



Supplement of

CH₄ emissions from Northern Europe wetlands: compared data assimilation approaches

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Table S1: Annual wetland, non-wetland and total emissions, in TgCH₄/year, for the full domain and the Nordic subdomain. For LPJ-GUESS-unopt and LPJ-GUESS-opt, the "non-wetland" columns show the non-optimized LUMIA priors. The JSBACH-HIMMELI row shows only the wetland estimate from that model, and LUMIA-Lpost_total shows the optimized emissions of a LUMIA inversion solving only for the total (wetland + non-wetland) CH₄ emissions.

Simulation	wetlands (full domain)	non wetlands (full domain)	wetlands (Nordics)	non wetlands (Nordics)	total (full domain)	total (Nordics)
LPJ-GUESS-unopt	8.69	35.29	4.29	3.32	43.97	7.62
LPJ-GUESS-opt	5.49	35.29	2.56	3.32	40.77	5.89
LUMIA-Lpri	5.35	34.27	1.98	2.23	39.63	4.21
LUMIA-Lpost	4.27	35.24	1.68	2.49	39.51	4.17
LUMIA-Lpri+corr	4.85	34.63	1.84	2.61	39.49	4.46
LUMIA-Lpost+corr	3.75	35.69	1.72	2.43	39.44	4.15
JSBACH-HIMMELI	2.41		1.29			
LUMIA-Lpost_total					40.18	4.37

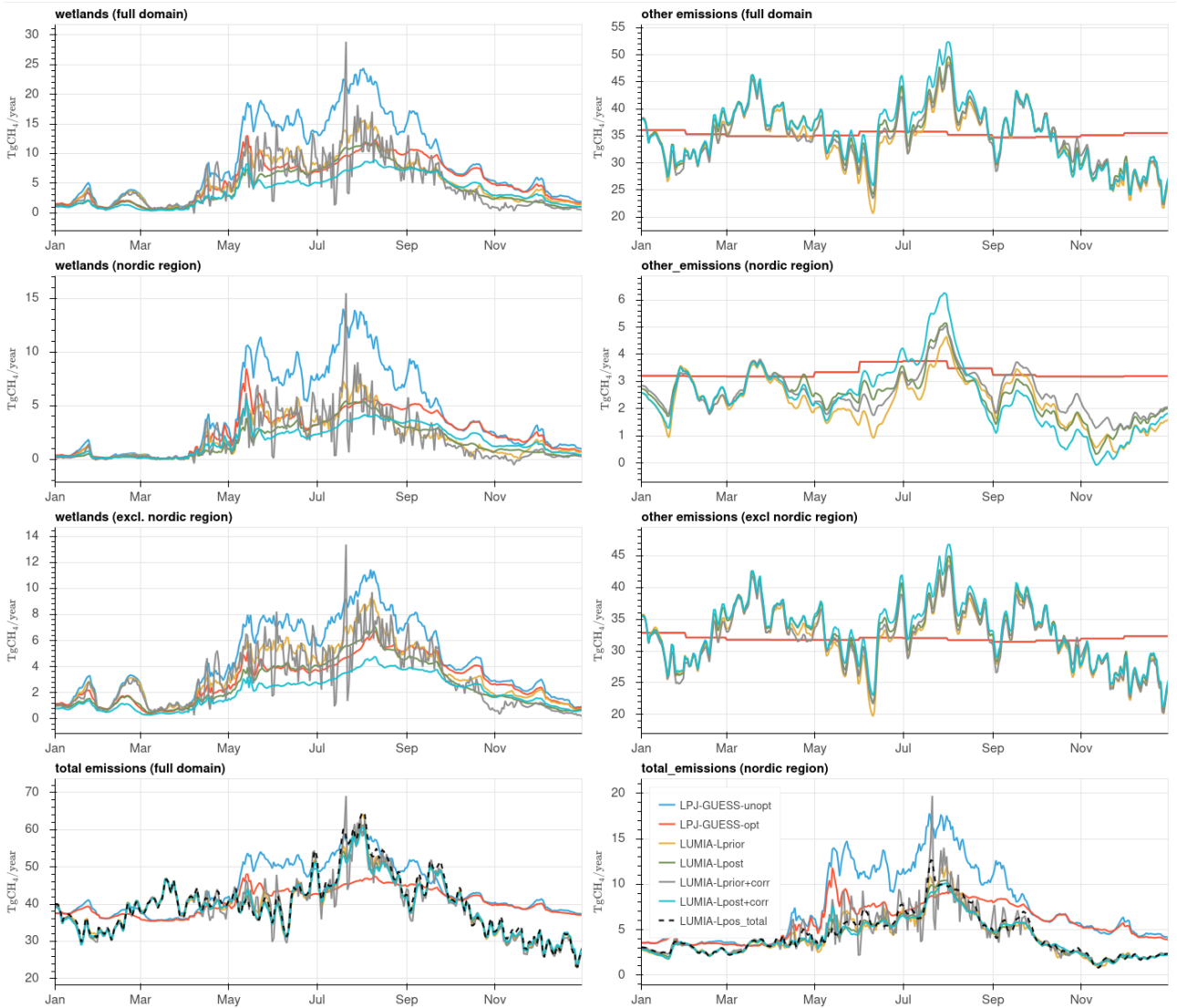


Figure S1: Wetland (left) and non-wetland (right) CH₄ emissions, in the full domain (top row), in the Nordic domain (second row), and in the full domain, except the Nordic part (third row). The last row shows total CH₄ emissions (wetland + non wetlands) in the full domain (left) and in the Nordic region (right).

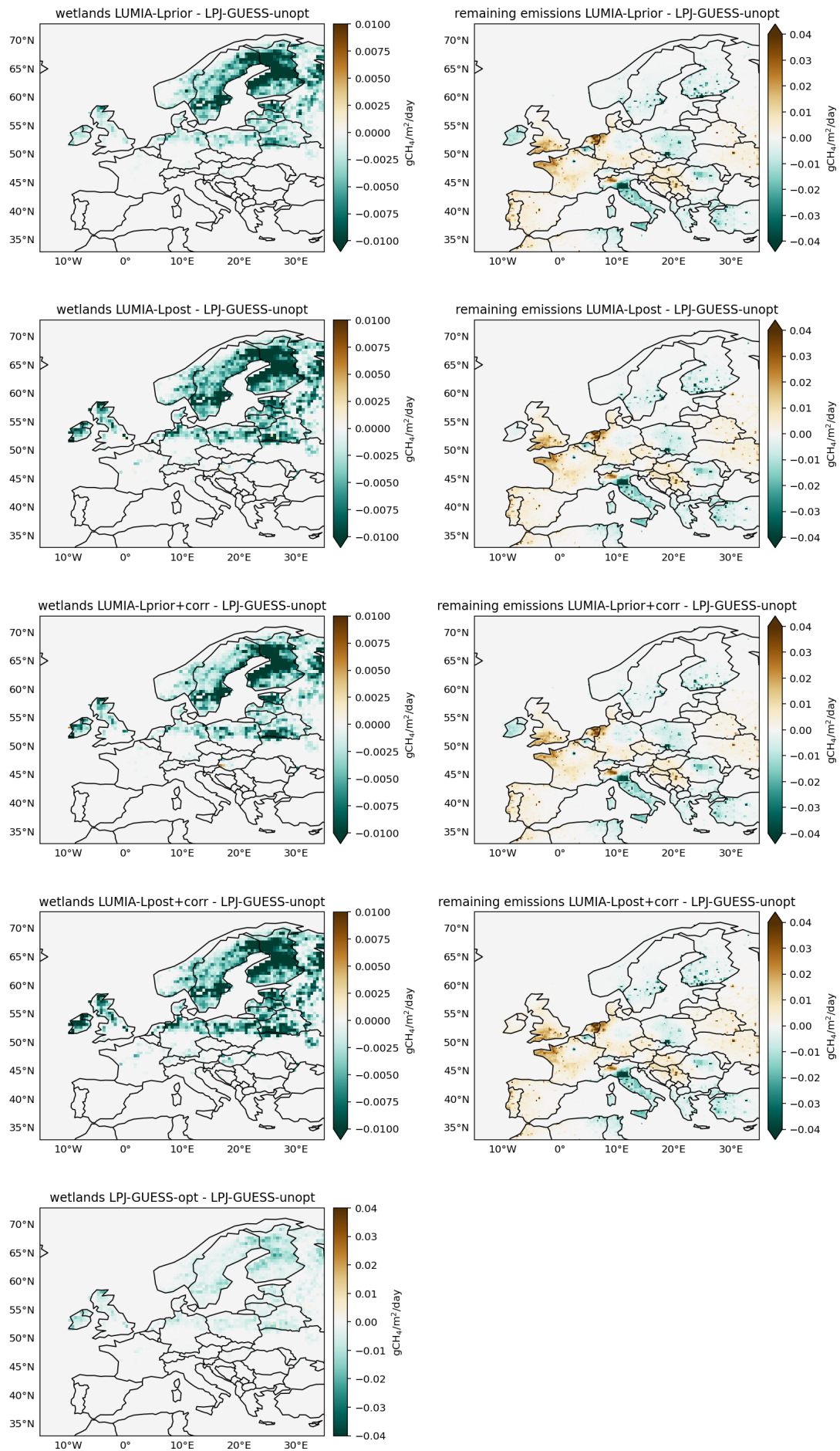


Figure S2: Emission adjustments for wetlands (left) and non-wetlands (right) compared to LPJ-GUESS-unopt, for the two main inversions (LUMIA-Lprior and LUMIA-Lpost), and two sensitivity runs (LUMIA-Lprior+corr and LUMIA-Lpost+corr)

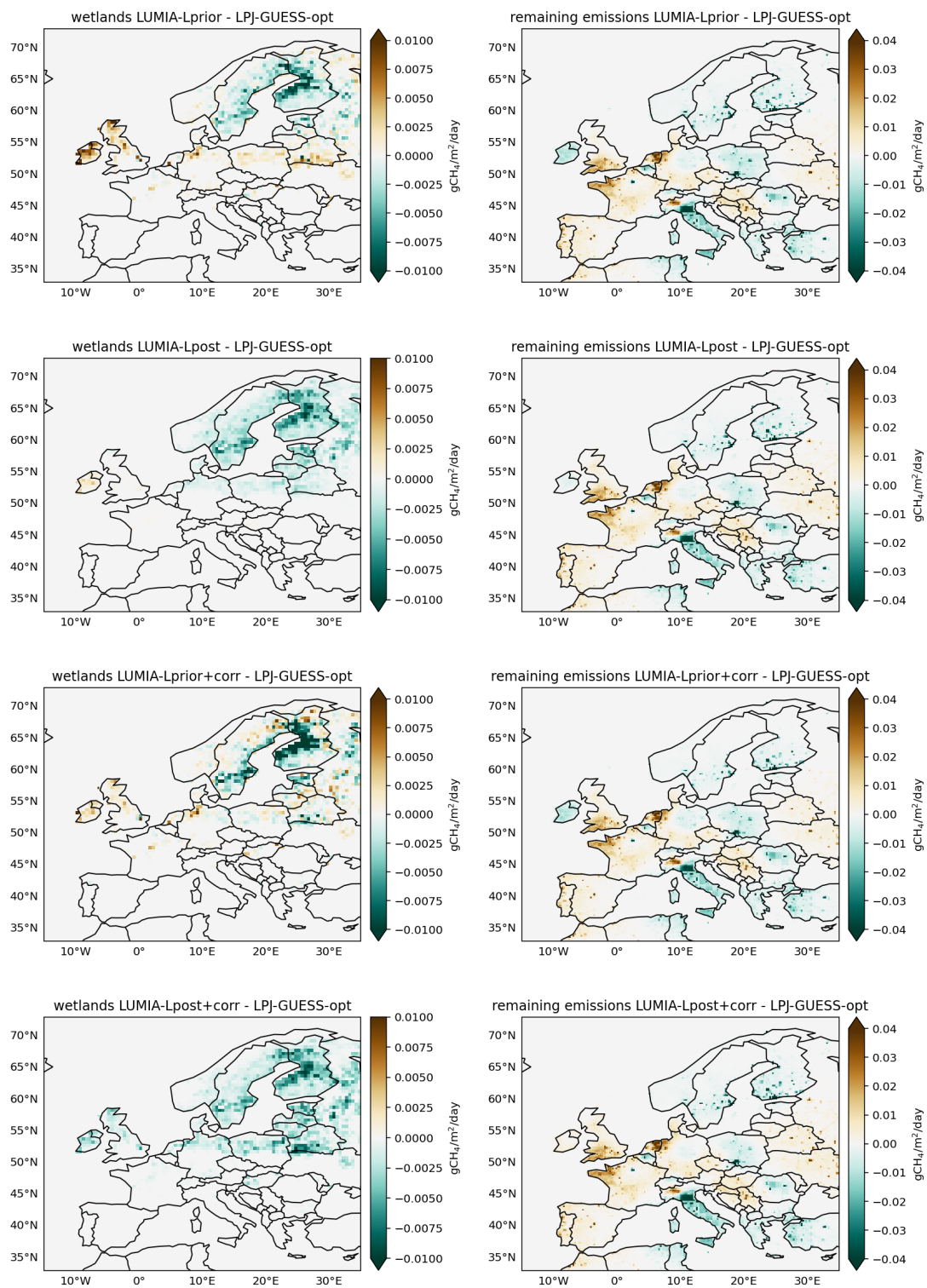


Figure S3: Same as Figure S2, but with LPJ-GUESS-opt as a reference.

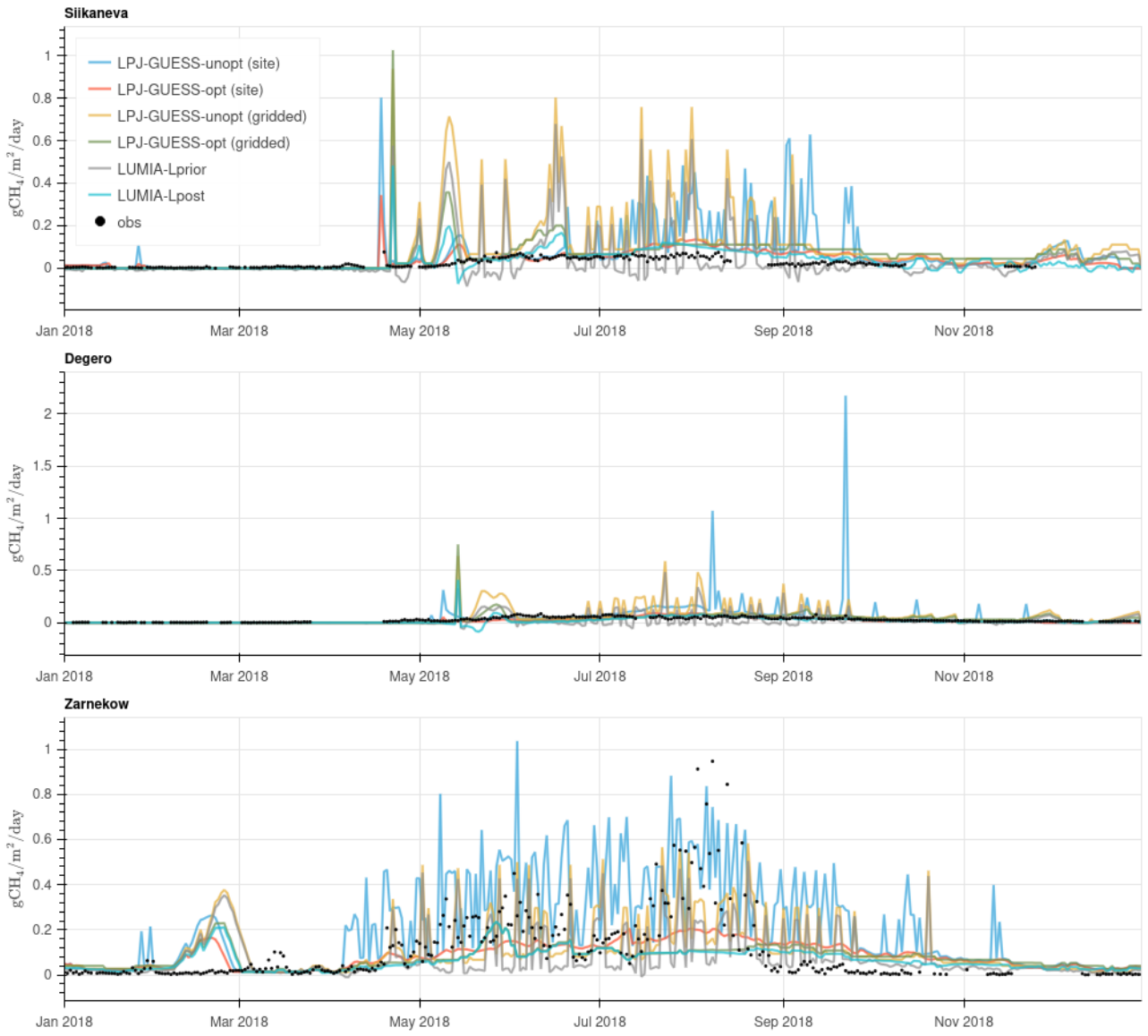


Figure S4: Modelled (solid lines) and observed (dots) methane emissions at three sites within the Nordic region, including the two LUMIA-Lprior+corr and LUMIA-Lpost+corr sensitivity inversions.

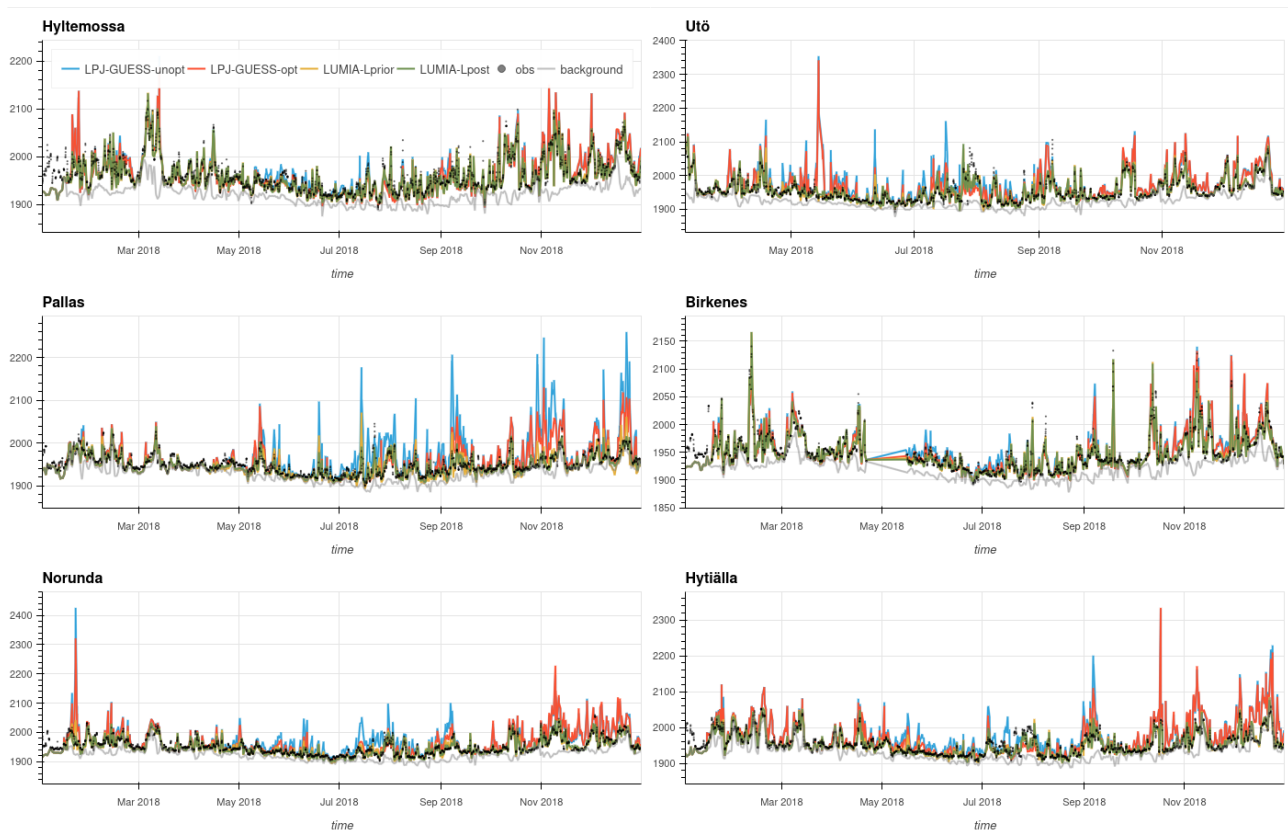


Figure S5: Modelled (solid lines) and observed (dots) CH₄ mixing ratio at the six observation sites within the Nordic region.