**Supplementary materials**

**Evaluation of Earth Systems Models and Atmospheric Inversions using Total Column CO2 Observations from GOSAT and OCO-2**

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**Figure S1:** Same as Figure 5 but for data over land surface only.



**Figure S2:** Same as Figure 5, but for the observations over water bodies only.

**Animation S1:** Same as Figure 6 for the time series of XCO2 for all the 15 land regions and 11 ocean regions for the period of 2009-2018. Note that these plots consist of 2 additional panels showing the model-measurement differences and the detrended seasonal cycles, for which the statistics are presented in Table 1. (https://ebcrpa.jamstec.go.jp/~prabir/data/Pubctn/XCO2model/Animation\_S1.gif)

**Animation S2:** Same as Animation S1, but for the OCO-2 measurement period (2014-2018).

(https://ebcrpa.jamstec.go.jp/~prabir/data/Pubctn/XCO2model/Animation\_S2.gif)

**Animation S3:** Same as Figure 7 for XCO2 seasonal cycle amplitudes for different years, and those for ACTM\_InvF and OCO-2 only for the period 2014 to 2018.

(https://ebcrpa.jamstec.go.jp/~prabir/data/Pubctn/XCO2model/Animation\_S3.gif)