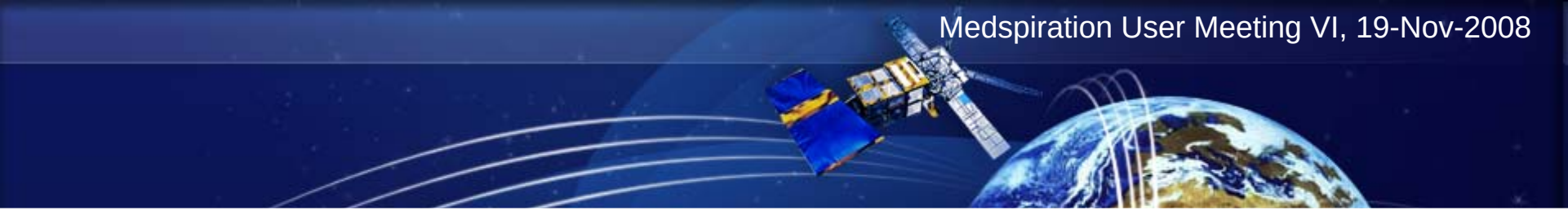

Medspiration Match-Up Database

JF Piollé (Ifremer/CERSAT)

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Requirements

- Satellite to in situ
- Match-up : coincindent in situ and satellite measurement with respect to some time difference and spatial distance criteria
- Production and delivery of MDB records originally part of GDS requirements, storage planned at PO.DAAC
- No implementation in GHRSST => task taken over by ESA
- Need for unified SSES (specific sensor error statistics) determination
  - ✓ Bias and standard deviation between satellite measurement and an independant in situ source
  - ✓ Complement estimation by providers
  - ✓ But added-value for sensor merging by :
    - ➢ Using the same source of in situ data
    - ➢ Using the same estimation methodology

In situ sources

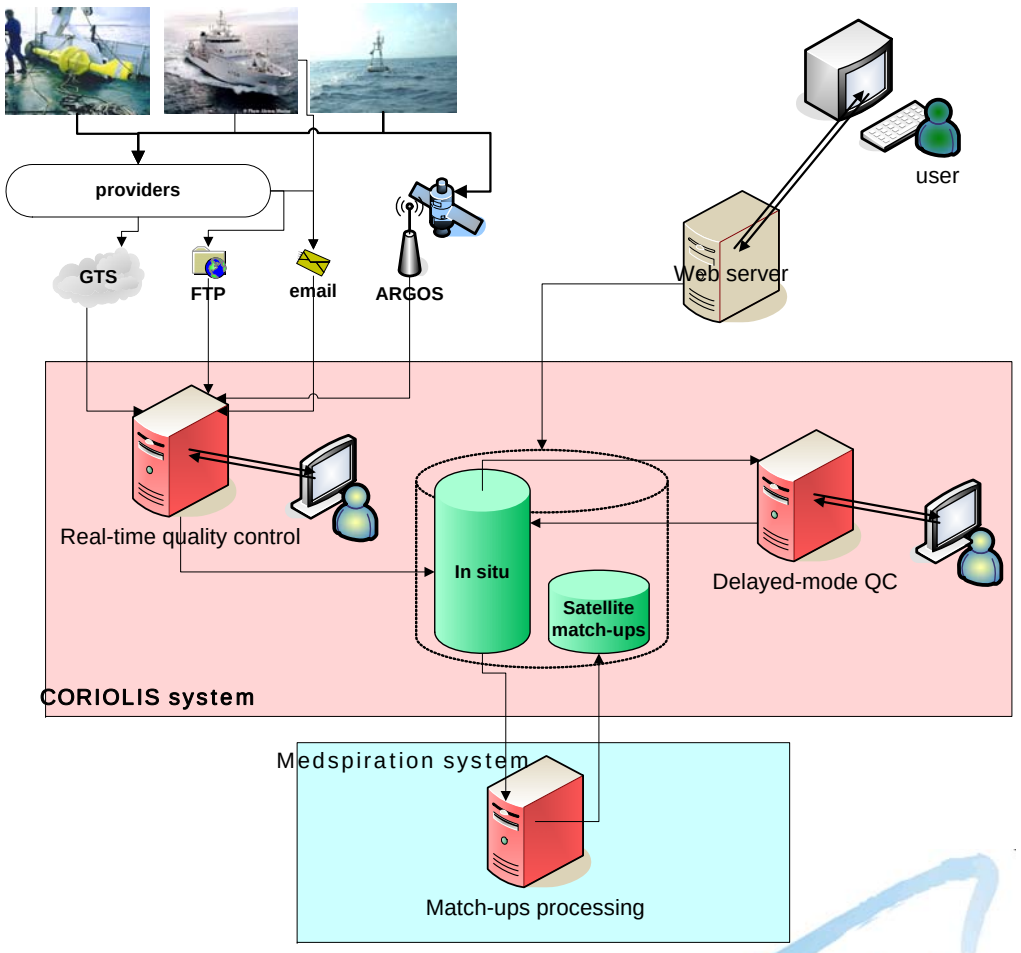
- Surface data
  - ✓ Drifting buoys : Meteorological buoys, floats parking at surface
    - More than 70% of surface data
    - Real-time (24h), GTS & FTP
  - ✓ Ship data (TSG) : Research institutes ships, voluntary observation ships
    - Real-time (48h), FTP
- Profile data
  - ✓ Moored buoys : TAO,TRITON,PIRATA, NODC/NDBC, European buoy,…
    - Real-time (24h), FTP & GMES
    - Depth usually ranges from 1m
  - ✓ Floats : ARGO
    - Real-time (from transmission)
  - ✓ Ship data (XBT/CTD) : Research inst., CORIOLIS, CLIVAR, GTSPP…
    - Real-time (24h) to delayed mode

Satellite sources

- All Medspiration L2P products
  - ✓ Extension to global scale for AATSR
- Why no match-ups for L4?
  - ✓ L4 = spatial & temporal averaging => all in situ data are colocated
  - ✓ More accurate to compare with spatially and temporally averaged in situ data
    - ➢ Collation of in situ measurements

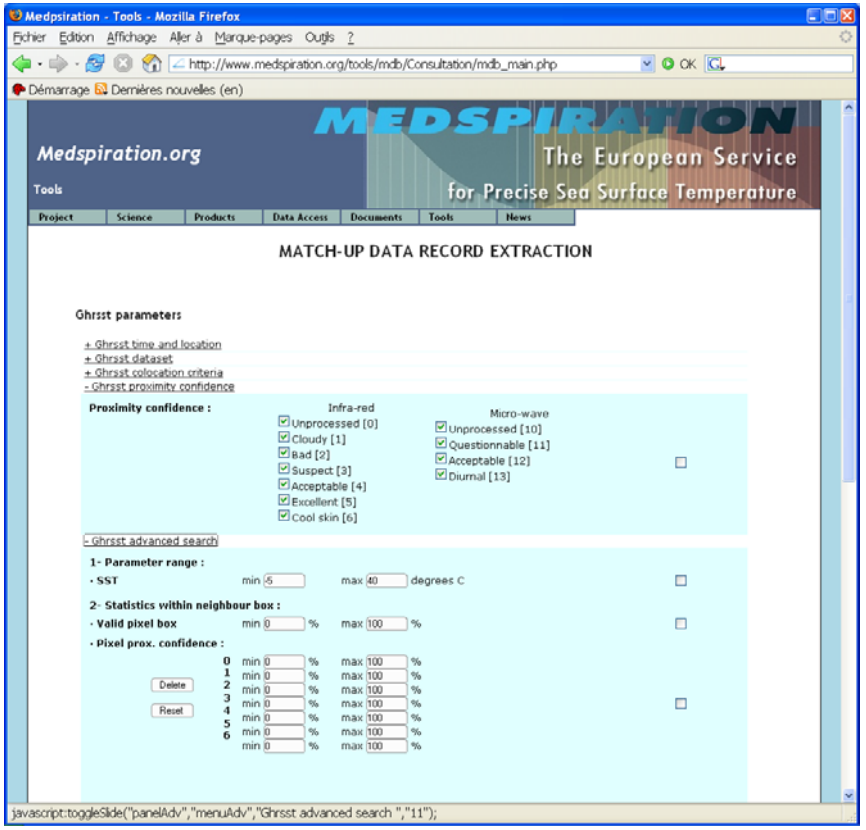
Implementation

- Integration of in situ sources by Coriolis
  - ✓ RT + Delayed mode
  - ✓ Most comprehensive source for SST & salinity
  - ✓ Consistency
  - ✓ Easier implementation
- Integration of MDB with Coriolis
  - ✓ Links (get last status of data)



Access to data

- Two means
  - ✓ pre-extracted files
    - ➢ contain all match-ups classified per GHRSST dataset and in situ category
    - ➢ netCDF format
    - ➢ additional information can be added aftwerwards :
      - – climatology, zenital solar angle, …
    - ➢ fast access, link on web site
    - ➢ users have then to apply their own filters
  - ✓ interface for customized requests
    - ➢ specific user criteria for advanced requests



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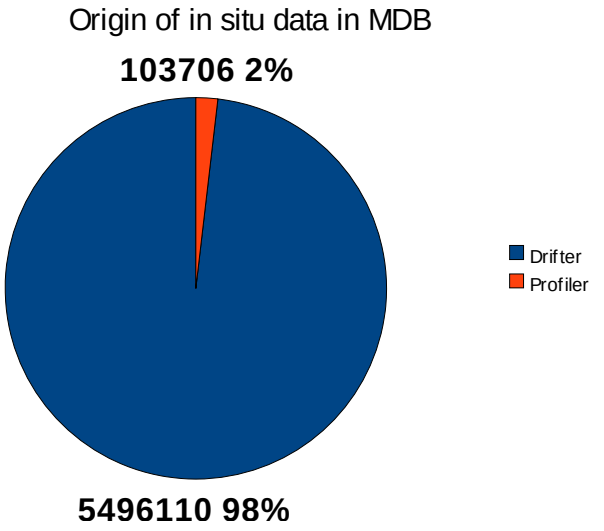
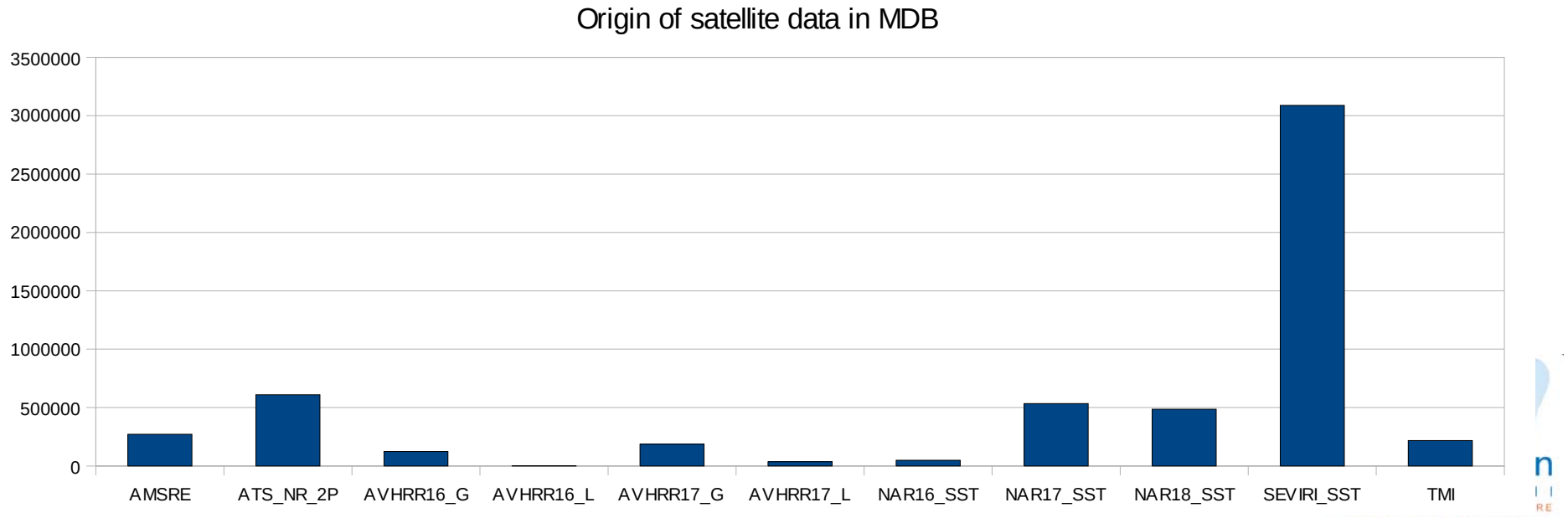
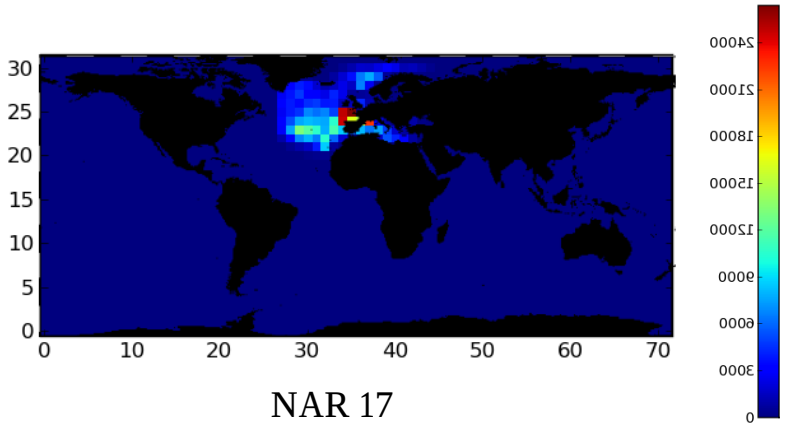
MDB content

- 5.34 Million match-ups

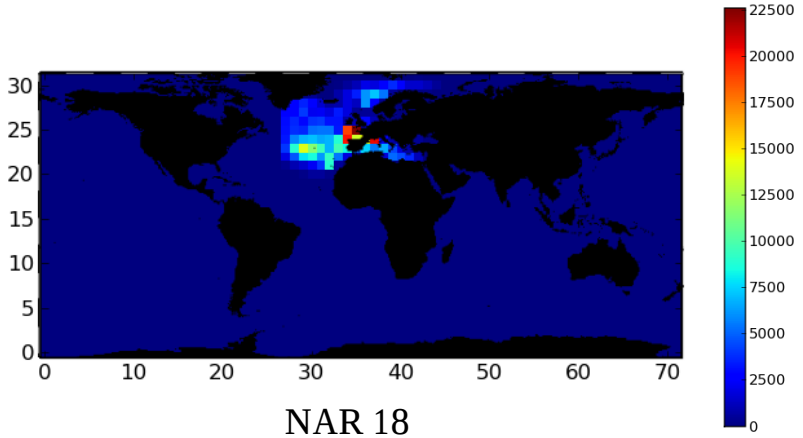




Sampling



NAR 17



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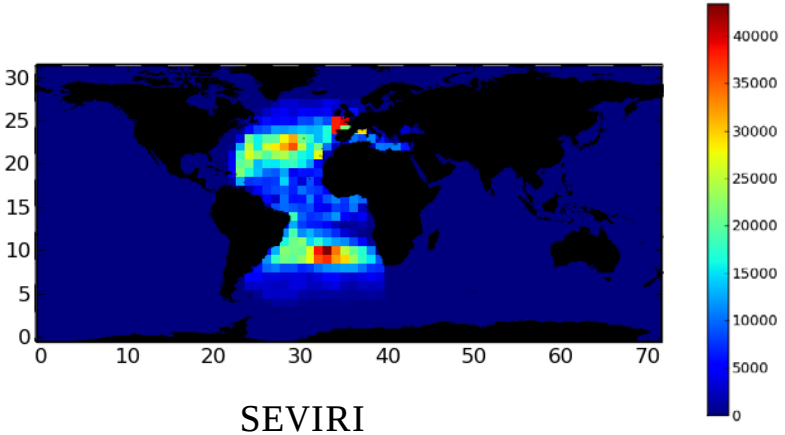
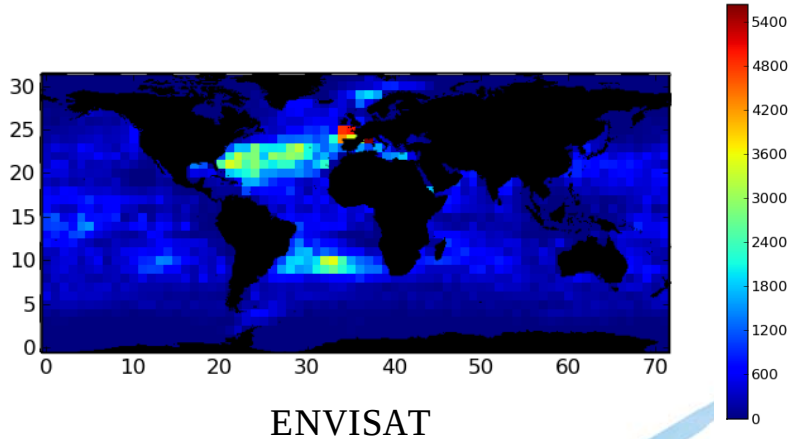


SEVIRI



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Application of MDB

- New error classification and SSES estimation for AATSR
- Two separate efforts
  - ✓ University of Leicester
  - ✓ Ifremer
- Validation of SST in high latitudes
  - ✓ Met No

AATSR bias to subskin estimation

- Principle :

Predictors X(i)

L2P informations (SST skin, AOD, Wind speed, proximity confidence, surrounding statistics)

Statistical model

AATSR SST skin

−

Respond variable Y

SST bias

AATSR adjusted SST subskin

- Statistical model: modeled by using Medspiration MDB
- Operational model since September 2007: linear model ($Y = \alpha^{(0)} + \sum_{i=1}^{p} \alpha^{(i)} X^{(i)}$)
- Updated in Mars 2008 (based on new AATSR fields)
- In test: non linear models:
  - regression trees, non parametric models ($Y = \alpha^{(0)} + \sum_{i=1}^{p} f^{(i)}(X^{(i)})$)

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AATSR bias to subskin estimation

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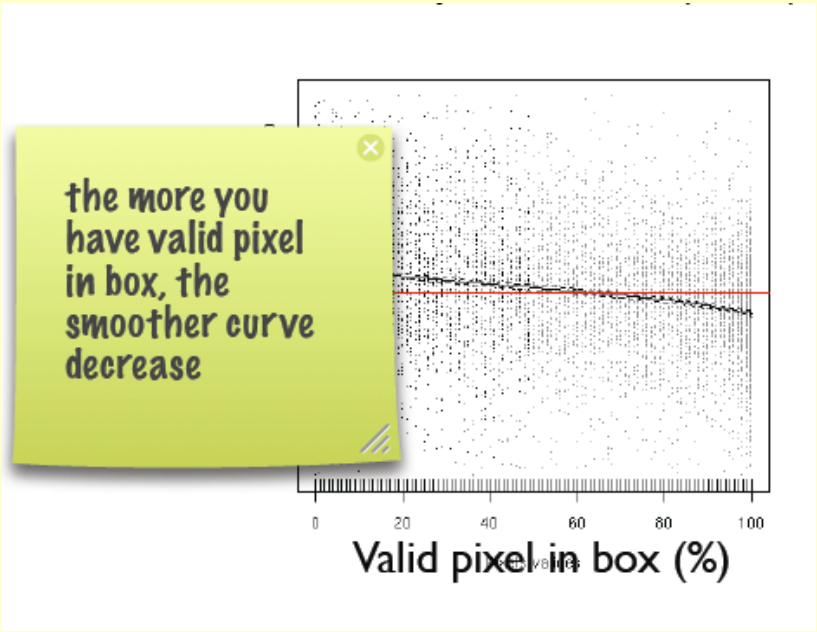

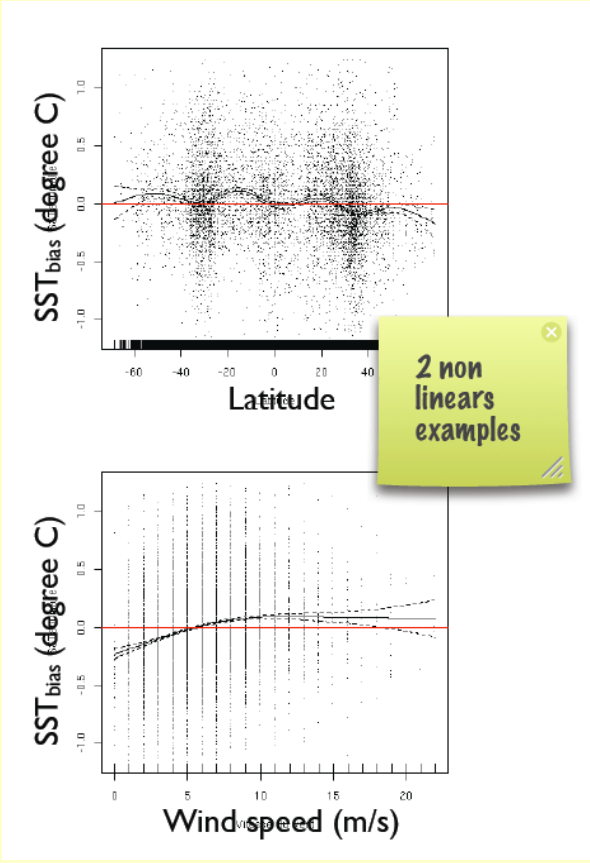

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Lessons learned

- MDB initially built for SSES estimation
  - ✓ But failed in this perspective
    - L2 providers have local MDB : poorer in situ content but richer parameter content (compared to L2P)
    - L2 providers are now L2P providers
    - Except AATSR (but combined approach)
- Resource for « external » users (poor diffusion of providers MDB)
- Independant control and real-time
- Richer content required (neighbours,...)
- Balance between independancy and redundancy to be found
- Online analysis tools and valorization needed (usage examples, updated statistics,...)

From Medspiration to MyOcean

- No service interruption
- MDB web interface will be moved to a new location

- Content extension
  - ✓ Current content update continues
    - AATSR, NAR17&NAR18, MSG/SEVIRI
  - ✓ Content of existing Real-Time MDBs to be included
    - O&SI SAF MDB for METOP, (MSG)
  - ✓ Missing RT Match-ups to be produced and ingested, by order of priority
  - ✓ Neighbours and ancillary fields to be added

- Interfaces
  - ✓ Online interactive analyse of content, plots, error estimation
  - ✓ Alerts

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Medspiration legacy

- Colocation software and/or match-up database to be re-used in the context of :
  - ✓ GlobWave
    - ➢ Similar Coriolis/MDB integration
  - ✓ SMOS mission (CATDS)
    - ➢ Same in situ sources
  - ✓ MyOcean
    - ➢ Sustain Medspiration MDB service
    - ➢ Additional support of other datastreams

Conclusion

- Proved to be a valuable tool
  - ✓ Despite deviated from original intend
  - ✓ New approaches by independant users
- Major basis for further extensions including other frameworks
- Seek better integration with existing MDBs
- Seek better valorization and interactivity