Matchup Database Standards (MDB)

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Purpose and Main Objective of the TT

- Suggest the way forward towards common SST MDB production method and assessment metrics and protocols

Current workplan

T1. Collect journal papers explaining different MDB criteria,
tools, metrics in SST analysis

Ongoing

T2. MDB tools

- T2.1. List of MDB tools
- T2.2. List of MDB functionalities
- T2.3. Create matrix between MDB functionalities

Completed (almost): felyx, OSI-SAF MDB, DMI+FI MDB, *NOAA ACSPO MDB*, ESA CCI MDB, NASA SDAP MDB

T3. Metrics and protocols

To revisit

- T3.1. Identify a list of validation and referent types of data and datasets
- T3.2. Identify current metrics and protocols in SST analysis
- T3.3. Group metrics and protocols by validation (i.e. satellite) and referent (i.e. in situ) data

T4 Round robin validation SST MDB intercomparison

- T4.1 Define round-robin intercomparison
- T4.2 Perform round-robin validation intercomparison on test MDB

GHRSST ~~XXV/XXVI~~ XXVI/XXVII

T5. Create whitepaper + online information

GHRSST ~~XXV~~ XXVI or XXVII

Plan for 2025/2026 and 2026/2027

2025/26

- Completed MDB/felyx deployment in cloud (WEkEO)
- T3: identify matchup methods, metrics, protocols and datasets for SST MDB analysis
- T4: round robin validation – extend and systematically apply to different datasets (L2P/L3/L4; IR/MW; LEO/GEO vs. in situ types) (TDS preparation)

2026/2027

- T4: round robin validation systematically applied to different datasets (e.g. L2P/L3/L4; IR/MW; LEO/GEO vs. in situ types) (analysis)
- T5: Whitepaper

T3 - metrics/protocols (discussion)

3.1-3.3) Template for MDB analysis – still in progress

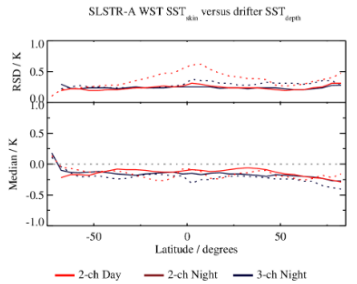
- L2P/L3/L4, IR/MW, LEO/GEO and for different in situ types
- On-to-one/one-to-many
- Statistics: mean/median; SD/RSD; …
- Single satellite pixel vs averaged satellite pixels (over in situ)
  - Maybe to use both: single pixel highlights cloud contamination, average pixels highlights retrieval performance
- Type of analysis:
  - Bias/std dependence: WV, time difference, wind, date, latitude, solar zenith angle, satellite zenith angle, across-track, SST, …
  - Histograms, uncertainty plots, …

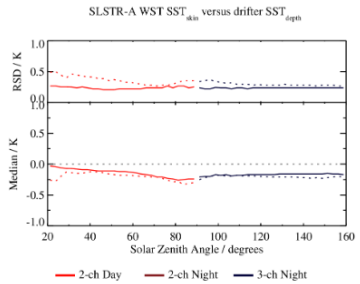
3.4) Develop community tool to perform analysis (new)

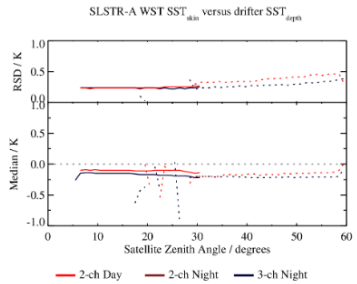
- extension of existing Felyx notebook and internal code
- Prerequsit for T4 Round robin

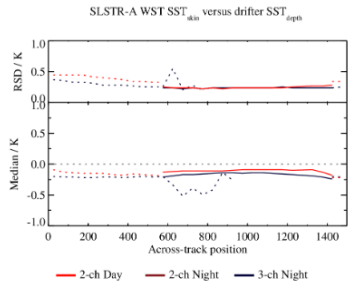
Revisit status of GHRSST Validation Protocol Document (VPD)?

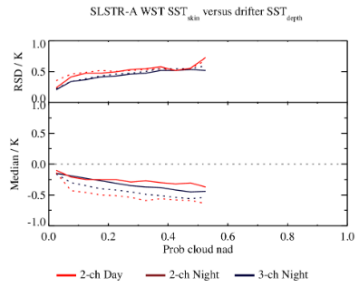
T3 – metrics (current set)

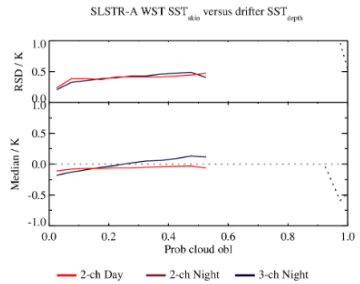


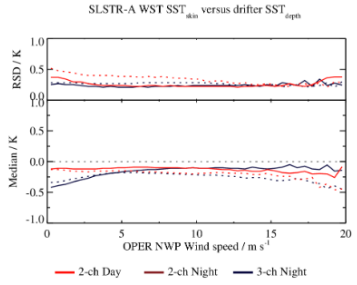


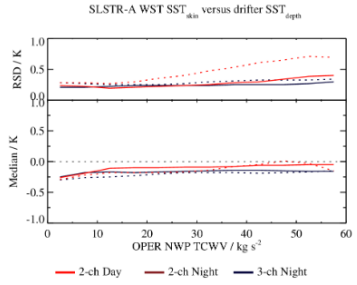


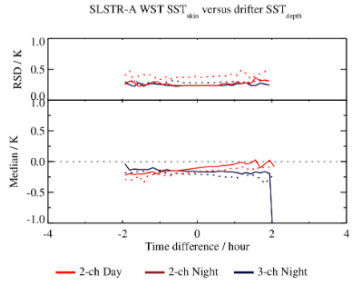


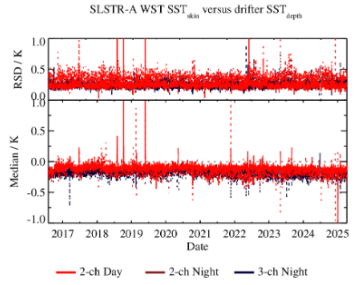


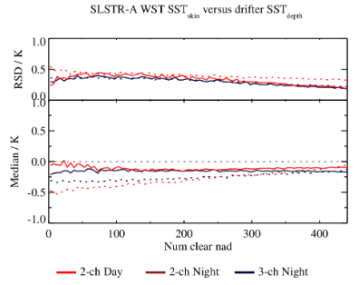


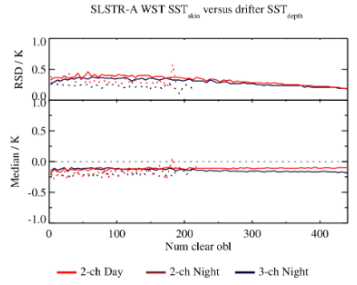


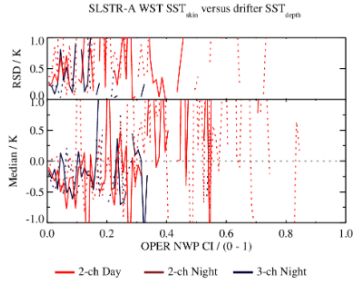


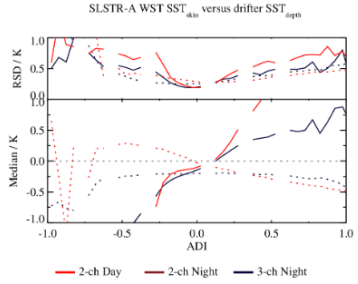


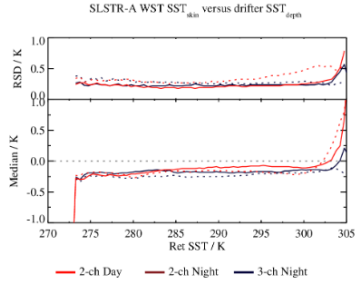


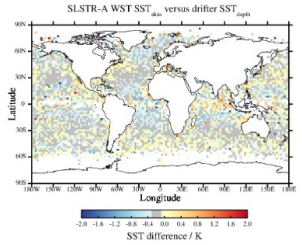


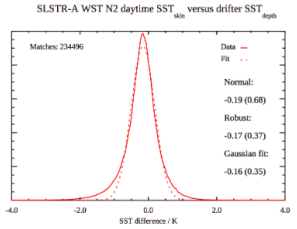


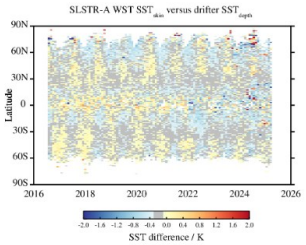


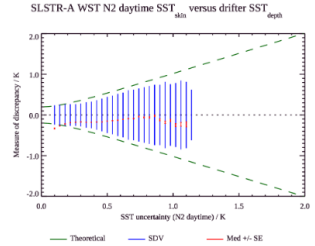












T4 - Round Robin: Revisit from last year

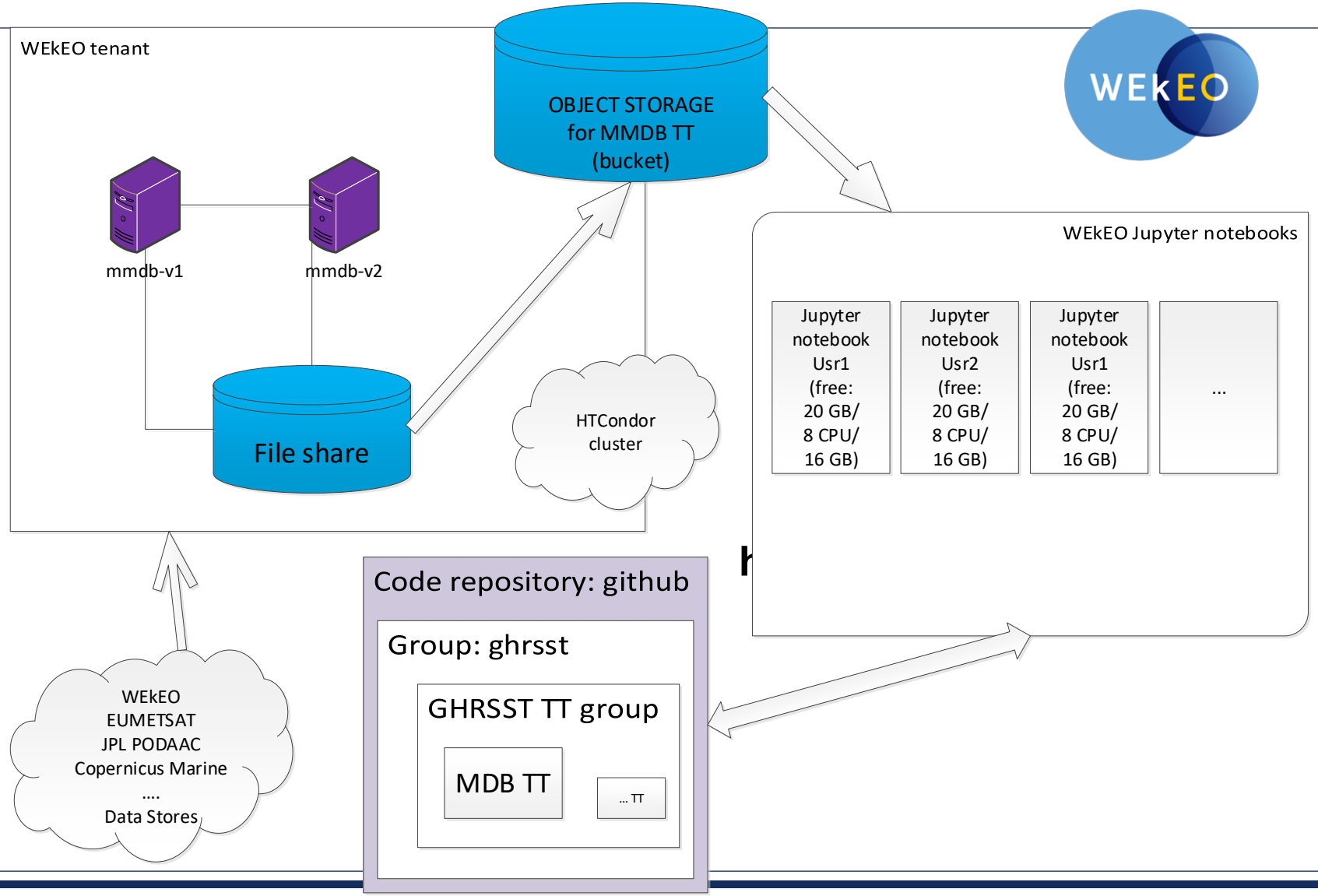
Round robin (core activity T4):

- Focus on comparison of different MDB methods/analysis (and not tools itself)
- Use single tool **(felyx v2)** applied consistently to all defined satellite/in situ datasets
- Use cloud platform accessible to MDB TT: **Copernicus WEkEO**

Test datasets (TDS) to use in round robin activity

- Duration: 1 month or longer? Overlap between datasets?
- Satellite data: IR: LEO:**SLSTR**, **VIIRS**, **AVHRR**, MODIS?; GEO: SEVIRI/AHI/ABI?; MW: **AMSR2**; levels: **L2**, **L3**, **L4** (L1?)
- In situ data: types: **drifters**, moorings, **Argo**, radiometers, saildrones;
- Sources: **CMEMS In situ**, iQuam, …

T4 - Round Robin: framework – (extended with HTCondor)



- **Sample TDS - 1 day**
  - **23/05/2024**
- In situ: drifters, Argo
- SLSTR SST L2
- VIIRS SST L2
- AVHRR SST L2
- AMSR2 SST L2
- OSTIA L4

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Next activities

- Meeting: ad hoc during GHRSST26?
- Completing T3:
  - MDB analysis template (2025 Q3)
- Ramping up T4:RR activities (2025 Q3/4)
  - Adding radiometers, GEO, …
  - Preparing longer time series (>1 month)
  - Preparing MDB analysis notebooks
    - In GHRSST Github
- For TT members:
  - When full TDS is prepared expect more regular exchange (bimonthly?)
  - Usage of Copernicus WEkEO resources (for running notebooks)
    - notebooks can also run from local environment

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Challenges and Needs

- RR validation Task 4 (MDB generation) is critical activitiy which requires computational and human effort and functional application (felyx v2).
- Felyx v2 (matchup tool) was only recently (Q1 2025) completed (due to several issues and delays) and the application is now deployed in WEkEO.
- We can allocate some computing resources for this task, but we are lacking human resources to help with this activity
- Please contact us if you are interested (and have time) to participate in the activity to prepare dedicated RR matchup datasets:
  - Help with collecting several months of different satellite SST datasets L1/L2/L3/L4 + in situ, configuration and test runs → systematically produce and check matchup datasets

Deliveries

- 2022: analysis of matchup methods, metrics, protocols and datasets for SST MDB : https://docs.google.com/spreadsheets/d/1Qdt29yld_E3xwwT0ErJ1K-pK9kzP4wVUnXn_3joWSzg/edit#gid=0
- ~~2024~~→2025: Deployment on cloud resources + prepared TDS (in progress: https://s3.waw3-1.cloudferro.com/swift/v1/mmdb/)
- 2025: Prepare complete Round-robin TDS
- ~~2025~~→2026: Preliminary Round-Robin results
- ~~2025~~→2026: Consolidated conclusions on TT work
- 2026-2027: White Paper - closing the task team