

EVID03: GIVE German Initiative for the Validation of EarthCARE



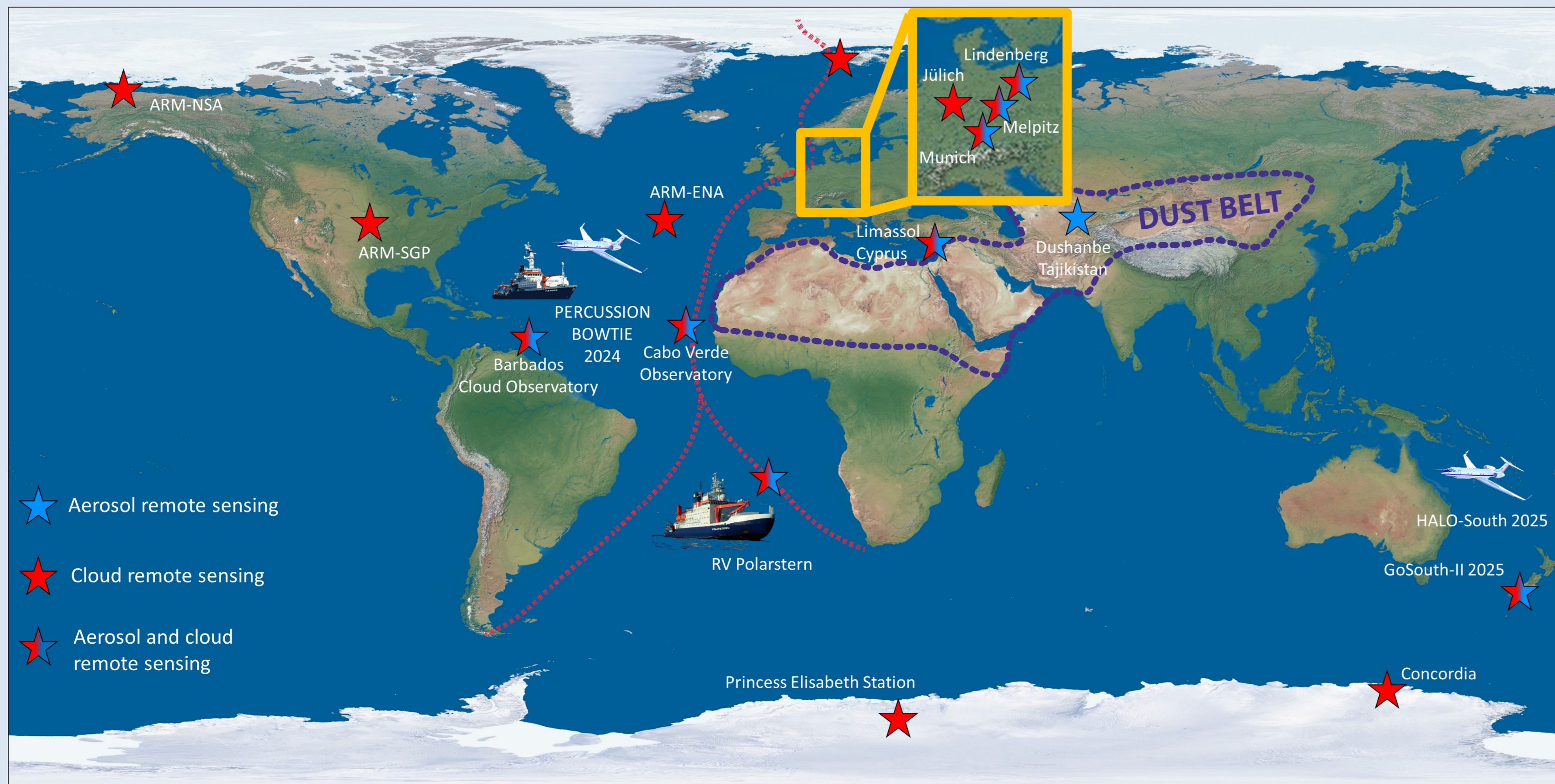
The GIVE Team

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Validation means and activities (green: ACTRIS QA & GEOMS conversion in place, black: diverse or unknown status)

Ground-based stationary observations	Mobile observations	Airborne and campaign activities	Satellite intercomparisons	Model studies
<ul style="list-style-type: none"> Aerosol remote sensing stations Melpitz, Lindenberg, Munich, Limassol, Dushanbe, Mindelo, Barbados Cloud remote sensing stations Melpitz, Lindenberg, Munich, Jülich, Limassol, Mindelo, Barbados, ARM research facilities Radiation networks 	<ul style="list-style-type: none"> LACROS – mobile facility for aerosol and cloud remote sensing OCEANET – mobile facility for aerosol and cloud remote sensing LIMMACO – mobile facility for cloud remote sensing <p>The facilities are available for land-based and shipborne campaigns and can be moved below the satellite track.</p>	<ul style="list-style-type: none"> PERCUSSION & BOWTIE 2024 HALO with EarthCARE-like payload LIMMACO onboard RV Meteor Mindelo and Barbados ground-based stations HALO-South & GoSouth-II 2025 HALO with in-situ payload LACROS & LIMMACO mobile facilities 	<ul style="list-style-type: none"> MSG SEVIRI & MTG FCI MSG GERB Sentinel-3 SLSTR Sentinel-3 OLCI Metop-SG MetImage CERES (on NOAA-20, Aqua, SNPP) SPARE-ICE product (AVHRR, SEVIRI, MODIS, SSMI/AMSR-2) 	<ul style="list-style-type: none"> 4D-var aerosol data assimilation with EURAD-IM



Instrumentation of fully equipped validation stations

- Multiwavelength Raman polarization lidar (355, 532, 1064 nm)
- Sun/sky photometer
- 94 and/or 35 GHz Doppler cloud radar
- Microwave radiometer
- Ceilometer
- Doppler wind lidar
- Micro rain radar
- Optical disdrometer
- All-sky imager
- Pyranometers (shaded and unshaded)
- Pyrgeometer
- Pyrheliometer
- Meteorological station

GIVE validation matrix: EarthCARE Level 1 and Level 2 products will be validated by means of airborne (A) and ground-based observations (G), 4D-var modelling (M), and cross-satellite comparisons (S)
Funding status: A G M S - funding available, A G M S - funding not (yet) available *

	TROPOS	FUB	UoC	DWD	FZJ	UHH	LMU	DLR & MPI-M	LIM
Level 1									
MSI	S	S	-	-	M	-	-	S	A
BBR	G	S	-	-	-	-	-	S	-
ATLID	G	-	-	-	M	-	G	A	-
CPR	G	-	G	-	-	-	G	A	G
Level 2 - Cloud-top, vertically integrated and layer-wise retrieval products									
Target classification	G, S	-	G	G	-	-	G	A, S	G
Cloud-top phase	G, S	-	G	G	-	-	-	A, S	G
Aerosol layer height/depth	G	-	-	-	M	-	G	A	-
Aerosol layer classification	G	-	-	-	M	-	G	A	-
Cloud detection, cloud-aerosol discrimination	S	-	G	-	-	-	G	-	-
Optical thickness	G, S	-	-	-	-	-	G	A, S	-
Effective radius	G, S	-	-	-	-	S	-	A, S	-
Water path	G, S	-	G	G	-	-	G	A, S	G
Surface snow rate	G	-	G	-	-	-	G	-	-
Optical thickness	S	-	-	-	-	-	-	S	-
Effective radius	S	-	-	-	-	-	-	S	-
Water path	G, S	-	G	G	-	-	G	A, S	G
Surface rain rate	G	-	G	G	-	-	G	-	G
Rain water path	G	-	G	-	-	-	G	-	-
Aerosol (per species)	G	S	-	-	M	-	G	A	-
Ångström exponent	G	S	-	-	-	-	G	A	-
Level 2 - Vertical profiles at nadir									
Target classification	G	-	G	G	-	-	G	A	G
Cloud/precipitation fraction	G	-	G	G	-	-	G	A	G
Cloud/precipitation phase	G	-	G	G	-	-	G	A	G
Aerosol fraction	G	-	-	-	-	-	-	-	-
Aerosol species	G	-	-	-	M	-	-	A	-
Extinction	G	-	-	G	-	S	G	A	G
Effective radius	G	-	-	-	-	S	-	A	G
Water content	G	-	-	G	-	S	G	A	G
Snow rate	-	-	G	-	-	S	-	-	-
Snow median diameter	-	-	G	-	-	S	G	-	G
Extinction-to-backscatter ratio	G	-	-	G	-	-	-	A	-
Extinction	G	-	-	G	-	-	-	-	-
Effective radius	G	-	-	G	-	-	-	-	G
Water content	G	-	-	G	-	-	-	-	G
Rain rate	G	-	G	G	-	-	G	-	G
Rain water content	G	-	G	-	-	-	-	-	-
Median drop size	G	-	G	-	-	-	G	-	G
Aerosol extinction	G	-	-	G	M	-	G	A	-
Extinction-to-backscatter ratio	G	-	-	G	M	-	G	A	-
Particle linear depolarization ratio	G	-	-	G	M	-	G	A	-
Level 2 - Radiation products									
Radiation	-	S	-	-	-	-	-	-	A
BBR SW unfiltered radiances	-	S	-	-	-	-	-	-	A
Solar top-of-atmosphere flux	G	S	-	-	-	-	-	-	A
SW and LW fluxes at surface	G	-	-	-	-	-	-	-	-
Terrestrial top-of-atmosphere flux	-	-	-	-	-	-	-	-	A

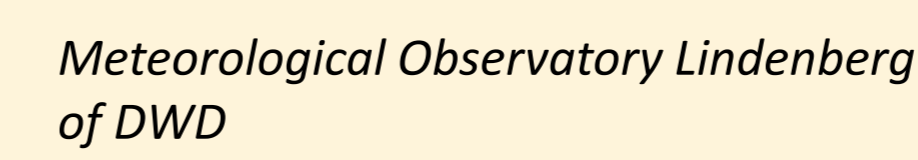
* funding is assured for about 40% of the planned activities for ground-based, modelling, and cross-satellite validation, further funding opportunities are under discussion
airborne campaigns with the HALO research aircraft and related ground-based activities are funded separately (DFG and institutional funds)



German research aircraft HALO



TROPOS Research Station Melpitz



Meteorological Observatory Lindenberg of DWD



Aerosol, cloud and radiation station of TROPOS at Ocean Science Center Mindelo, Cabo Verde



Mobile radiation measurement station of TROPOS



LIMMACO mobile active cloud observatory of LIM onboard German research vessel Meteor



JOYCE cloud remote sensing station of TROPOS at Forschungszentrum Jülich



LACROS mobile facility of TROPOS at Limassol, Cyprus



Barbados Cloud Observatory of MPI-M

