

Supplementary Materials: Worldwide Evaluation of CAMS-EGG4 CO₂ Data Re-Analysis at the Surface Level

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Table S1. Location, root-mean-squares error (RMSE), percentile (%) differences, mean bias (MB), and the slope of the regression between observation and CAMS-EGG4 at the studied stations. * The number subscripted on the acronym of the station refer to the height (m agl) of the observation in tower stations.

Station	Site	latitude	longitude	RMSE	% difference	MB	slope
ALT	Alert (ALT, Canada)	82.49915	−62.3415	2.21	0.47	−0.57	0.999
AMS	Amsterdam Island (AMS, France)	−37.7983	77.5378	1.68	0.41	1.58	1.004
ATTO _{10m}	Amazon Tall Tower Observatory (ATTO 10 m, Brazil)	−2.1441	−58.9999	74.30	12.30	44.53	1.12
ATTO _{34m}	Amazon Tall Tower Observatory (ATTO 34 m, Brazil)	−2.1441	−58.9999	33.01	5.63	17.39	1.04
ATTO _{71m}	Amazon Tall Tower Observatory (ATTO 71 m, Brazil)	−2.1441	−58.9999	55.46	8.36	3.83	1.01
AZR	Serreta (AZR, Terceira - Azores)	38.77	−27.38	1.85	0.40	−0.33	0.999
AMY	Anmyeon-do (AMY, Republic of Korea)	36.5386	126.33	35.20	4.94	19.16	1.045
BEO	BEO Moussala (BEO, Bulgaria)	42.1792	23.5856	50.56		63.11	1.164
BHD	Baring Head (BHD, New Zealand)	−41.4082	174.8708	10.31	1.76	−6.24	0.985
BKT	Bukit Kototabang (BKT, Indonesia)	−0.20194	100.3181	52.71	9.72	30.69	1.074
BRW	Barrow (BRW, Alaska)	71.32301	−156.611	2.77	0.54	1.22	1.003
CDL	Candle Lake (CDL, Canada)	53.98711	−105.118	5.81	1.09	2.59	1.007
CGO	Cape Grim (CGO, Australia)	−40.6822	144.6883	4.86	0.78	1.10	1.003
CGR	Capo Granitola (CDR, Italy)	37.57111	12.65972	8.30	1.35	−2.46	0.994
CLH	Churchill (CLH, Canada)	58.7379	−93.8206	3.89	0.63	1.97	1.005
CMN	Monte Cimone (CMN, Italy)	44.16667	10.68333	33.31	6.22	24.28	1.061
CPA	Cholpon-Ata (CPA, Kyrgyzstan)	42.63694	77.0675	13.35	2.12	5.17	1.012
CPT	Cape Point (CPT, South Africa)	−34.3535	18.48968	3.86	0.61	1.64	1.004
CUR	Monte Curcio (CUR, Italy)	39.31597	16.42325	13.02	3.03	11.89	1.029
CVO	Cape Verde (CVO)	16.86403	−24.8675	1.67	0.33	0.01	1.000
DDR	Mt. Dodaira (DDR, Japan)	36	139.18	65.72	11.48	44.79	1.111
DEU	Deuselbach (DEU, Germany)	49.76667	7.05	22.86	3.46	11.41	1.029
DIG	Diabla Gora (DIG, Poland)	54.15	22.06667	21.91	3.66	−7.93	0.978
DMV	Danum Valley (DMV, Malaysia)	4.981389	117.8436	75.24	14.41	50.67	1.129
ECO	Lecce Environmental-Climate Observatory (ECO, Italy)	40.3358	18.1245	28.47	3.52	−12.56	0.967
EGB	Egbert (EGB, Canada)	44.23101	−79.7838	8.15	1.16	0.32	1.001
ESP	Estevan Point (SEP, Canada)	49.38294	−126.544	5.53	0.91	−0.22	0.999
ETL	East Trout Lake (ETL, Canada)	54.35374	−104.987	2.51	0.43	−0.28	0.999

FDT	Fundata (FDT, Romania)	45.43147	25.27154	33.30	7.88	28.06	1.077
FRF	Farafra (FRF, Egypt)	27.05812	27.99016	49.95	11.47	36.06	1.088
FSD	Fraserdale (FSD, Canada)	49.87517	−81.5698	6.33	0.84	−1.05	0.997
GAT	Gartow (GAT, Germany)	53.06551	11.44273	8.05	1.17	2.77	1.007
GLH	Giordan Lighthouse (GLH, Malta)	36.0722	14.2184	15.13	3.63	14.18	1.036
GSN	Gosan (GSN, Republic of Korea)	33.29382	126.1628	7.13	1.35	−0.03	0.99
HPB	Hohenpeissenberg (HPB, Germany)	47.8015	11.00962	15.50	2.19	6.45	1.016
IZO	Izaña (IZO, Tenerife)	28.309	−16.4994	3.01	0.61	1.90	1.005
JBN	Jubany (JBN, Argentina)	−62.2382	−58.666	1.60	0.33	0.84	1.002
JFJ	Jungfrauoch (JFJ, Switzerland)	46.54749	7.98509	23.13	4.18	15.42	1.040
JGS	Jeju Gosan (JFJ, Republic of Korea)	33.30005	126.2057	12.57	2.78	10.68	1.027
KIS	Kisai (KIS, Japan)	36.08	139.55	56.21	9.69	28.82	1.067
KIT	Karlsruhe (KIT, Germany)	49.1	8.438	21.08	2.98	5.44	1.013
KMW	Kollumerwaard (KMW, Netherlands)	53.33333	6.266667	25.08	3.82	−13.47	0.964
KSG	King Sejong (KSG, Republic of Korea)	−62.2167	−58.7833	1.64	0.40	1.50	1.004
LIN	Lindenberg (LIN, Germany)	52.21667	14.11667	9.62	1.34	3.46	1.008
LLB	Lac La Biche (LLB, Canada)	54.95381	−112.467	6.36	0.98	−2.61	0.994
LMP	Lampedusa (LMP, Italy)	35.5182	12.6305	1.81	0.36	−1.24	0.997
LMT	Lamezia Terme (LMT, Italy)	38.8763	16.2322	23.60	3.10	−12.27	0.968
MEX	Mexico, (MEX)	18.9841	−97.311	12.03	1.90	8.14	1.02
MHD	Mace Head (MHD, Ireland)	53.32661	−9.90442	4.01	0.74	0.66	1.002
MKW	Mikawa-Ichinomiya (MKW, Japan)	34.85	137.43	39.89	7.22	19.73	1.048
MLO	Mauna Loa (MLO, USA)	19.53623	−155.576	2.89	0.62	2.23	1.006
MNM	Minamitorishima (MNM, Japan)	24.2883	153.9833	1.86	0.39	0.97	1.002
MQA	Macquarie Island (MQA, Australia)	−54.4985	158.9385	1.42	0.33	−1.34	0.997
NGL	Neuglobsow (NGL, Germany)	53.14278	13.03333	15.36	2.18	−6.38	0.983
PAL	Pallas (PAL, Finland)	67.97361	24.11583	6.35	1.18	2.53	1.006
PDI	Pha Din (PDI, Viet Nam)	21.5731	103.5157	49.19	8.40	13.28	1.032
PRS	Plateau Rosa (PRS, Italy)	45.93534	7.70731	22.39	4.24	16.28	1.041
PUY	Puy de Dôme (PUY, France)	45.7723	2.9658	14.48	2.38	8.42	1.021
RYO	Ryori (RYO, Japan)	39.0319	141.8222	18.63	2.92	9.74	1.024
SMO	Samoa (SMO, USA)	−14.247	−170.564	1.65	0.35	0.28	1.001
SNB	SONNBLICK (SNB, Austria)	12.95778	47.05417	4.45	0.86	0.42	1.001
SPO	South Pole	−89.98	−24.8	1.42	0.33	0.46	1.001
SSL	Schauinsland (SSL, Germany)	47.9	7.916667	25.62	4.61	17.44	1.044
SUI	Suita (SUI, Japan)	34.82	135.52	37.89	6.28	15.44	1.036
TIK	Tiksi (TIK, Russian Federation)	71.5965	128.8887	4.45	0.70	1.30	1.003
TKY	Takayama (TKY, Japan)	36.14617	137.4231	33.99	6.03	21.88	1.056
TLL	El Tololo (TLL, Chile)	−30.1683	−70.8036	6.13	1.12	3.43	1.009
TOH	Torfhaus (TOH, Germany)	51.8088	10.535	15.25	2.20	8.26	1.02
WES	Westerland (WES, Germany)	54.92314	8.308017	6.45	1.10	−0.11	0.999

WSA	Sable Island (WSA, Canada)	43.93227	−60.0126	3.01	0.58	−1.68	0.996
YON	Yonagunijima (YON, Japan)	24.4667	123.0106	3.49	0.64	0.76	1.002
ZEP	Zeppelin Mountain (ZEP, Norway)	78.90669	11.88934	3.01	0.63	1.89	1.005
ZSF	Zugspitze-Schneefernerhaus (ZSF, Germany)	47.4165	10.97964	22.25	3.99	14.70	1.04
ABP	Arembepe (ABP, Brazil)	−12.7667	−38.1667	3.63	0.92	3.54	1.009
AMT_{12m}	Argyle, Maine, United States (AMT _{12m})	45.0345	−68.6821	18.21	2.32	−5.16	0.986
AMT_{30m}	Argyle, Maine, United States (AMT _{30m})	45.0345	−68.6821	13.35	1.89	−3.11	0.992
AMT_{107m}	Argyle, Maine, United States (AMT _{107m})	45.0345	−68.6821	9.46	1.54	−1.35	0.996
ASC	Ascension Island (ASC, United Kingdom of Great Britain and Northern Ireland)	−7.97	−14.4	1.29	0.28	0.16	1
ASK	Assekrem (ASK, Algeria)	23.26667	5.633333	1.89	0.41	1.02	1.003
BAL	Baltic Sea (BAL, Poland)	55.5	16.67	3.54	0.74	1.54	1.004
BGU	Begur (BGU, Spain)	41.97	3.23	11.33	2.80	10.87	1.028
BME	St. David's Head (BME, United Kingdom of Great Britain and Northern Ireland)	32.37	−64.65	3.59	0.74	2.01	1.003
BMW	Tudor Hill (Bermuda) (BMW, United Kingdom of Great Britain and Northern Ireland)	32.27	−64.88	4.21	0.80	−0.44	0.999
BSC	Constanta (Black Sea) (BSC, Romania)	44.17	28.68	8.067	1.49	−5.08	0.987
CAI	Cairo (CAI, Egypt)	30.08333	31.28333	52.25	12.87	36.74	0.912
CBA	Cold Bay (AK) (CBA, United States of America)	55.2	−162.717	2.44	0.49	0.22	1
CFA	Cape Ferguson (CFA, Australia)	−19.2773	147.0584	2.33	0.49	1.60	0.969
CHM	Chibougamau (CHM, Canada)	49.69251	−74.3423	4.44	0.94	3.38	0.992
CHR	Christmas Island (CHR, Kiribati)	1.7	−157.17	3.98	0.66	−1.24	0.853
CRI	Cape Rama (CRI, India)	15.08	73.83	5.61	0.98	3.77	1.01
CRZ	Crozet (CRZ, France)	−46.4333	51.83358	1.35	0.31	0.29	1.001
CYA	Casey (CYA, Australia)	−66.2833	110.5167	1.31	0.30	0.28	1.001
DMV	Danum Valley (DMV, Malaysia)	4.981389	117.8436	71.14	13.77	291.64	1.12
DRP	Drake Passage (DRP, United States of America)	59.00002	−64.69	10.02	2.30	7.62	1.019
EIC	Easter Island (EIC, Chile)	−27.1667	−109.417	1.87	0.91	0.91	1.002
FKL	Finokalia (FKL, Greece)	35.3378	25.6694	2.89	0.65	2.20	1.005
GMI	Guam (Mariana Island) (GMI, United States of America)	13.43	144.78	1.88	0.42	1.08	1.003
GPA	Gunn Point (GPA, Australia)	−12.2488	131.0453	10.42	3.31	1.40	1.021
HBA	Halley (HBA, United Kingdom of Great Britain and Northern Ireland)	−75.5715	−25.5039	1.45	0.34	0.93	0.974
HFD	Heathfield (HFD, United Kingdom of Great Britain and Northern Ireland)	50.97667	0.230556	2.82	0.54	0.98	1.002

HKG	Hong Kong, China	22.2095	114.2579	36.09	7.43	29.70	1.073
HKO	King's Park (HKO,Hong Kong, China)	22.312	114.173	33.55	6.57	26.18	1.063
HUN ^(10 m)	Hegyhatsal (HUN ^(10 m) , Hungary)	46.95	16.65	13.13	2.07	−1.92	0.994
HUN ^(48 m)	Hegyhatsal (HUN ^(48 m) , Hungary)	46.95	16.65	8.38	1.48	−1.48	0.997
HUN ^(82 m)	Hegyhatsal (HUN ^(82 m) , Hungary)	46.95	16.65	7.24	1.31	−1.31	0.997
HUN ^(115 m)	Hegyhatsal (HUN ^(115 m) , Hungary)	46.965	16.65	6.73	1.23	−1.23	0.997
LEF ^(396 m)	Park Falls, Wisconsin, United States (LEF)	45.93	−90.27	3.89	0.73	−0.29	0.999
ICE	Storhofdi (ICE,Iceland)	63.4	−20.2833	0.97	0.57	1.39	1.003
ISK	Issyk-Kul (ISK, Kyrgyzstan)	42.61666	76.98333	10.99	2.43	8.89	1.023
KCO	Kaashidhoo (Male Atoll) (KCO,Maldives)	4.97	73.47	1.62	0.14	−0.31	0.999
KEY	Key Biscane (FL) (KEY,United States of America)	25.66667	−80.2	7.19	1.73	6.93	1.017
KOT	Kotelnyj Island (KOT,Russian Federation)	76	137.87	9.98	10.55	12.44	1.019
KPS	K-Puszt (KPS,Hungary)	46.96667	19.58333	7.11	7.38	8.32	0.997
KUM	Cape Kumukahi (HI) (KUM,United States of America)	19.52	−154.82	1.70	0.37	0.89	1.002
KYZ	Kyzylcha (KYZ,Uzbekistan)	40.87	66.15	2.50	6.99	7.12	1.016
KZD	Sary Taukum (KZD,Kazakhstan)	44.45	77.57	8.84	2.15	8.28	1.021
KZM	Plateau Assy (KZM,Kazakhstan)	43.25	77.88	11.60	2.93	11.19	1.029
LEF	Park Falls (WI) (LEF,United States of America)	45.93	−90.27	6.94	1.95	3.93	1.021
LLN	Lulin (LLN,Taiwan, Province of China)	23.47	120.87	29.67	7.35	29.07	1.073
LPO	Ile Grande (LPO,France)	48.8036	−3.5839	3.97	0.93	3.48	1.009
MAA	Mawson (MAA,Australia)	−67.6047	62.87056	1.27	0.29	0.18	1
MDN	Madonie - Piano Battaglia (MDN,Italy)	37.88031	14.02564	12.39	2.97	11.27	1.028
MID	Sand Island (MID,United States of America)	28.22	−177.37	1.95	0.41	1.01	1.003
MKN	Mt. Kenya (MKN,Kenya)	−0.0622	37.2972	8.62	2.14	8.17	1.021
NAT	Natal (NAT,Brazil)	−6	−35.2	1.64	0.33	1.04	1.003
NMB	Gobabeb (NMB,Namibia)	−23.57	15.03	1.19	0.24	−0.51	0.999
NWR	Niwot Ridge - T-van (CO) (NWR,United States of America)	40.05	−105.59	17.63	4.19	16.50	1.042
OXK	Ochsenkopf (OXK,Germany)	50.0301	11.8084	10.38	2.42	9.58	1.024
PDM	Pic du Midi (PDM,France)	42.9372	0.1411	13.17	3.27	12.57	1.033
PSA	Palmer Station (PSA,United States of America)	−64.7743	−64.0544	1.32	0.30	0.27	1.001
PTA	Point Arena (CA) (PTA,United States of America)	38.95	−123.73	7.03	1.54	5.68	1.015

RGL_(45 m)	Ridge Hill (RGL,United Kingdom of Great Britain and Northern Ireland)	51.99756	−2.54003	3.50	0.61	−1.54	0.996
RGL_(90 m)	Ridge Hill (RGL,United Kingdom of Great Britain and Northern Ireland)	51.99756	−2.54003	3.39	0.59	−1.44	0.996
RPB	Ragged Point (RPB,Barbados)	13.17	−59.43	1.83	0.39	1.13	1.003
SDZ	Shangdianzi (SDZ,China)	40.65	117.1166	23.06	5.41	21.55	1.053
SEY	Mahé (SEY,Seychelles)	−4.67	55.17	1.92	0.51	1.92	1.001
SGP	Southern Great Plains E13 (OK) (SGP,United States of America)	36.6	−97.5	13.75	3.61	13.75	1.02
SHM	Shemya Island (SHM,United States of America)	52.72	174.1	2.66	0.51	0.87	1.002
STM	Ocean Station M (STM,Norway)	66	2	2.34	0.53	1.98	1.005
SUM	Summit (SUM,Denmark)	72.58	−38.48	1.95	0.43	1.03	1.003
SYO	Syowa (SYO,Japan)	−69.0053	39.5811	1.36	0.31	0.44	1.001
TAC_(54 m)	Tacolneston Tall Tower (TAC _(54 m) ,United Kingdom of Great Britain and Northern Ireland)	52.5177	1.1386	3.95	0.70	−1.59	0.996
TAC_(100 m)	Tacolneston Tall Tower (TAC _(100 m) ,United Kingdom of Great Britain and Northern Ireland)	52.5177	1.1386	9.20	1.81	−0.97	0.997
TAC_(185 m)	Tacolneston Tall Tower (TAC _(185 m) ,United Kingdom of Great Britain and Northern Ireland)	52.5177	1.1386	2.99	0.54	−0.27	0.999
TAP	Tae-ahn Peninsula (TAP,Republic of Korea)	36.73	126.13	17.45	4.17	16.75	1.042
TER	Teriberka (TER,Russian Federation)	69.2	35.1	2.62	0.54	1.10	1.003
THD	Trinidad Head (CA) (THD,United States of America)	41.0541	−124.151	8.27	1.79	6.98	1.018
USH	Ushuaia (USH,Argentina)	−54.8485	−68.3107	1.49	0.34	0.72	1.002
UTA	Wendover (UT) (UTA,United States of America)	39.9	−113.72	3.09	0.65	2.46	1.006
UUM	Ulaan Uul (UUM,Mongolia)	44.444	111.0861	5.55	1.16	4.34	1.011
WIS	Sede Boker (WIS,Israel)	31.13	34.88	6.47	1.55	6.09	1.015
WLG	Mt. Waliguan (WLG,China)	36.2875	100.8963	5.52	1.13	4.59	1.011
WBI_{31m}	West Branch, Iowa, United States (WBI _{31m})	41.7248	−91.3529	10.11	1.75	−3.46	0.992
WBI_{99m}	West Branch, Iowa, United States (WBI _{99m})	41.7248	−91.3529	7.79	1.40	−2.23	0.994
WBI_{379m}	West Branch, Iowa, United States (WBI _{379m})	41.7248	−91.3529	6.54	1.19	−0.74	0.997
WKT_{9m}	Moody, Texas, United States (WKT _{9m})	31.3149	−97.3269	16.39	2.86	6.15	1.015

WKT_{30m}	Moody, Texas, United States (WKT _{30m})	31.3149	−97.3269	12.73	2.41	5.77	1.015
WKT_{61m}	Moody, Texas, United States (WKT _{61m})	31.3149	−97.3269	10.82	2.07	3.16	1.008
WKT_{122m}	Moody, Texas, United States (WKT _{122m})	31.3149	−97.3269	8.63	1.73	1.61	1.004
WKT_{244m}	Moody, Texas, United States (WKT _{244m})	31.3149	−97.3269	7.58	1.55	3.46	1.009
WKT_{457m}	Moody, Texas, United States (WKT _{457m})	31.3149	−97.3269	6.57	1.34	2.83	1.007
SCT_{31m}	Beech Island, South Carolina, United States (SCT _{31m})	33.4057	−81.8334	13.99	2.21	7.21	1.017
SCT_{61m}	Beech Island, South Carolina, United States (SCT _{61m})	33.4057	−81.8334	10.71	1.82	6.03	1.014
SCT_{305m}	Beech Island, South Carolina, United States (SCT _{305m})	33.4057	−81.8334	5.99	1.09	3.37	1.008