

climate change initiative

→ CLIMATE MODELLING USER GROUP

WP3: quality assessment of CCI products
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- Objective
 - Assess consistency and quality of CCI products
 - Across ECVs
 - Using climate (sub-)models and reanalyses
- Effort: 50 pm
 - Meteo-France (13 pm) – 3.1, 3.2, 3.3 + coordination
 - BSC (15 pm) – 3.4, 3.8, 3.10, 3.11
 - ECMWF (9 pm) – 3.12
 - IPSL (8 pm) – 3.5, 3.6
 - Met Office (5 pm) – 3.7, 3.9



WP3: quality assessment of CCI products



- 7 new CCI variables covered by WP3
 - **LST** (3.1, 3.4, 3.5, 3.6, 3.7)
 - **Snow** (3.2, 3.6)
 - **HRLC** (3.10, 3.11)
 - **Sea salinity** (3.8, 3.9)
 - **Permafrost** (3.3)
 - **Lakes** (3.7)
 - **Sea state** (3.9)
- Ozone and AOD (3.12)
- AGB used by WP4
- Water vapor used by WP5



- Cross-cutting consistency assessment of new CCI variables
 - **LST-SM-LAI** (3.1) through assimilation of *LAI* with and without SM
 - **Snow-SM-LAI** (3.2) through assimilation of *LAI* with and without SM
 - **Permafrost-SM-LAI** (3.3) through assimilation of *LAI* with and without SM
 - **LST-SM-BA** (3.4) through statistical analysis of hindcast simulations
 - **LST-SM** (3.5) through thermal inertia process
 - **LST-Snow-SM-ET** (3.6) through (**LST-Ta**) driven processes
 - **Lakes-LST** (3.7) through spatial and temporal consistency analysis
 - **Ssal-SST-SI-Clds** (3.8) through initialization of SI accounting for SST
 - **Ssal-Ssta-SST-OC-SSH-SI** (3.9) through assimilation of OC
 - **HRLC-Aero-LC** (3.10, 3.11) through assimilation of dust



- LDAS-Monde
 - An open-source land data assimilation system
 - Based on the open-source SURFEX modeling platform
 - Integrates satellite data into the ISBA land surface model
 - The only LDAS able to sequentially assimilate vegetation products
 - Thanks to flexible *LAI*/phenology in ISBA
 - Joint assimilation of *LAI* and SM is possible
 - *LAI* assimilation allows the analysis of root-zone soil moisture
 - Demonstrated capability of cross-cutting consistency assessment of
 - *LAI, SM, LST, FAPAR, Albedo*



- Scientific questions
 - How can land ECVs' consistency be verified ?
 - Are land ECVs represented well in climate and land surface models ?
 - Can EO data improve land reanalyses ?
 - Can EO data improve representation of extreme events (e.g. droughts) ?



- Coverage
 - Global
 - Forced by ERA5
 - Baseline spatial resolution is $1^\circ \times 1^\circ$
 - Can be $0.25^\circ \times 0.25^\circ$ over specific areas
 - Daily (sub-daily) outputs
- Now: active monitoring of
 - SM and *LAI* together
 - *LAI* alone
 - (*LAI from C3S and/or from other sources*)



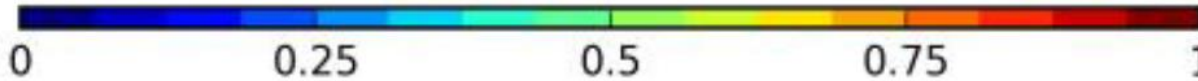
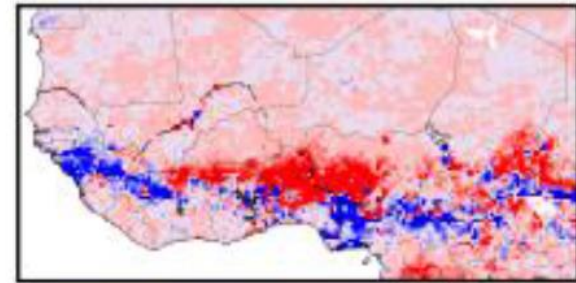
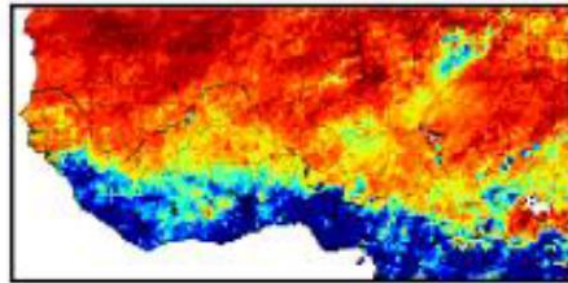
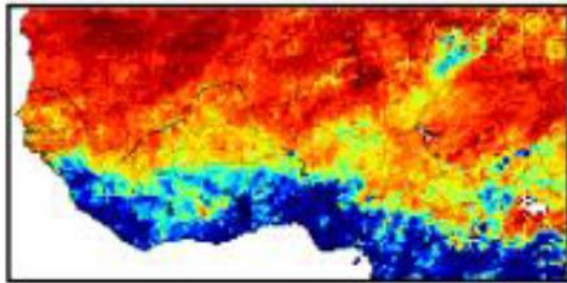
- **Passive** monitoring of LST (daytime and nighttime)
 - Example: impact of SM and LAI assimilation on correlation with METEOSAT LST at 12H00 UTC (West Africa at $0.25^\circ \times 0.25^\circ$)

Model

Analysis

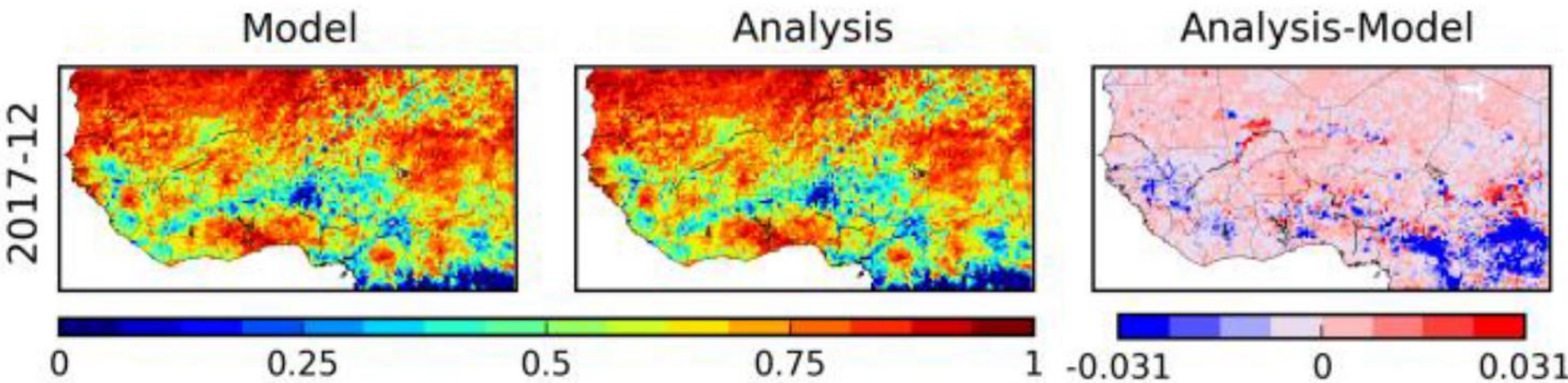
Analysis-Model

2017-12





- **Passive** monitoring of LST (daytime and nighttime)
 - Example: impact of SM and LAI assimilation on correlation with METEOSAT LST at 06H00 UTC (West Africa at $0.25^\circ \times 0.25^\circ$)





- **Active** monitoring of Snow fraction
 - Associated to the assimilation of SM and *LAI*, and *LAI* alone
 - Snow fraction is related to SM and LAI through
 - initial soil temperature profile conditions
 - during and after melting



- **Passive** monitoring of Permafrost
 - Associated to the assimilation of SM and *LAI*, and *LAI* alone
 - Permafrost is related to SM and LAI through
 - initial soil temperature profile conditions
 - during and after melting
 - since SM is used in Permafrost product, assimilation of *LAI* alone will be the baseline experiment