Figure S1. Seasonally averaged differences (Δ) of X_{CH4} between TROPOMI and GOSAT retrievals for May 2018 – April 2019 at different SWIR surface albedo.
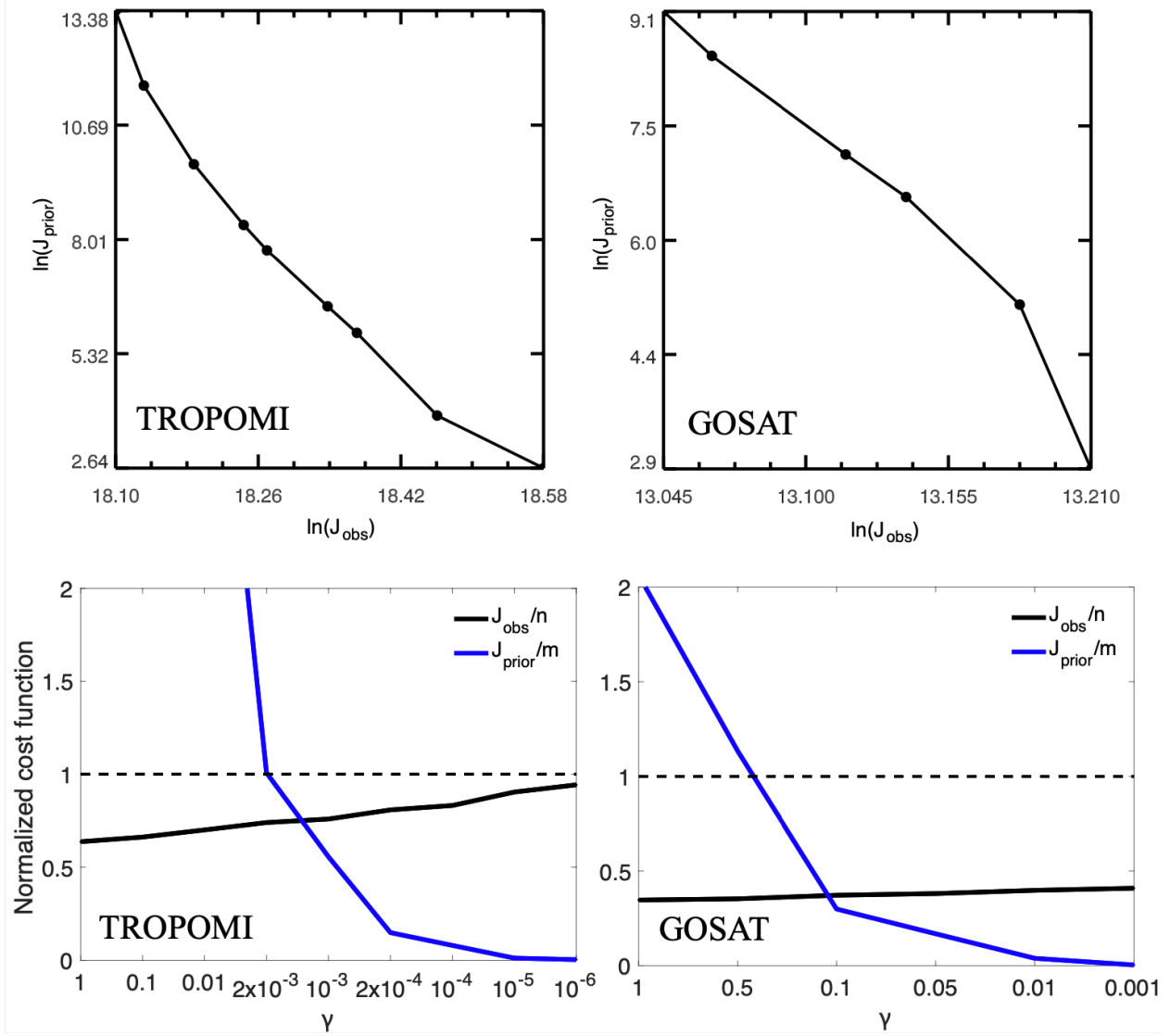
Figure S2. Dependence of the inverse modeling solution on the regularization parameter γ for TROPOMI (left column) and GOSAT (right column). J_{obs} and J_{prior} stand for the prior term $(x - x_a)^T S_a^{-1}(x - x_a)$ and the observation term $(y - Kx)^T S_o^{-1}(y - Kx)$ in the cost function. m and n are number of parameters and observations. Selected γ values in the test are: 1, 0.1, 0.01, 0.002, 0.001, 0.0002, 0.0001, 10^{-5}, 10^{-6} for the TROPOMI inversion and 1, 0.5, 0.1, 0.05, 0.01, and 0.001 for the GOSAT inversion. We chose $\gamma = 0.002$ (TROPOMI) and 0.5 (GOSAT) based on the corner of L-curve and the ratio between J_{prior} and n.
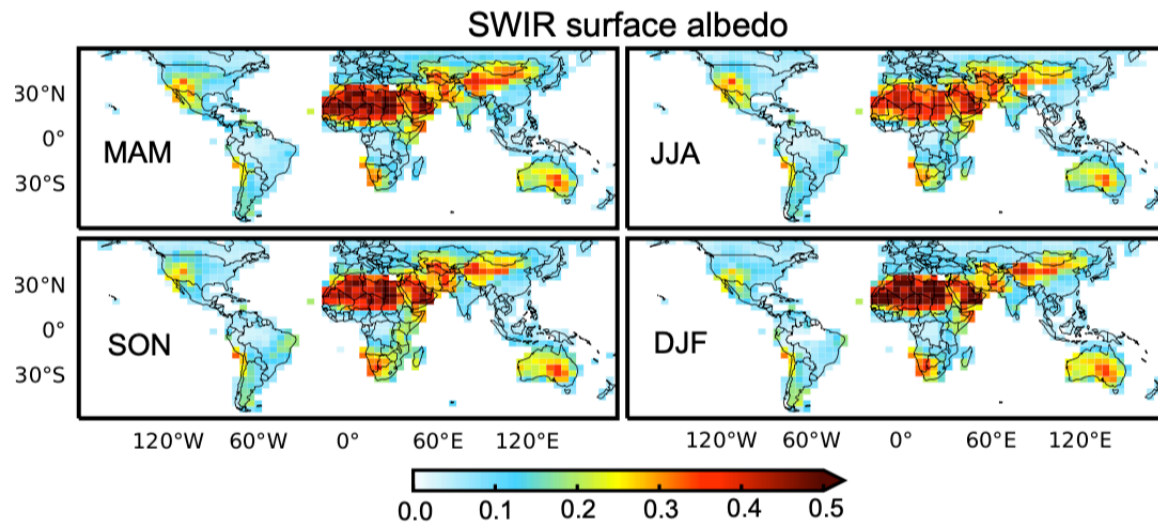
Figure S3. Seasonally averaged SWIR surface albedo for May 2018 – April 2019.

Table S1. Global methane budget in 2019 from the TROPOMI sensitivity inversions.

	$\gamma = 0.02$ [Tg a^{-1}]	$\gamma = 0.5$ [Tg a^{-1}]	$\gamma = 0.002$, no weighting [Tg a^{-1}]	$\gamma = 0.002$, weight = 1 for wetland [Tg a^{-1}]	$\gamma = 0.002$, weight = 2010 for OH [Tg a^{-1}]
Total sources	**577**	**593**	**479**	**571**	**574**
Non-wetland	357	391	348	389	375
Wetland	220	202	131	182	199
Total sinks	**546**	**559**	**471**	**555**	**560**
OH oxidation	471[a]	484[b]	396[c]	479[d]	485[e]
Other losses	75	75	75	76	75
Imbalance	**31**	**34**	**8**	**16**	**14**

[a] Posterior methane has a lifetime of 11.0 years against oxidation by tropospheric OH.
[b] Posterior methane has a lifetime of 10.7 years against oxidation by tropospheric OH.
[c] Posterior methane has a lifetime of 13.0 years against oxidation by tropospheric OH.
[d] Posterior methane has a lifetime of 11.1 years against oxidation by tropospheric OH.
[e] Posterior methane has a lifetime of 10.7 years against oxidation by tropospheric OH.

Table S2. Global methane budget in 2019 from the GOSAT sensitivity inversions.

	$\gamma = 0.002$ [Tg a^{-1}]	$\gamma = 0.02$ [Tg a^{-1}]	$\gamma = 0.5$, no weighting [Tg a^{-1}]	$\gamma = 0.5$, weight = 1 for wetland [Tg a^{-1}]	$\gamma = 0.5$, weight = 2010 for OH [Tg a^{-1}]
Total sources	**569**	**569**	**575**	**583**	**551**
Non-wetland	403	398	391	404	395
Wetland	166	171	184	179	156
Total sinks	**559**	**556**	**545**	**555**	**533**
OH oxidation	484 [a]	481 [b]	470 [c]	480 [d]	458
Other losses	75	75	75	75	75
Imbalance	**10**	**13**	**30**	**33**	**18**

[a] Posterior methane has a lifetime of 10.7 years against oxidation by tropospheric OH.
[b] Posterior methane has a lifetime of 10.8 years against oxidation by tropospheric OH.
[c] Posterior methane has a lifetime of 11.1 years against oxidation by tropospheric OH.
[d] Posterior methane has a lifetime of 10.8 years against oxidation by tropospheric OH.
[e] Posterior methane has a lifetime of 10.8 years against oxidation by tropospheric OH.