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Supplement of

Inverse modelling of CH₄ emissions for 2010–2011 using different satellite retrieval products from GOSAT and SCIAMACHY

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Table T1: Statistics of model to observations fit residuals for inversions S2/S3-GOSAT-SRON-FP and S2/S3-GOSAT-UL-PX: NOAA surface measurements (left) and satellite data (right).

Inversion	NOAA ground stations			Satellite		
	n	Bias [ppb]	RMS [ppb]	n	Bias [ppb]	RMS [ppb]
S2-GOSAT-SRON-FP	3418	-0.6	12.1	31201	-0.1	10.4
S3-GOSAT-SRON-FP	3418	0.3	12.0	31201	-0.3	10.3
S2-GOSAT-UL-PX	3418	-0.9	12.1	129916	0.0	9.0
S3-GOSAT-UL-PX	3418	0.3	11.8	129916	-0.1	8.8

Table T2: NOAA/ESRL stations used in the inversion.

Station ID	Latitude	Longitude	Altitude [m]	Station Name
ALT	82.45	-62.52	210.0	Alert, Nunavut, Canada
ZEP	78.90	11.88	475.0	Ny-Alesund, Svalbard (Spitsbergen), Norway and Sweden
SUM	72.58	-38.48	3238.0	Summit, Greenland
BRW	71.32	-156.60	11.0	Barrow, Alaska, USA
ICE	63.34	-20.29	127.0	Heimay, Vestmannaeyjar, Iceland
CBA	55.20	-162.72	25.0	Cold Bay, Alaska, USA
SHM	52.72	174.10	40.0	Shemya Island, Alaska, USA
UUM	44.45	111.10	914.0	Ulaan Uul, Mongolia
NWR	40.05	-105.58	3526.0	Niwot Ridge, Colorado, USA
AZR	38.77	-27.38	40.0	Terceira Island, Azores, Portugal
WLG	36.29	100.90	3810.0	Mt. Waliguan, Peoples Republic of China
BMW	32.27	-64.88	30.0	Tudor Hill, Bermuda, UK
IZO	28.30	-16.48	2360.0	Tenerife, Canary Islands, Spain
MID	28.21	-177.38	7.7	Sand Island, Midway, USA
ASK	23.18	5.42	2728.0	Assekrem, Algeria
MLO	19.53	-155.58	3397.0	Mauna Loa, Hawaii, USA
KUM	19.52	-154.82	3.0	Cape Kumukahi, Hawaii, USA
GMI	13.43	144.78	6.0	Mariana Islands, Guam
RPB	13.17	-59.43	45.0	Ragged Point, Barbados
CHR	1.70	-157.17	3.0	Christmas Island, Republic of Kiribati
SEY	-4.67	55.17	7.0	Mahe Island, Seychelles
ASC	-7.92	-14.42	54.0	Ascension Island, UK
SMO	-14.24	-170.57	42.0	Tutuila, American Samoa, USA
CGO	-40.68	144.68	94.0	Cape Grim, Tasmania, Australia
CRZ	-46.45	51.85	120.0	Crozet Island, France
TDF	-54.87	-68.48	20.0	Tierra Del Fuego, La Redonda Isla, Argentina
PSA	-64.92	-64.00	10.0	Palmer Station, Antarctica, USA
SYO	-69.00	39.58	14.0	Syowa Station, Antarctica, Japan
HBA	-75.58	-26.50	33.0	Halley Station, Antarctica, UK
SPO	-89.98	-24.80	2810.0	South Pole, Antarctica, USA

Table T3: TCCON stations used for validation

Station ID	Latitude	Longitude	Altitude [m]	Station Name
EUR	80.05	-86.42	610.0	Eureka, Canada
ZEP	78.92	11.92	20.0	Ny-Alesund, Svålbard (Spitsbergen), Norway and Sweden
SOD	67.37	26.63	180.0	Sodankyla, Finland
BIA	53.23	23.03	160.0	Bialystok, Poland
BRM	53.10	8.85	30.0	Bremen, Germany
KAR	49.10	8.44	110.0	Karlsruhe, Germany
ORL	47.97	2.11	130.0	Orleans, France
GAR	47.48	11.06	750.0	Garmisch, Germany
PAR	45.94	-90.27	440.0	Park Falls, WI, USA
INF	39.86	-86.00	270.0	INFLUX, Indianapolis, IN, USA
FCO	36.80	-108.48	1640.0	Four Corners, NM, USA
LAM	36.60	-97.49	320.0	Lamont, OK, USA
TS2	36.05	140.12	30.0	Tsukuba, Japan
JP1	34.13	-118.13	210.0	JPL, USA
SAG	33.24	130.29	10.0	Saga, Japan
IZO	28.30	-16.48	2370.0	Izaña, Tenerife, Spain
ASC	-7.92	-14.33	10.0	Ascension Island
DAR	-12.43	130.89	30.0	Darwin, Australia
WGO	-34.41	150.88	30.0	Wollongong, Australia
LD2	-45.05	169.68	370.0	Lauder, New Zealand

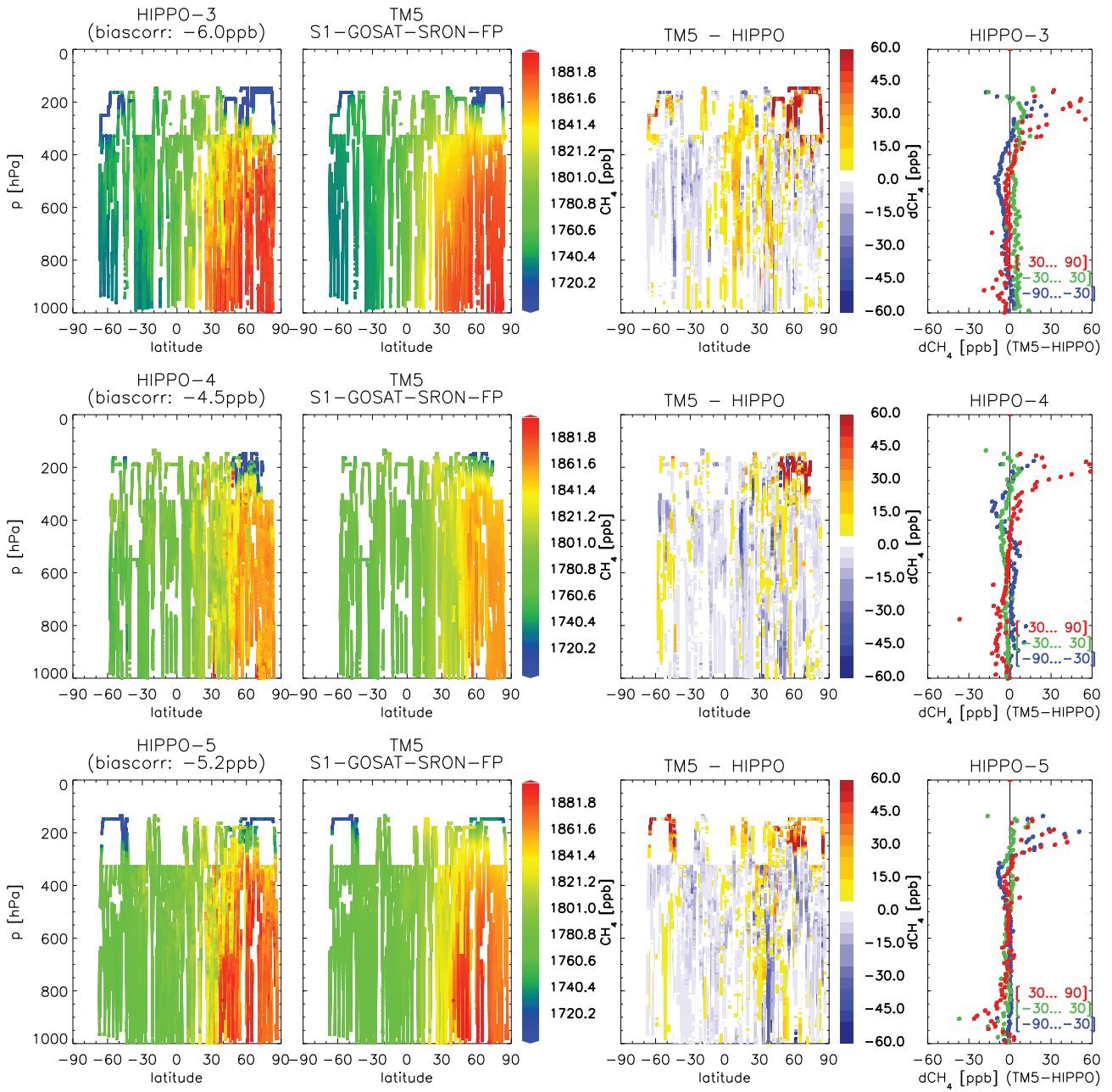


Figure S1: Model validation against HIPPO campaigns 3-5 for S1-GOSAT-SRON-FP. Rightmost plots show the average bias as a function of latitude: extratropical Northern Hemisphere (NH) in red, extratropical SH in blue, and the tropics in green.

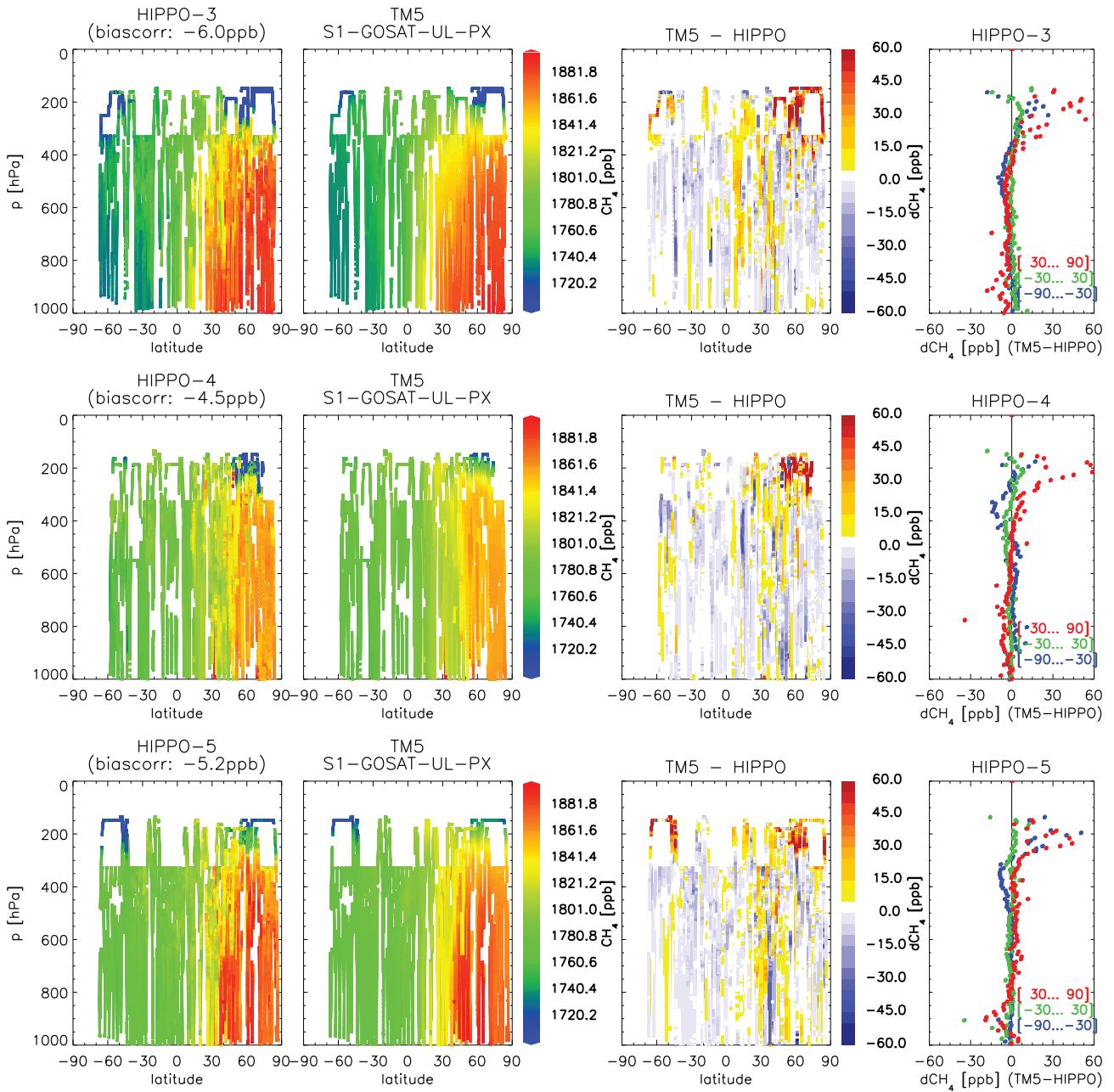


Figure S2: Model validation against HIPPO campaigns 3-5 for S1-GOSAT-UL-PX.

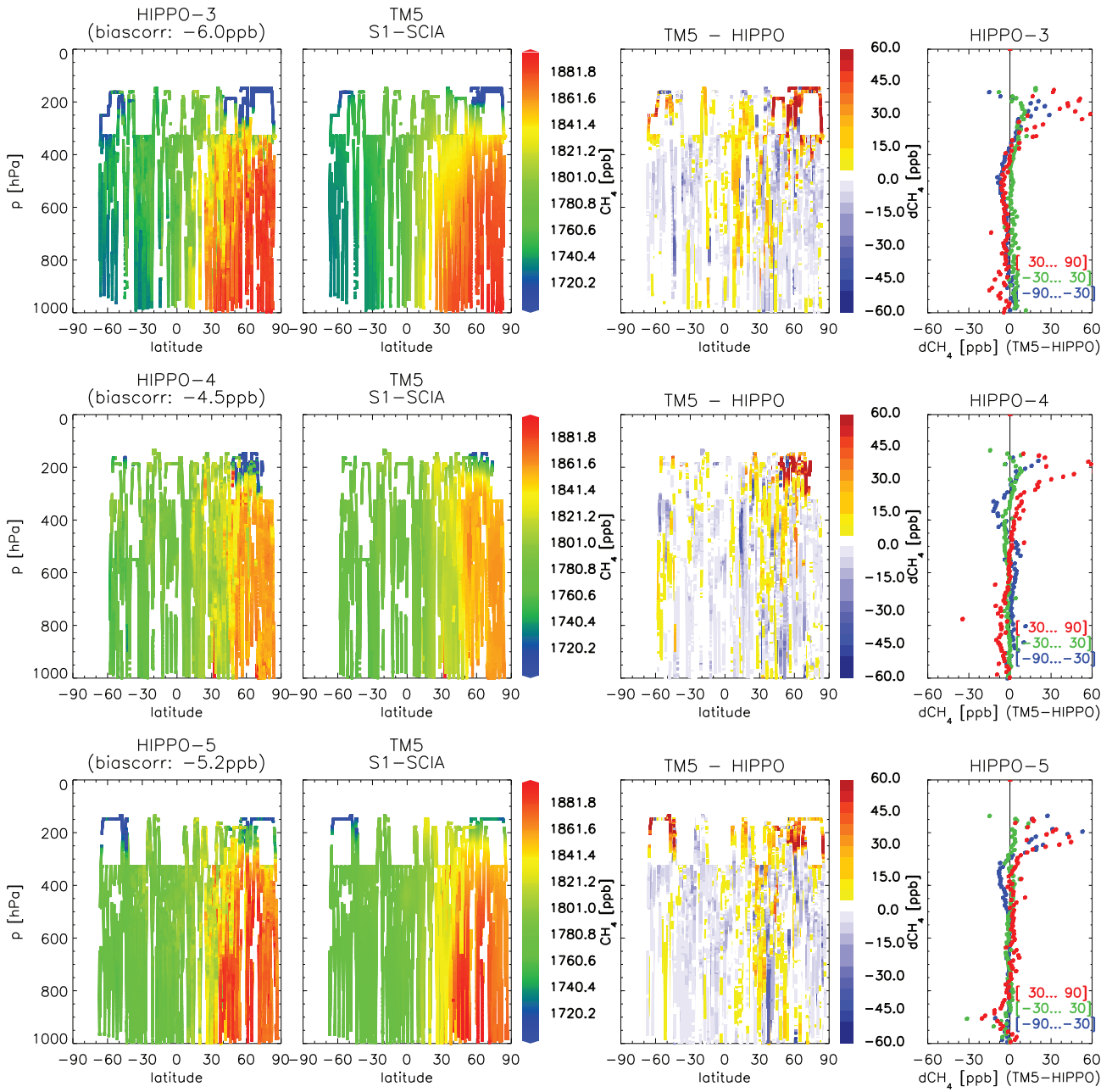


Figure S3: Model validation against HIPPO campaigns 3-5 for S1-SCIA.

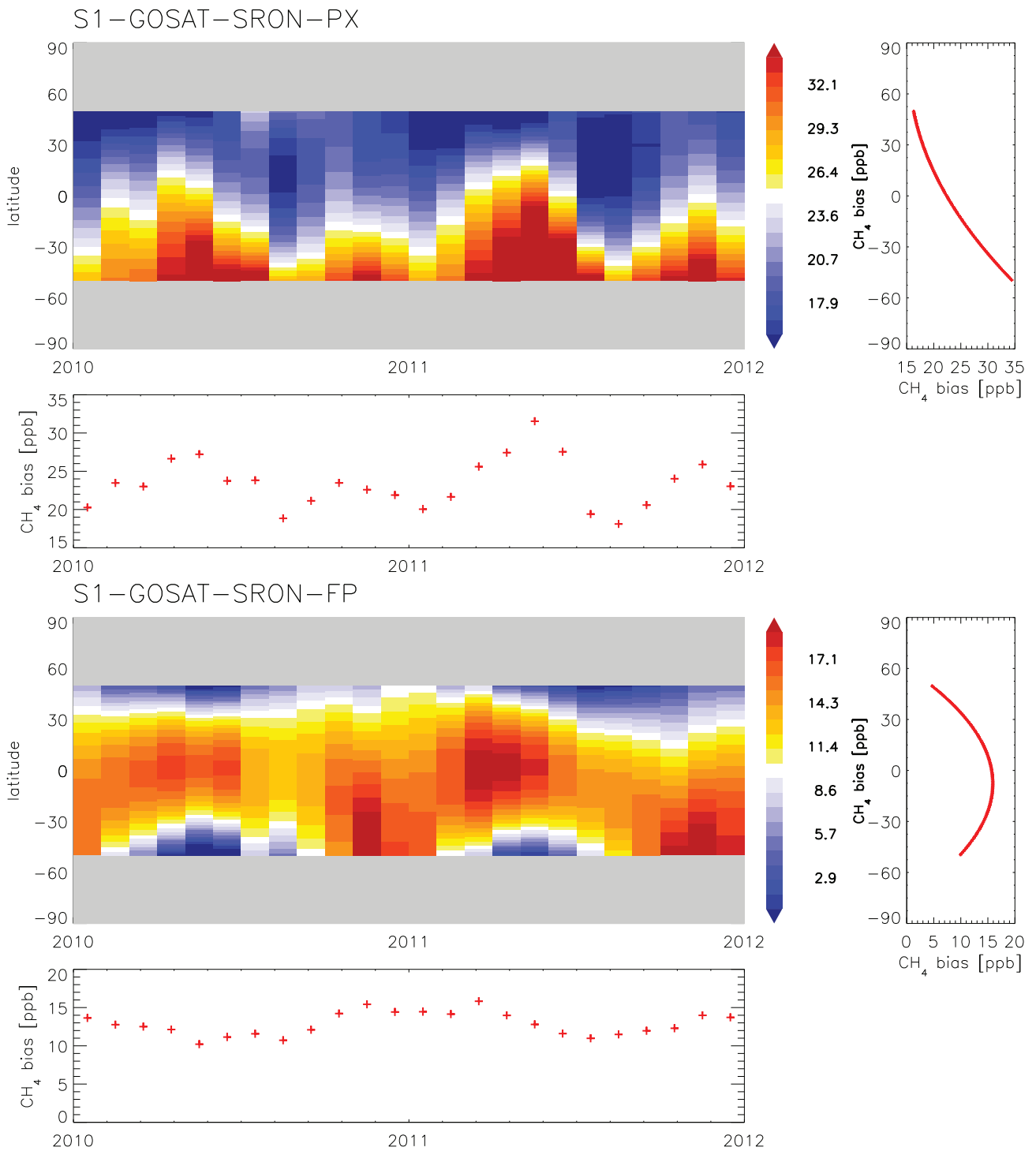


Figure S4: Polynomial bias correction for GOSAT RemoTeC proxy (top) and full-physics XCH₄ retrievals (bottom).

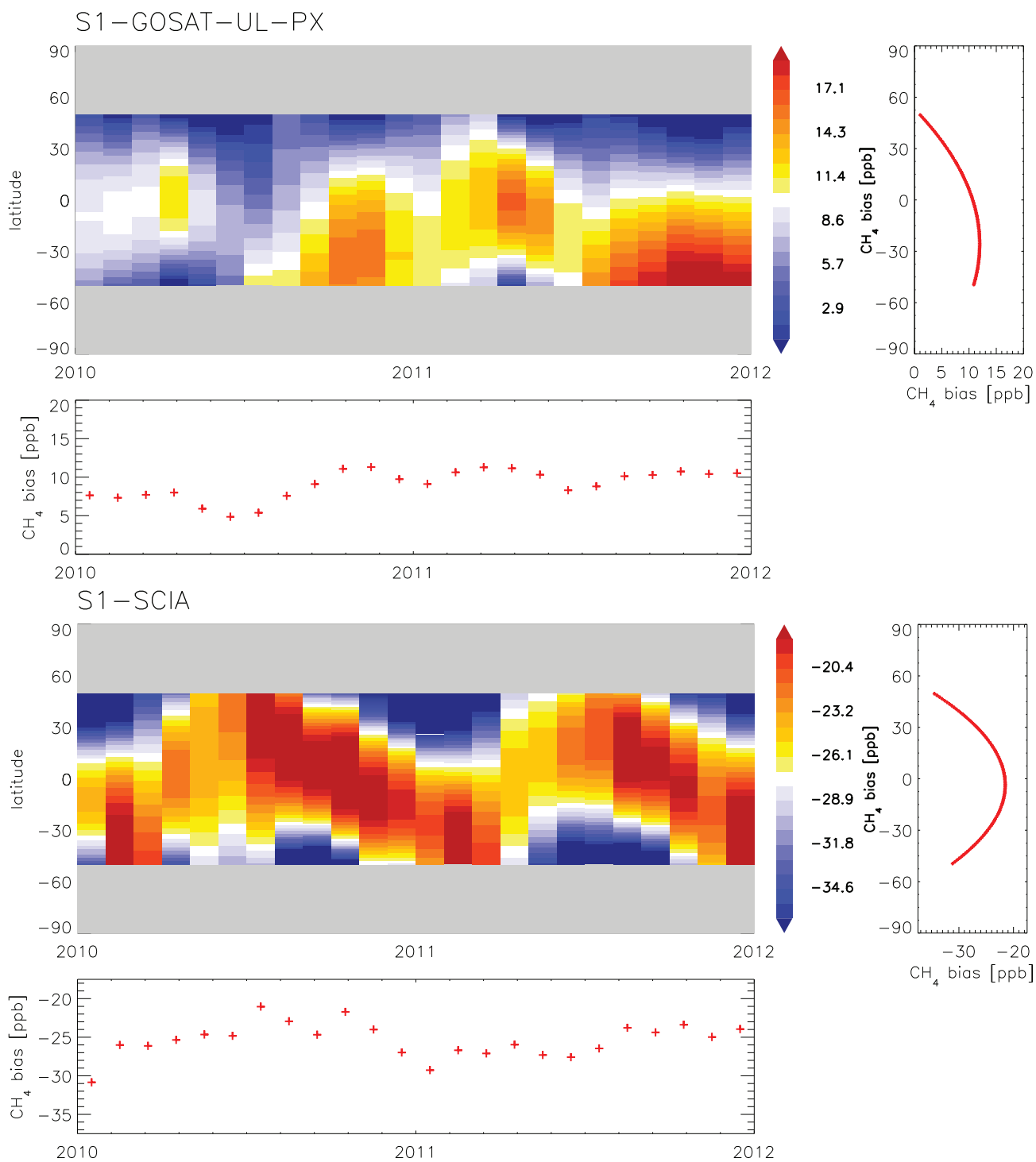


Figure S5: Polynomial bias correction for GOSAT OCPR proxy (top) and SCIAMACHY IMAP XCH₄ retrievals (bottom).