

Pi-MEP: Advanced Multi-Mission Tools for Satellite Salinity Assessment

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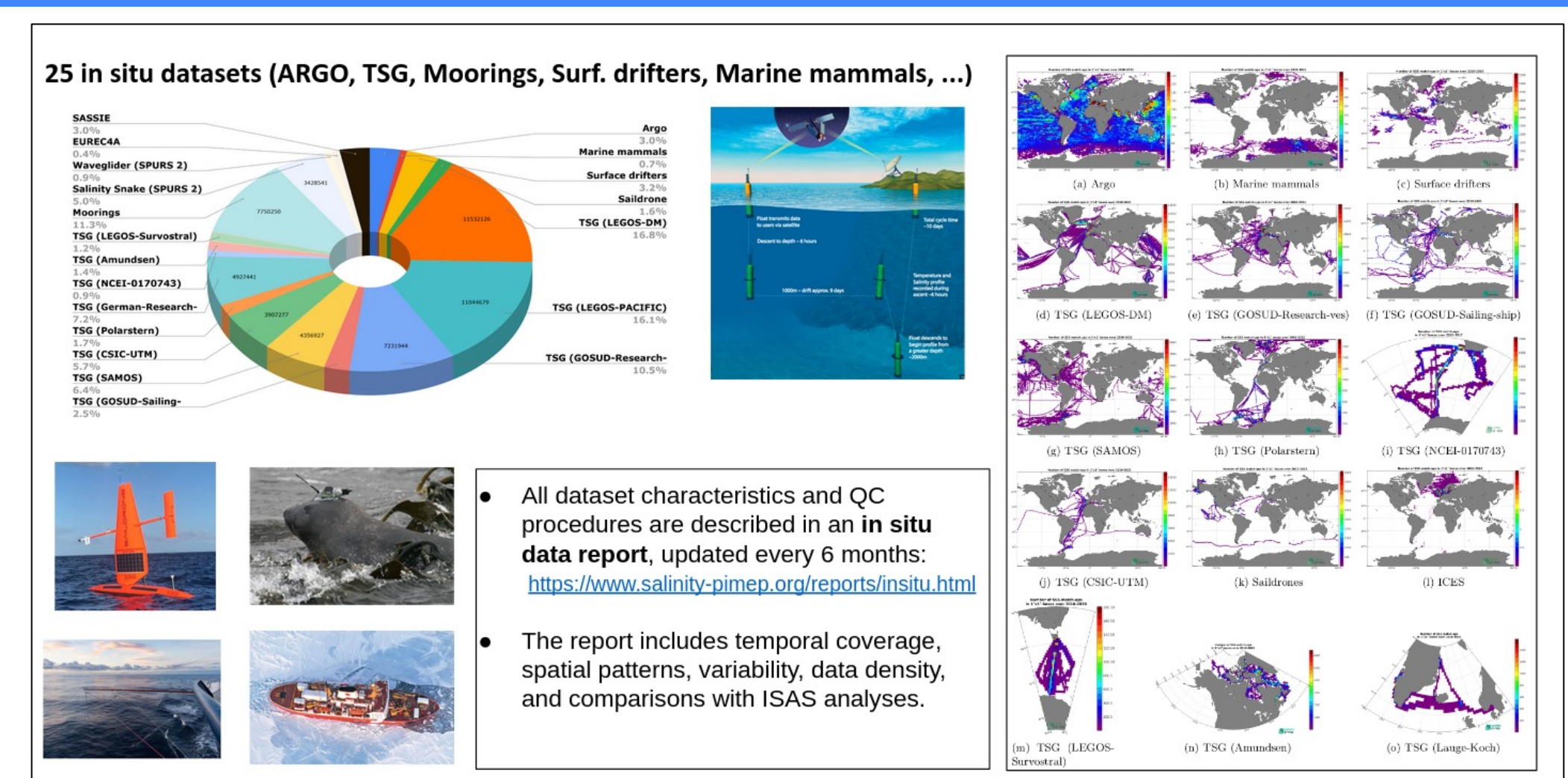
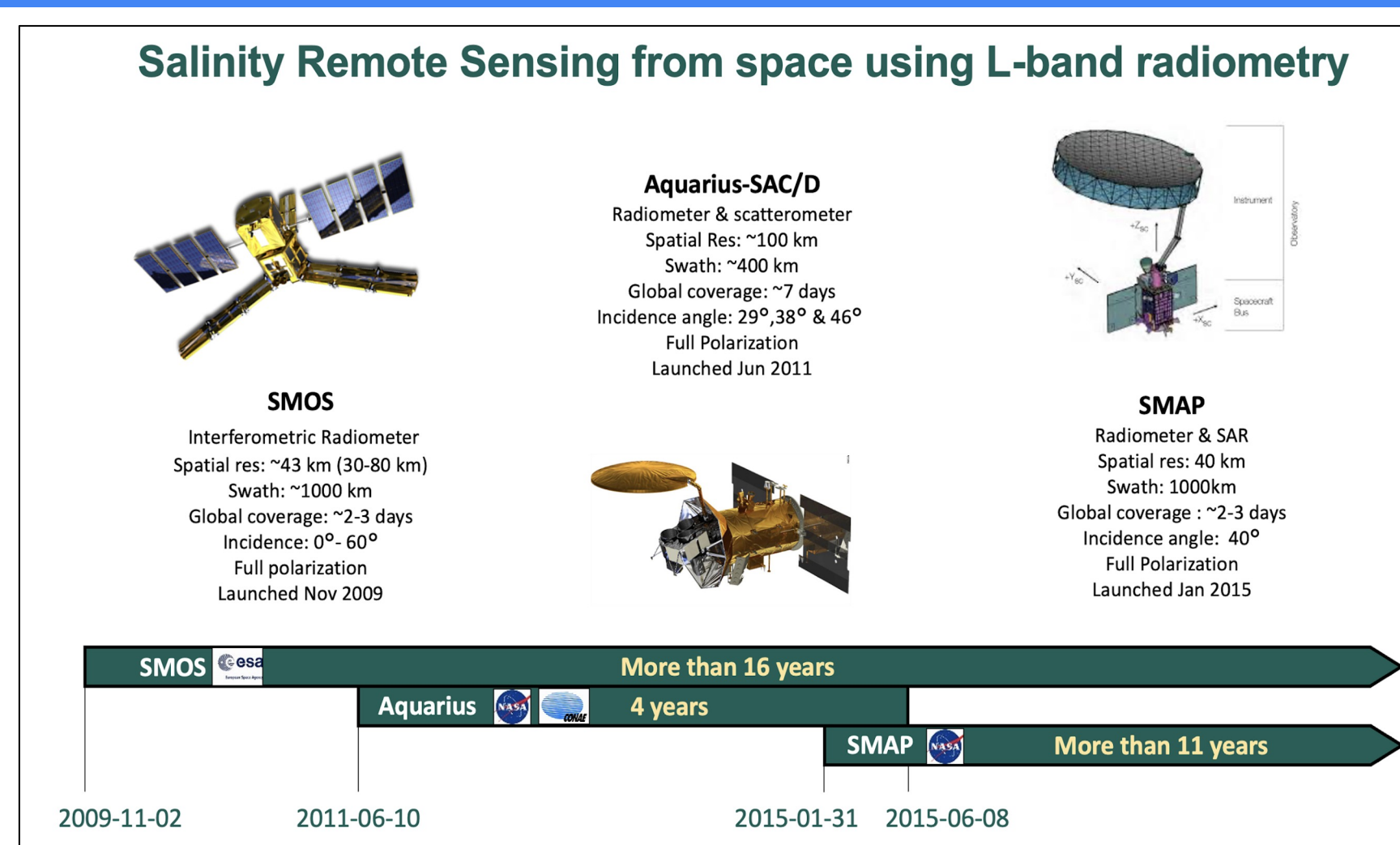
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I - Project Overview

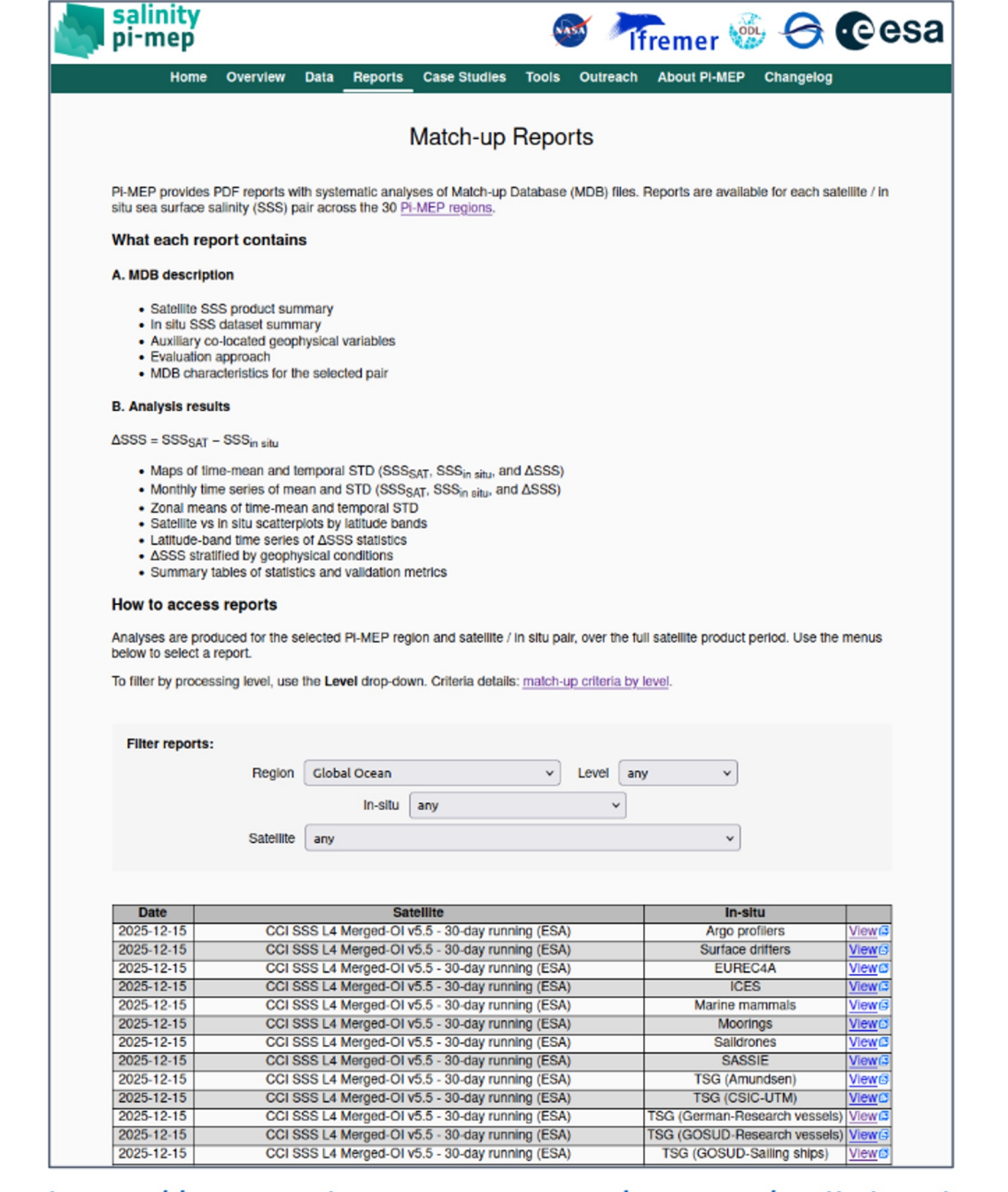
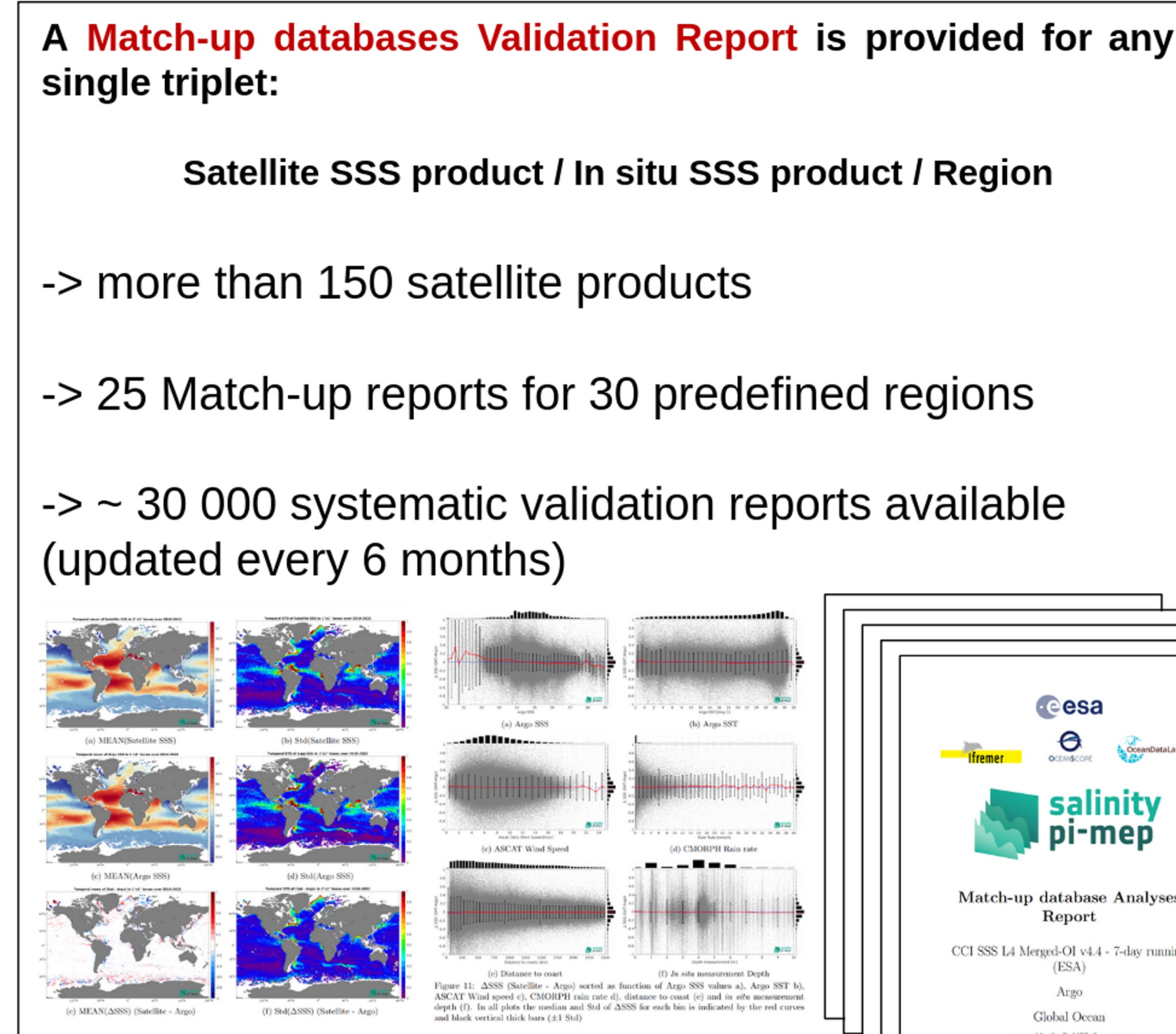
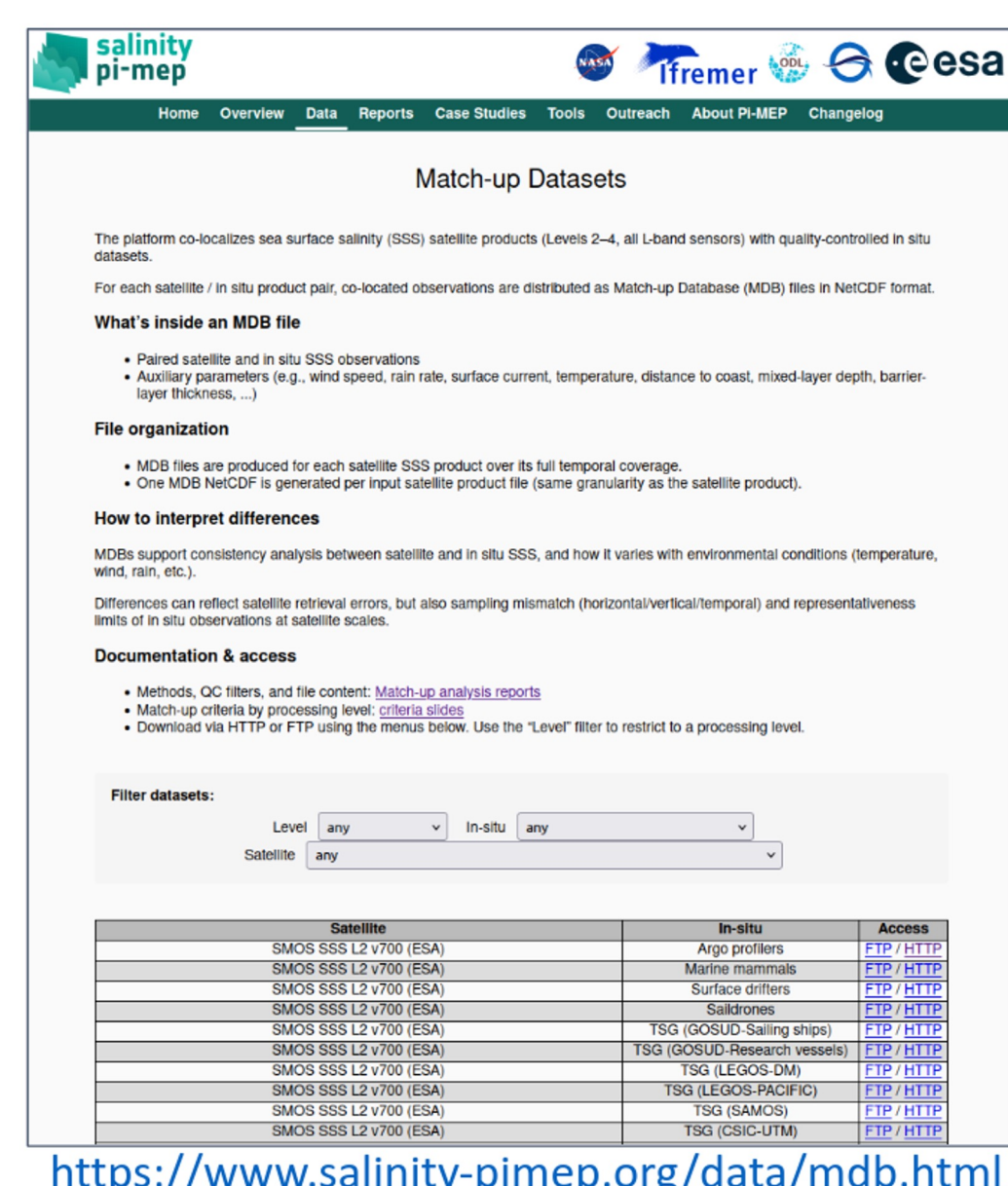
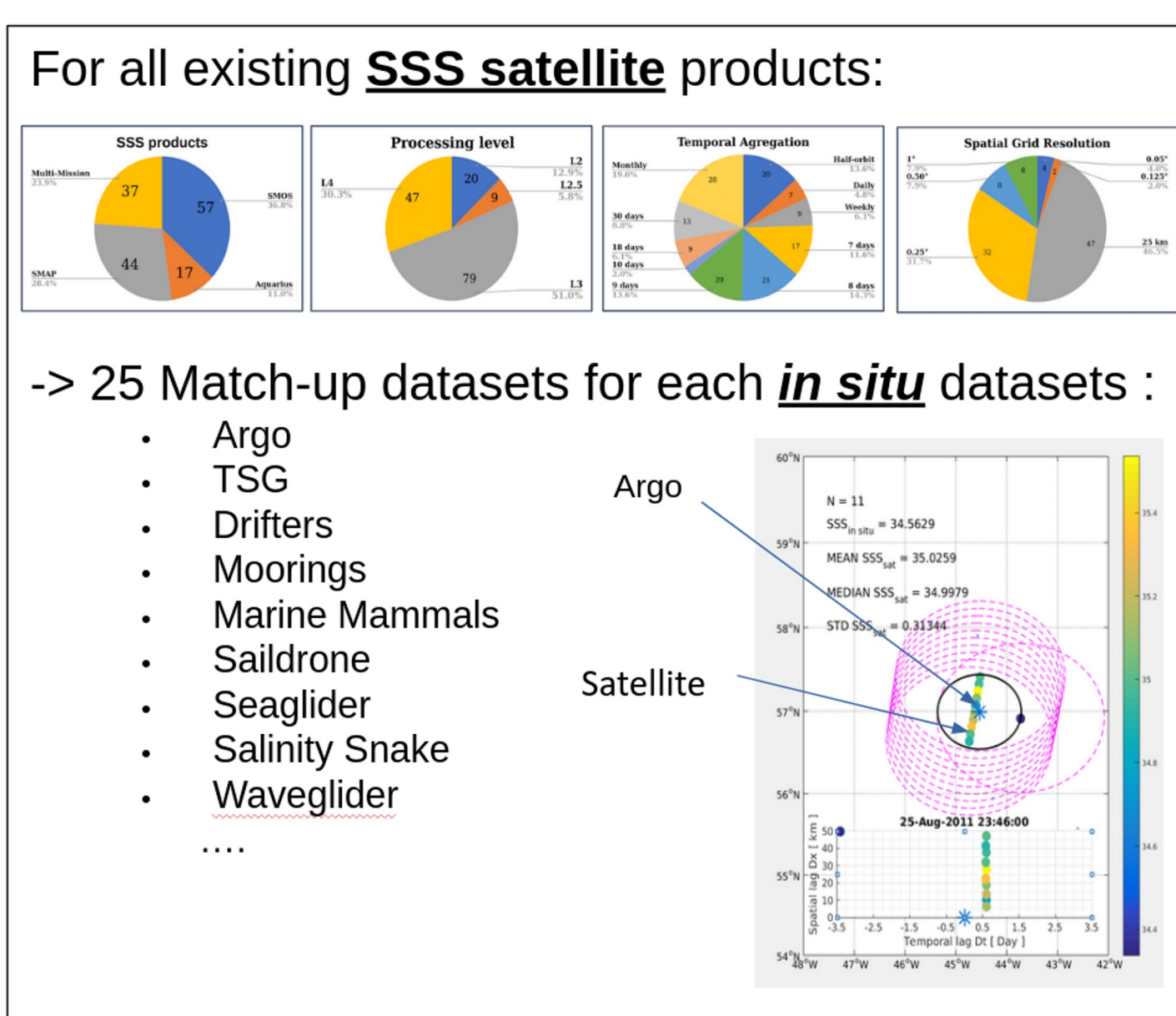
The Pilot-Mission Exploitation Platform (Pi-MEP) for salinity (<https://www.salinity-pimep.org/>) is an initiative originally meant to support and widen the uptake of ESA Soil Moisture and Ocean Salinity (SMOS) mission data over the ocean. Since its beginning in 2017, the project aims at setting up a computational web-based platform focusing on satellite sea surface salinity data validation, supporting also process studies over the ocean. It has been designed in close collaboration with a dedicated science advisory group in order to achieve three main objectives: 1) gathering all the data required to exploit satellite sea surface salinity data, 2) systematically producing a wide range of metrics for comparing and monitoring sea surface salinity products' quality, and 3) providing user-friendly tools to explore, visualize and exploit both the collected products and the results of the automated analyses.

II - Datasets

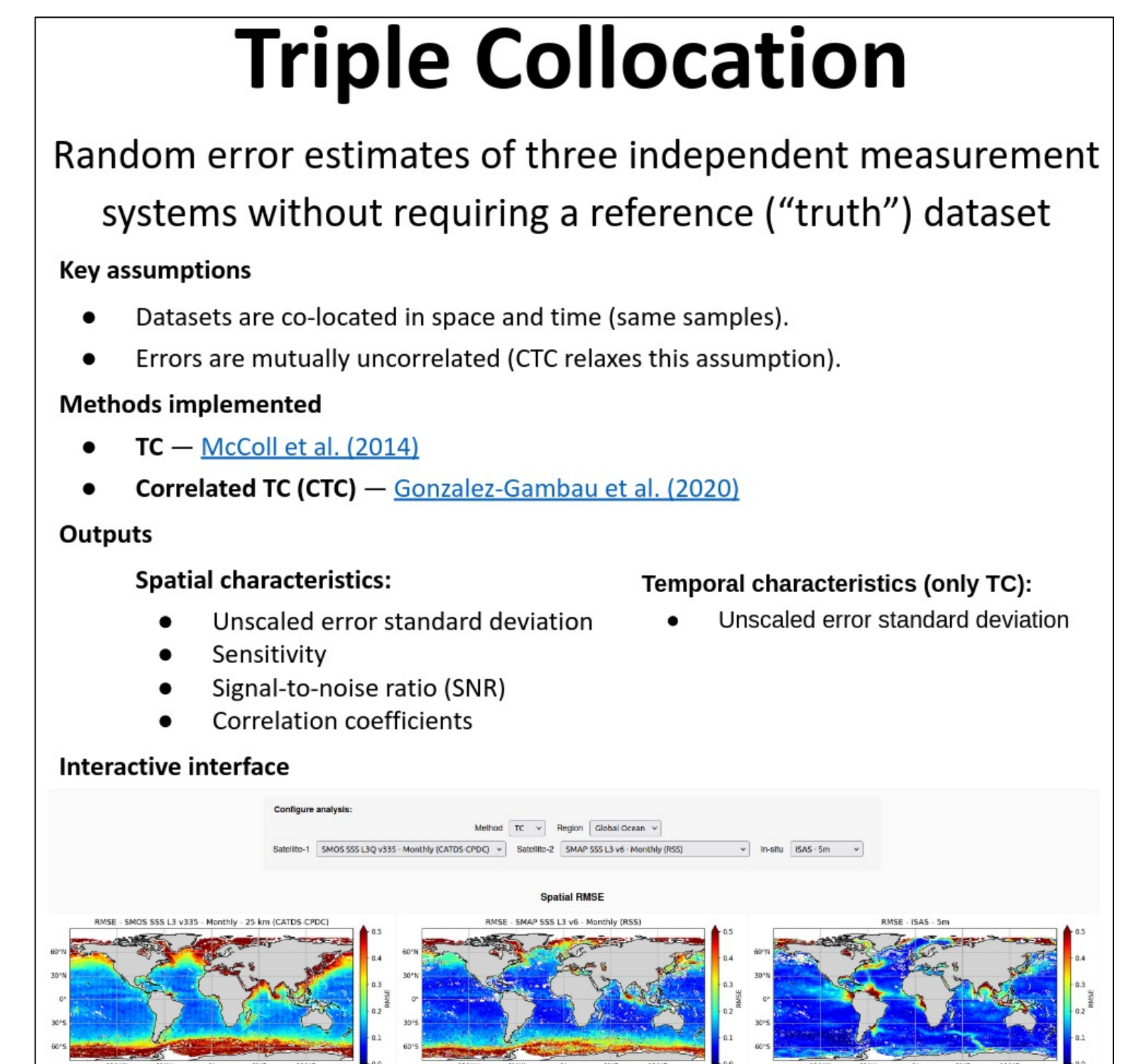
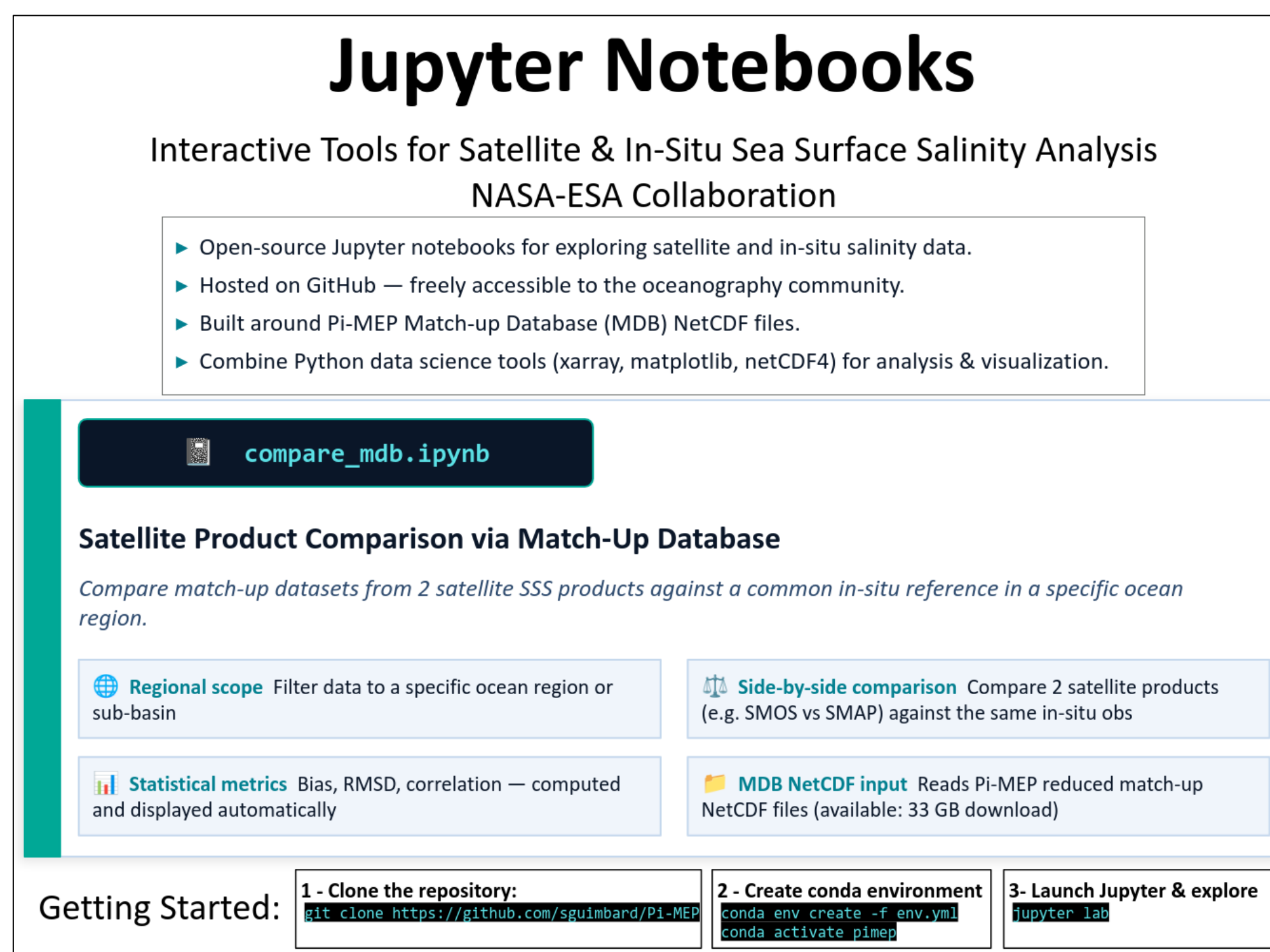
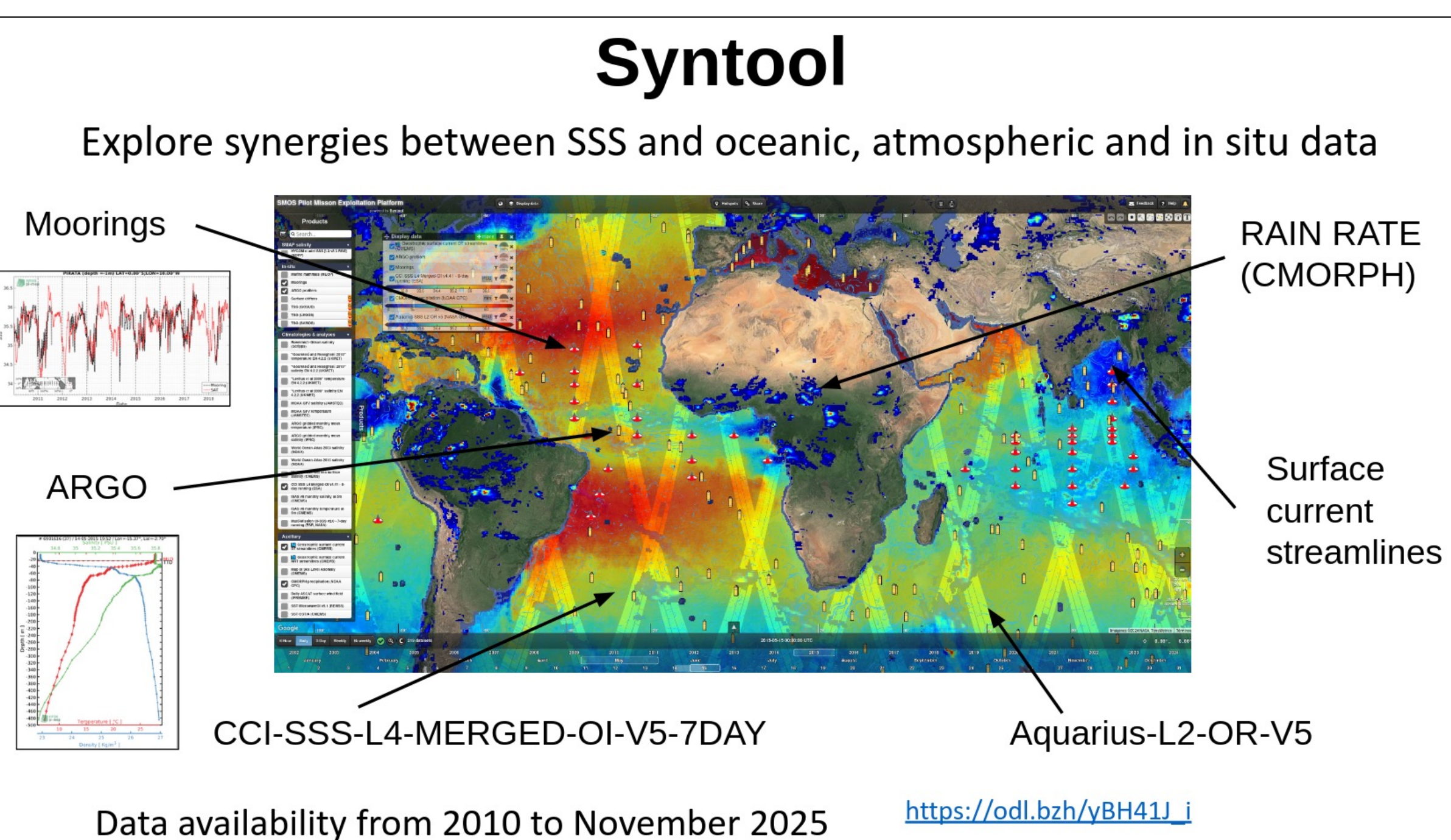
- 155 satellite SSS products
- 25 in situ datasets (Argo, TSG, Moorings, drifters, Mammals...)
- 8 analyzed in situ datasets (ISAS, EN4, JAMSTEC, SCRIPPS, IPRC, WOA)
- 3 numerical models (MERCATOR (NEMO), ECCO (mitGCM), HYCOM)
- 25 thematic datasets (MLD, SST, RAIN RATE, Surf. Currents, evaporation, wind speed, ...)
- 8 process study dedicated datasets



III - Matchup database & reports



IV - Tools



V - R&D activities

Representation errors:

-> Use of "Very" High resolution models: **ECCO (1/48°)** [Bingham et al., 2022]: 1 year, sampling mismatch using simulated SMAP/SMOS/Aquarius & Argo. **Glorys-CMEMS-NEMO (1/12°)** [Thouvenin-Masson et al., 2022], unresolved small scales -> variability increased by a factor 1.20

To derive: Vertical / horizontal and temporal mismatch errors

Effective resolution:

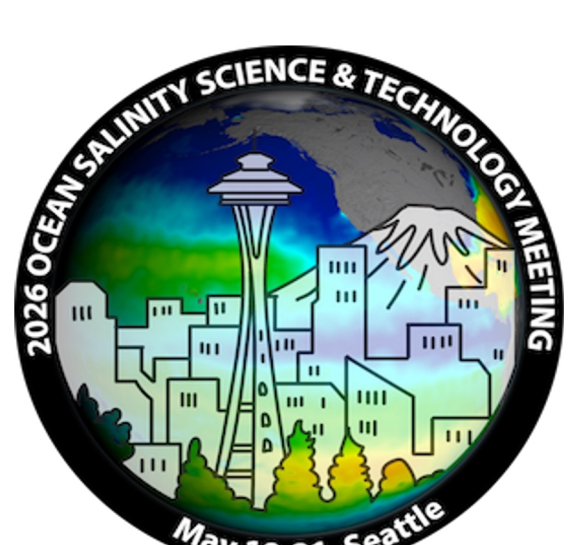
Spectral analysis along TSG lines

- Along-track satellite vs. TSG SSS comparisons
- Power spectral density (PSD)
- Coherence / wavelet spectra
- Spectral slopes and effective resolution estimates
- Direct links to NetCDF outputs for further analysis

Committed areas:

Assessing Mission Requirements

- Most favourable conditions in which the MR holds
- Variable performance as function of Cold/warm waters / Distance to coast / Wind regimes / Low SSS spatial-temporal variability / MLD, etc.
- Assess upfront in-situ coverage and actual sampling difference



Guimbard, S.; Reul, N.; Sabia, R.; Herlédan, S.; Khoury Hanna, Z.E.; Piollé, J.-F.; Paul, F.; Lee, T.; Schanze, J.J.; Bingham, F.M.; et al. The Salinity Pilot-Mission Exploitation Platform (Pi-MEP): A Hub for Validation and Exploitation of Satellite Sea Surface Salinity Data. *Remote Sens.* **2021**, *13*, 4600. <https://doi.org/10.3390/rs13224600>

