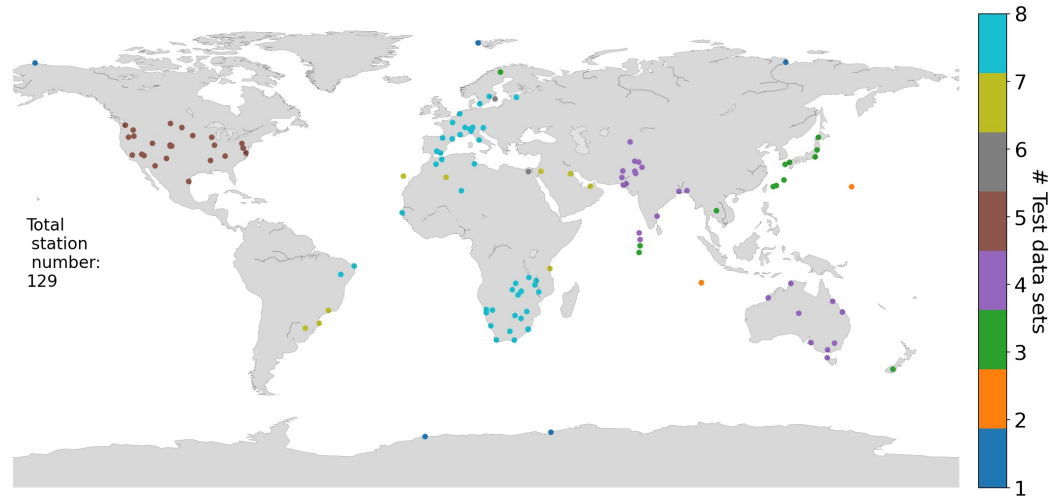


Worldwide benchmark of modelled solar irradiance data: Approach



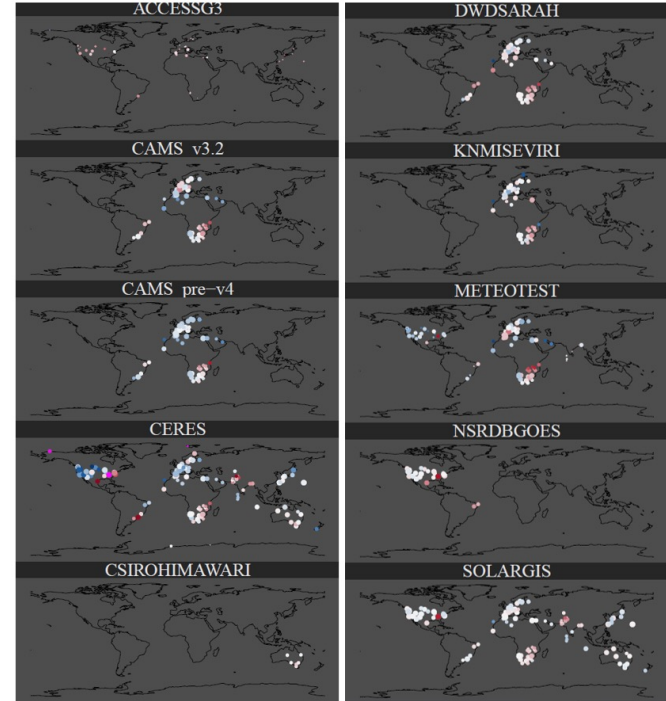
- Comparison to 10 model data sets from 9 public and commercial providers to high quality ground-based reference data
- Expert quality control of global (GHI), direct (DNI) and diffuse (DIF) irradiance measurements from worldwide ground stations
- Selection of 129 ground stations worldwide from 27 different providers



Worldwide benchmark of modelled solar irradiance data: Results

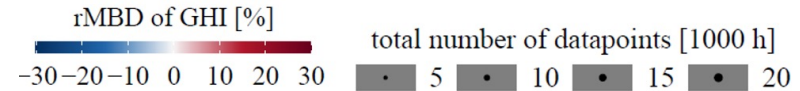


- Users are provided with world maps of the results for overview and regional analysis
- Tables providing a ranking for continents and climate zones are provided as well for a more detailed analysis



Europe: DNI, rMBD (%)

site	CAB	CAR*	CAS	CEN	DAO	DAV	JAE*	KAZ	KIR	LOC	LYN	NOR	NYA	ODE	PAL	PAY	TAB*	TOR	VIS	Mean	Std	Abs_Mean	Abs_Std		
model																									
SOLARGIS	-1.6	-0.5	-1.5	2.2	13.1	14.6	10.2	10.9		1.3	-3.3	7.3	-2.5		2.2	-1.6	0.3	1.8	-5.4	-2.5	2.8	6.1	4.7	4.7	
CAMS_v3.2	9.5	-2.6	0.3	-1.2	-10.6	-10.1	3.1	7.6		-4.2	-4.2	4.7	9.1		3.5	7.4	-1.7	4.4	-11.5		-1.4	6.7	5.6	3.6	
METEOTEST	-5.5	0.7	-3.1	8.9	20.8	21.7	16.8	11.7		1.9	-1.3	1.8	-3.5		14.3	1.2	3.3	14.1	-9.2	-11.8	5.6	9.5	8.2	7.1	
DWDSARAH	4.3	-1.2	-0.2	-1.8	-31.4	-31.0	2.7	-2.8		-1.7	-4.3	12.9	-5.4		-19.7	6.3	-3.8	1.8	-8.8		-4.9	12.0	8.2	9.9	
KNMISEVIRI	1.1	-6.3	-4.6	-4.7	-34.8	-35.3	-2.2	-5.8	-0.0		-6.2	-1.1	9.1	-1.1		-23.5	-0.9	-3.5	-9.2	-5.5	-3.9	-7.9	12.0	11.1	
CAMS_pre-v4	-18.6	-7.9	-4.7	-14.1	-19.3	-15.7	-5.2	-9.7		-2.1	-17.8	1.9	-21.0		-18.4	-13.8	-10.2	-4.9	-29.5	-19.0	-12.4	8.1	12.6	7.7	
CERES	-20.4	-24.9	-18.5	-11.4	-17.4	-16.3	-17.3	-21.3	-7.2		-27.8	-11.3	-8.5	-18.0	-68.8	-27.8	-14.2	-24.4	-21.7	-19.8	-21.4	-18.9	5.6	18.9	5.6





- Most appropriate modelled data set depends on site and climate or continent of interest
- Modelled errors and deviations between data sets are generally much higher for DNI than for GHI
- Without a stringent quality control procedure, no real validation can be done, with the risk of obtaining invalid results
- A bulk of the reference database was made publicly available including the quality flags (Forstinger et al., 2021 [link](#))