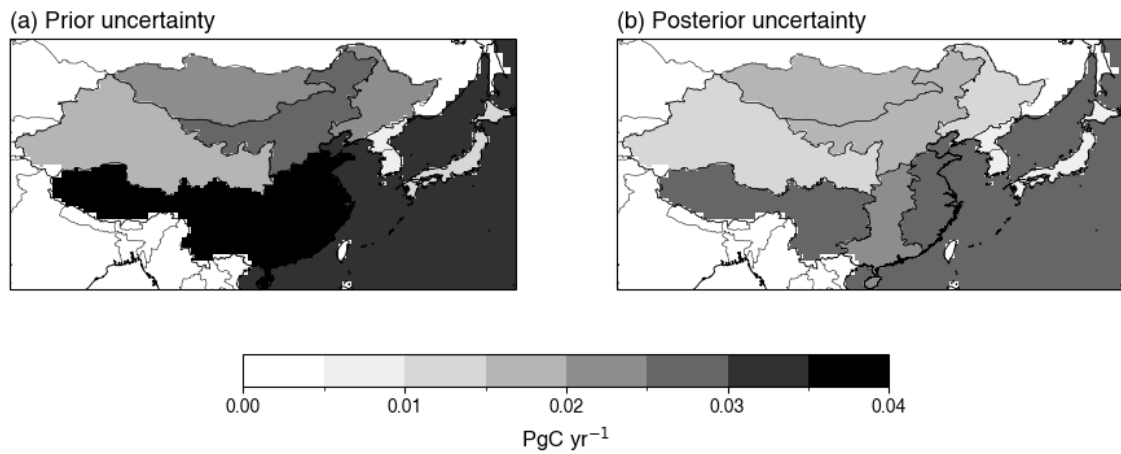


Figure S2. Spatial distributions of the (a) prior uncertainty and (b) posterior uncertainty of the estimated CO<sub>2</sub> fluxes over East Asia for the study period.

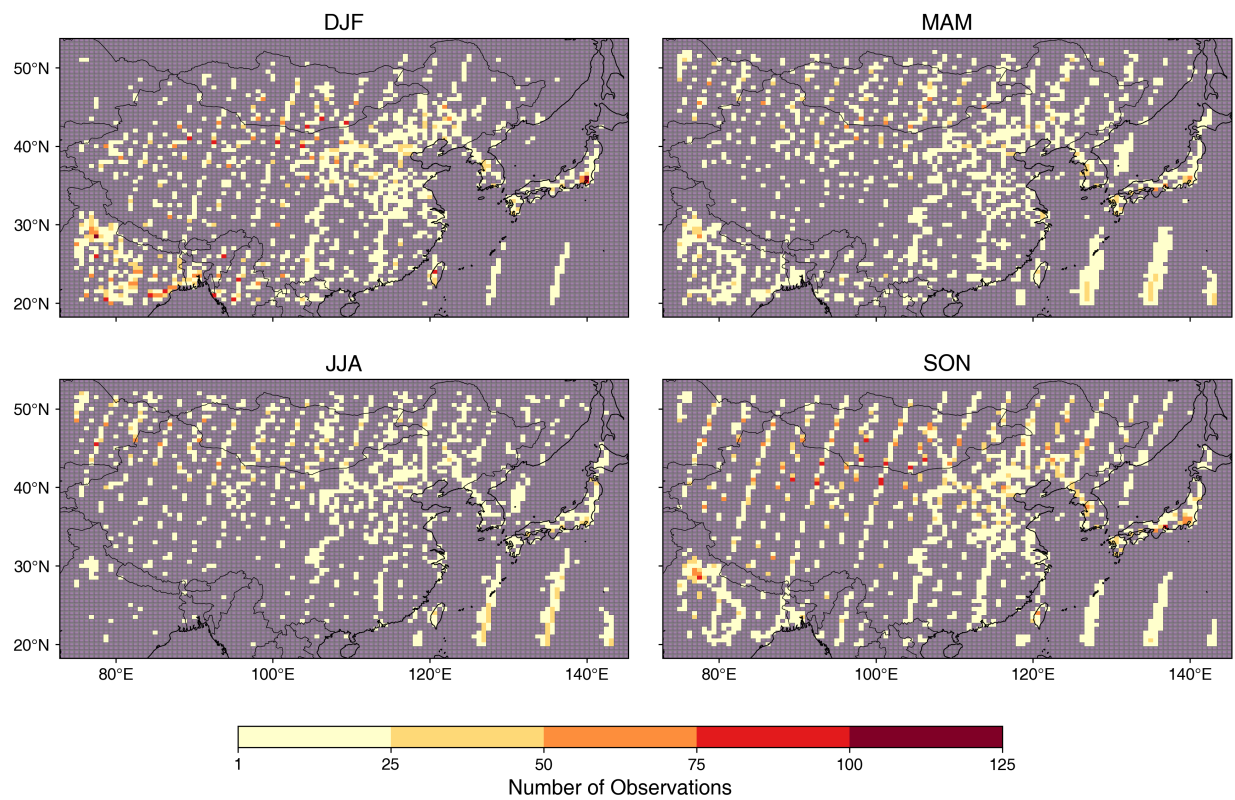
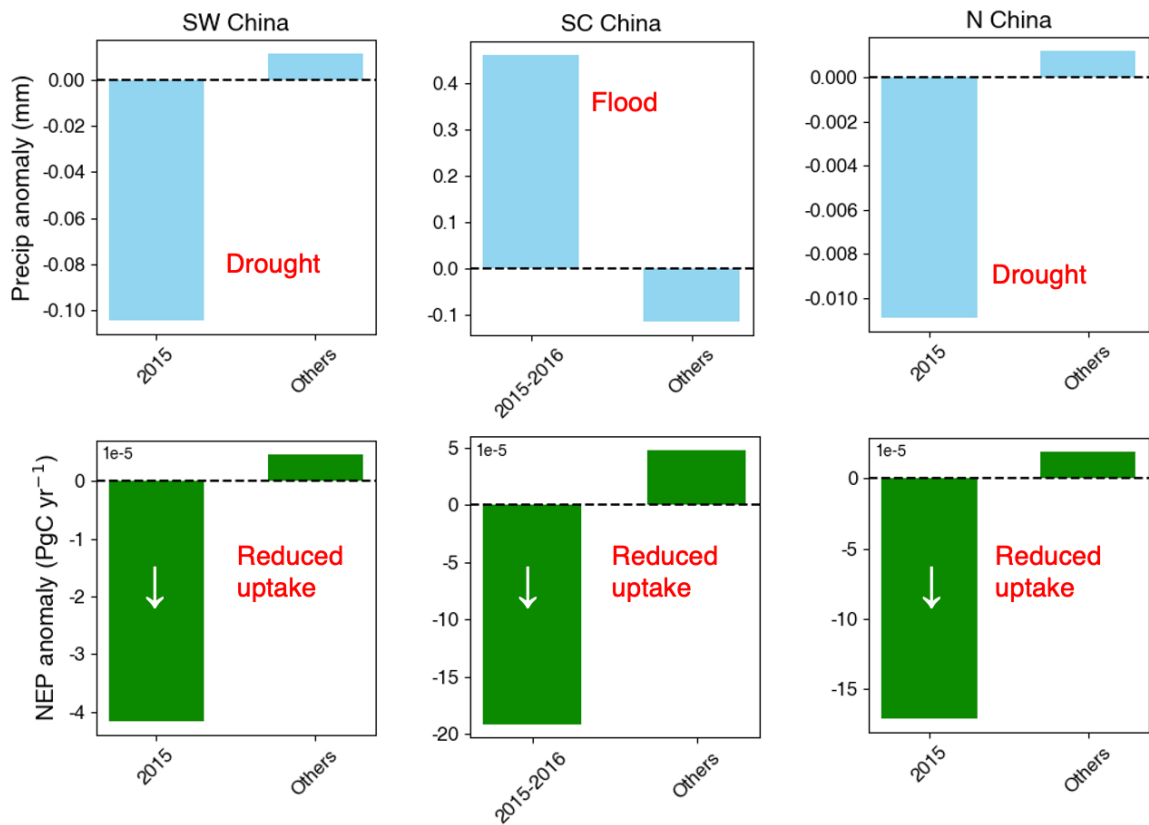


Figure S3. Seasonal spatial distribution of GOSAT XCO<sub>2</sub> observations over East Asia during 2010–2019. Panels show the number of observations for each season: DJF, MAM, JJA, and SON. Colors indicate the number of observations per grid cell.



... Southwest China underwent persistent drought due to weakened southward moisture transport (Ma et al., 2018). This region suffered from **prolonged drought conditions from summer 2015 through spring 2016**

South Central China similarly exhibited enhanced precipitation and **frequent flooding during 2015–2016** (Ma et al., 2018),

... precipitation deficits prevailed **during the 2015 El Niño peak**, especially in North China, where severe summer droughts were reported (Zhai et al., 2016)

Figure S4. Regional anomalies in precipitation (sky blue) and terrestrial carbon uptake expressed as NEP (= -NEE; green) over Southwest China, South Central China, and North China. The text below each panel is excerpted from the corresponding discussion in the main text.

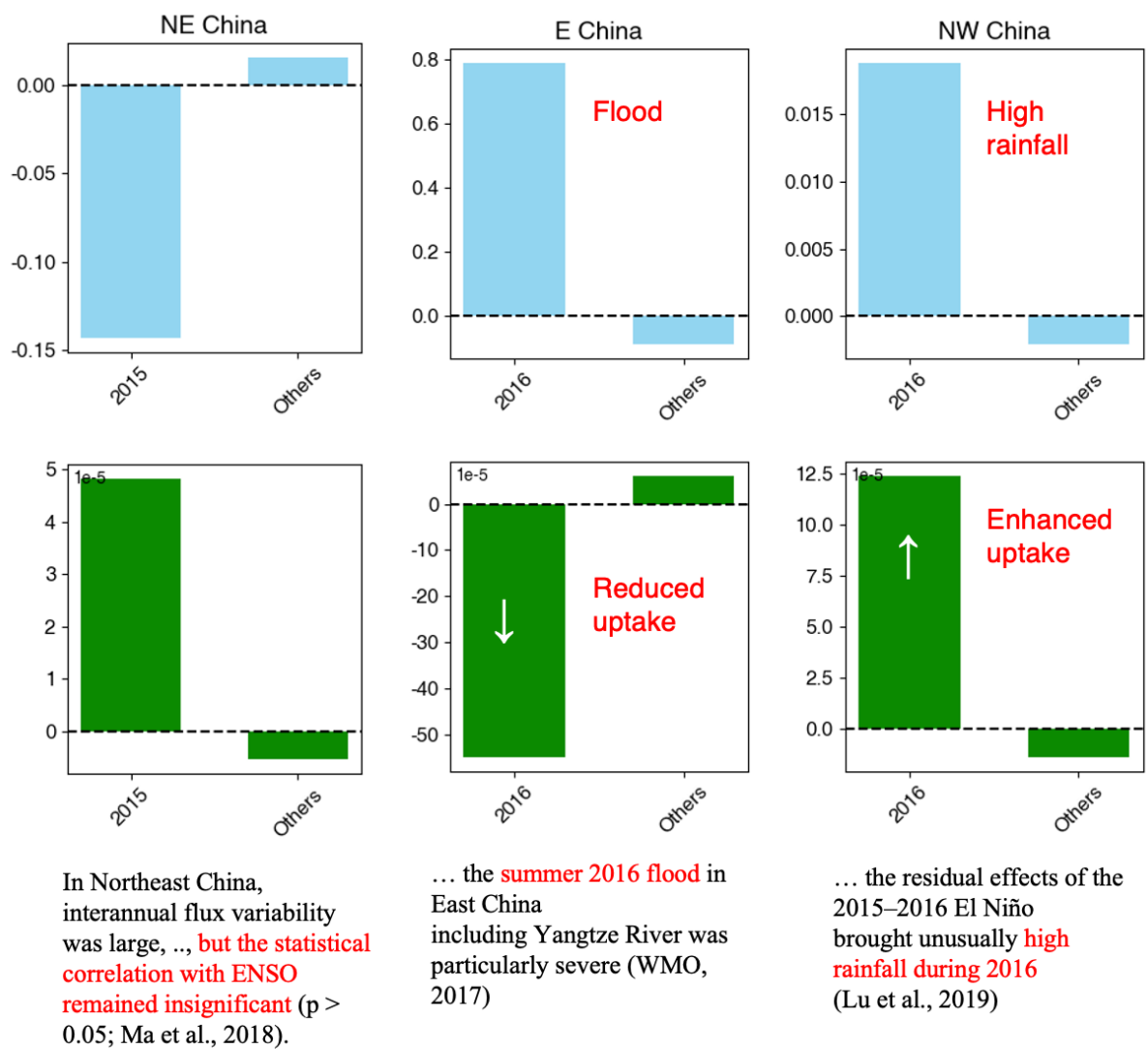


Figure S5. Same as Figure S4, but for Northeast China, East China, and Northwest China.