

Medspiration Match-Up Database

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Requirements

- ❖ Satellite to in situ
- ❖ Match-up : coincident 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 GHRSSST => 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, GTSP...
 - Real-time (24h) to delayed mode

Satellite sources

❖ All Medspiration L2P products

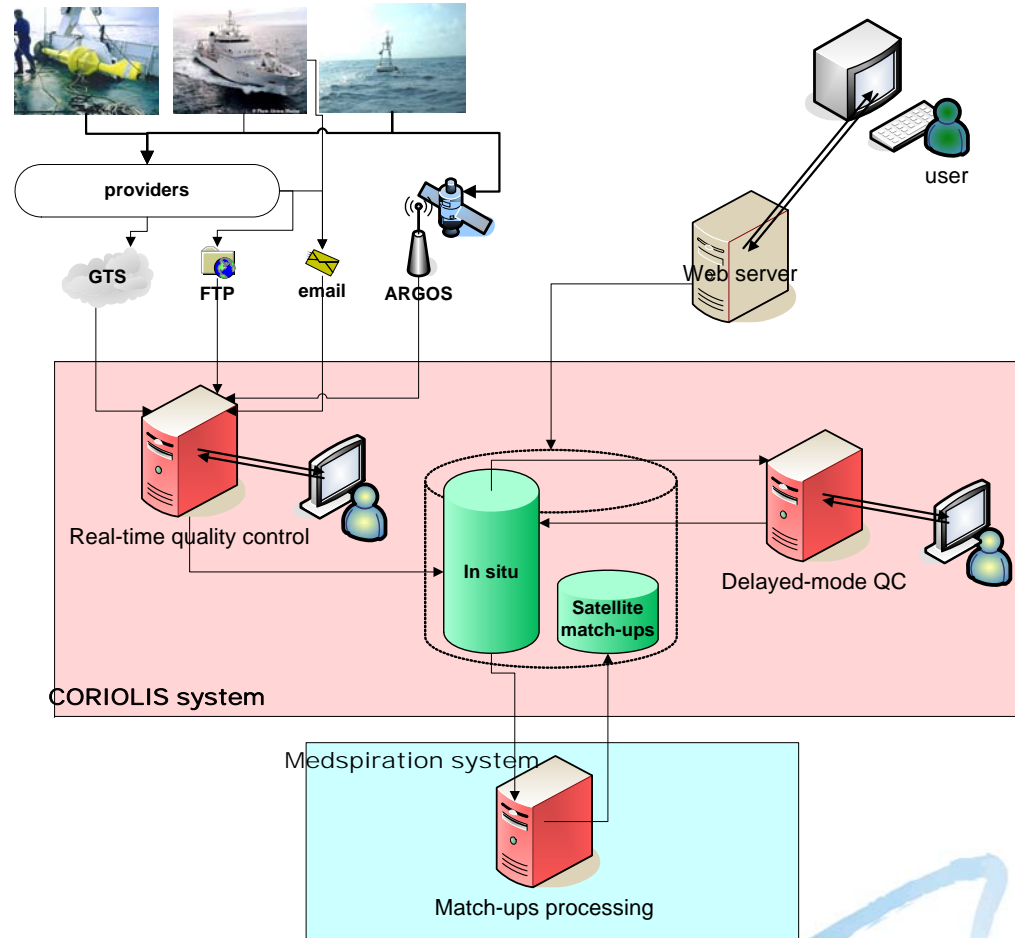
- ✓ Extension to global scale for AATSR

❖ Why no match-ups for L4?

- ✓ L4 = spatial & temporal averaging => all in situ data are collocated
- ✓ 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)

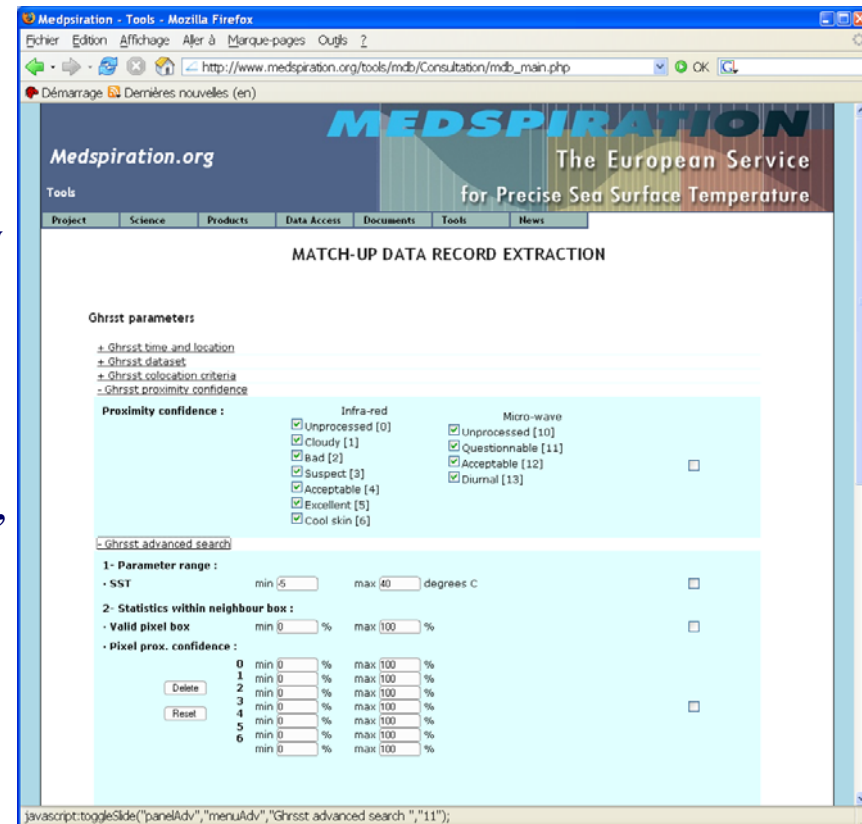


Access to data

❖ Two means

- ✓ pre-extracted files
 - contain all match-ups classified per GHR SST dataset and in situ category
 - netCDF format
 - additional information can be added afterwards :
 - climatology, zenital solar angle,
 - ...
 - fast access, link on web site
 - users have then to apply their own filters

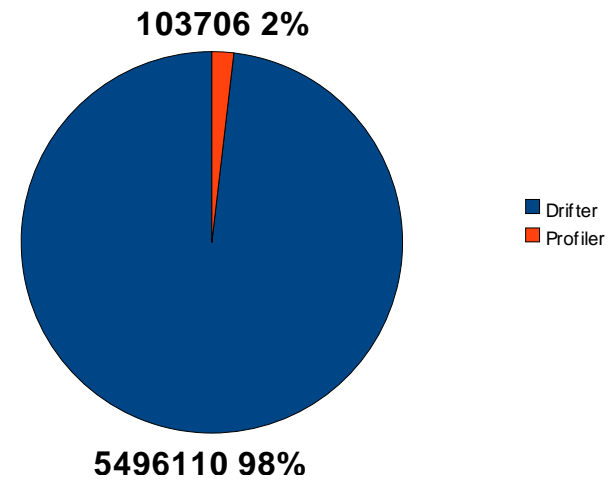
- ✓ interface for customized requests
 - specific user criteria for advanced requests



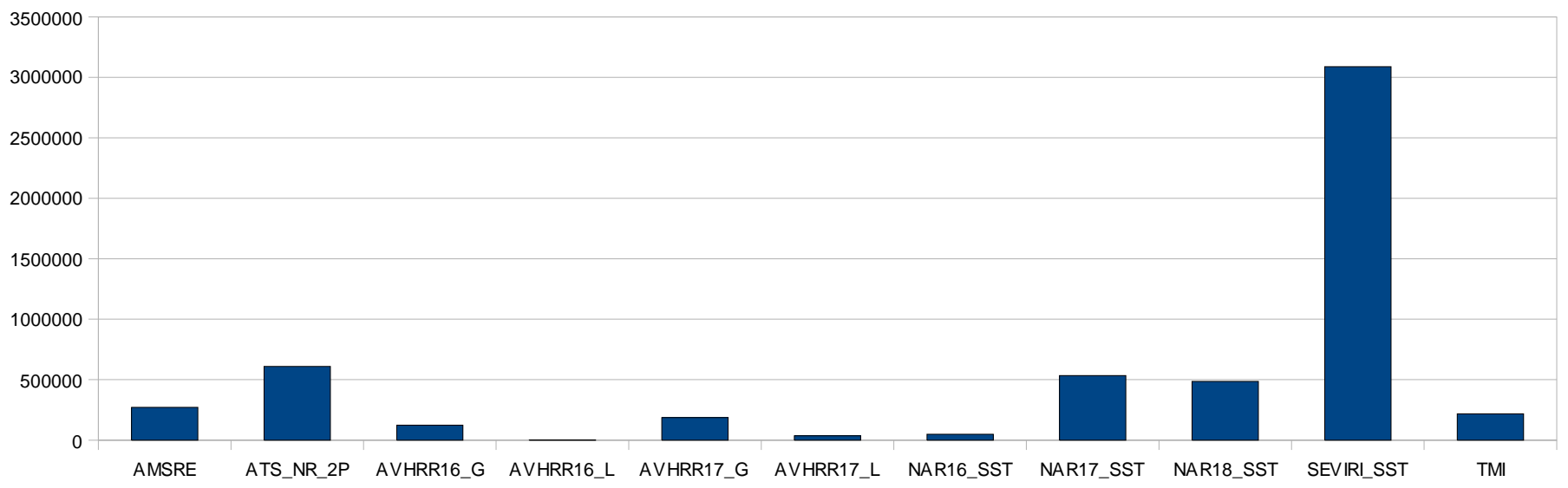
MDB content

❖ 5.34 Million match-ups

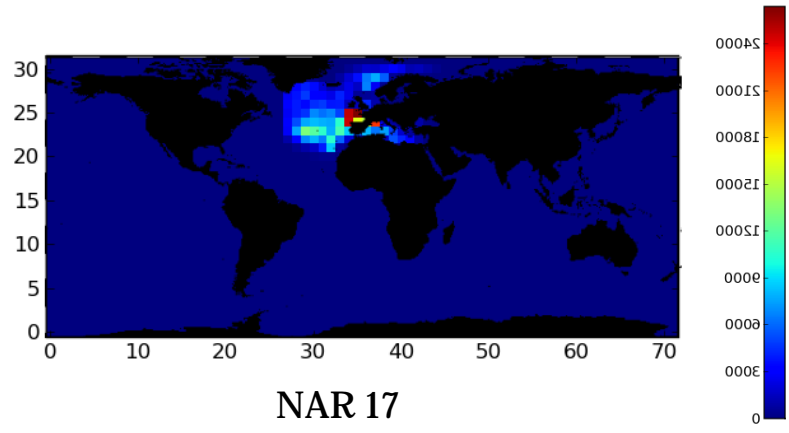
Origin of in situ data in MDB



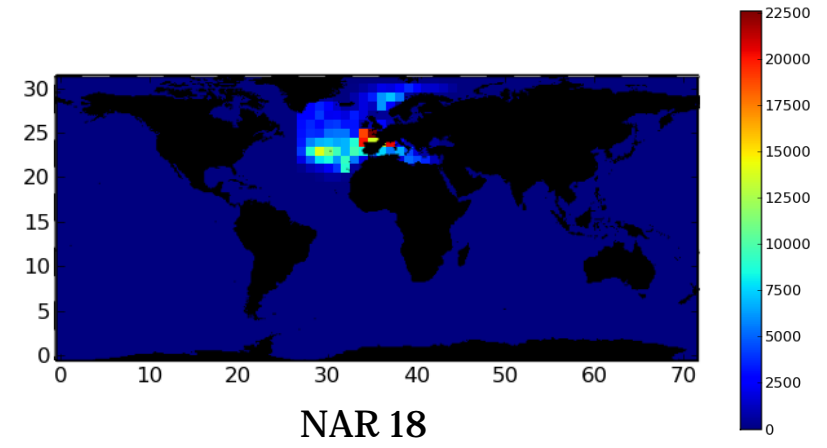
Origin of satellite data in MDB



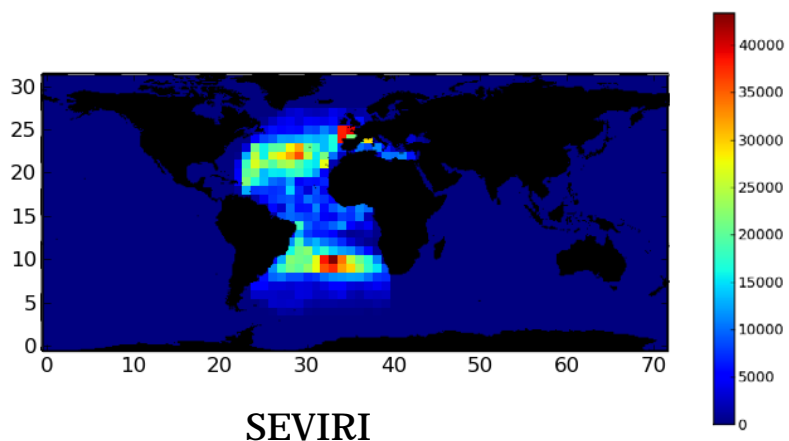
Sampling



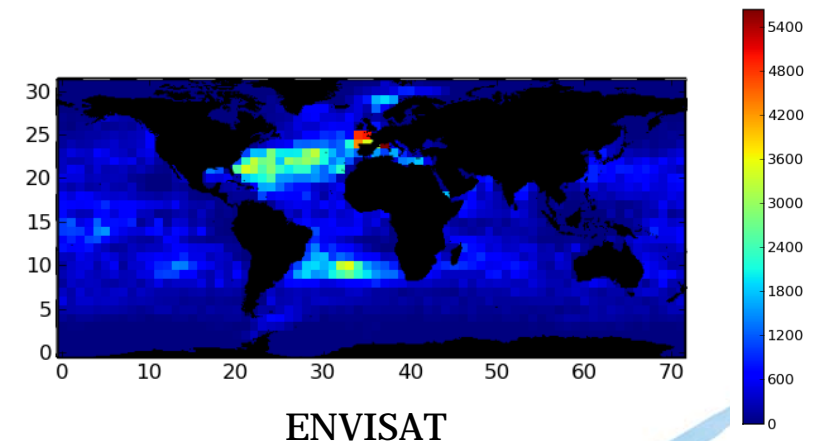
NAR 17



NAR 18



SEVIRI



ENVISAT

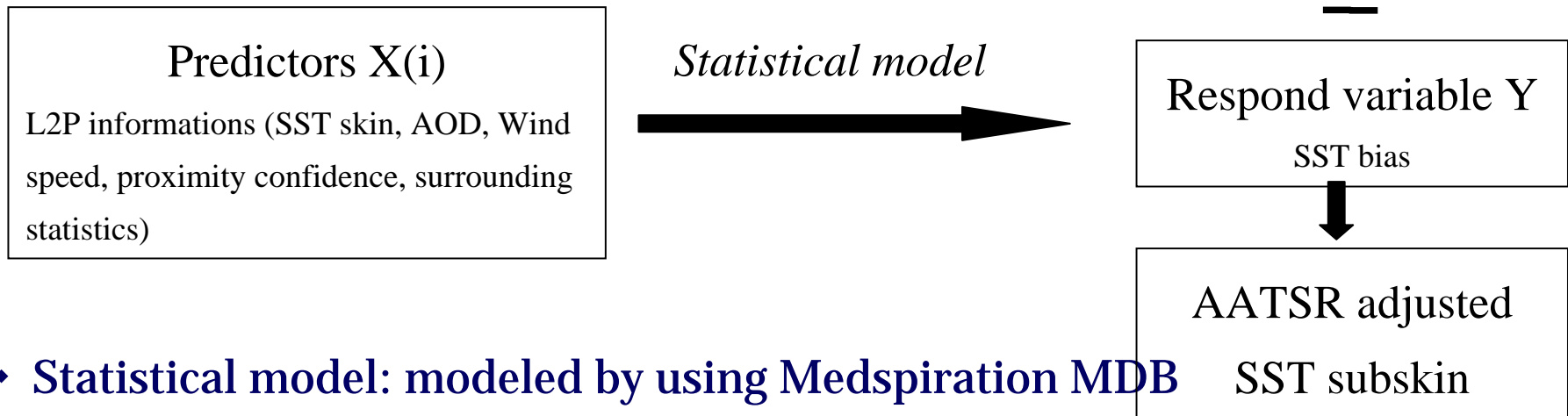
Application of MDB

- ❖ 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 :



❖ **Statistical model: modeled by using Medspiration MDB**

❖ **Operational model since September 2007: linear model**

$$\left(Y = \alpha^{(0)} + \sum_{i=1}^P \alpha^{(i)} X^{(i)} \right)$$

❖ **Updated in Mars 2008 (based on new AATSR fields)**

❖ **In test: non linear models:**

❖ regression trees, non parametric models $\left(Y = \alpha^{(0)} + \sum_{i=1}^P f^{(i)}(X^{(i)}) \right)$

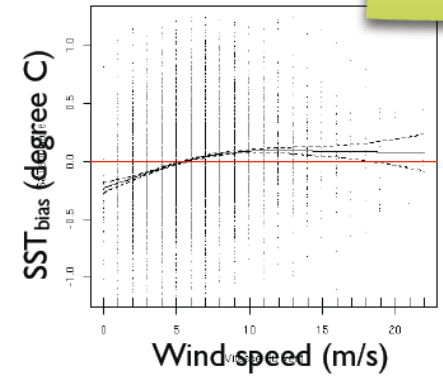
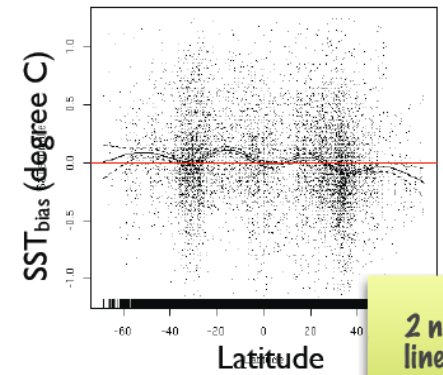
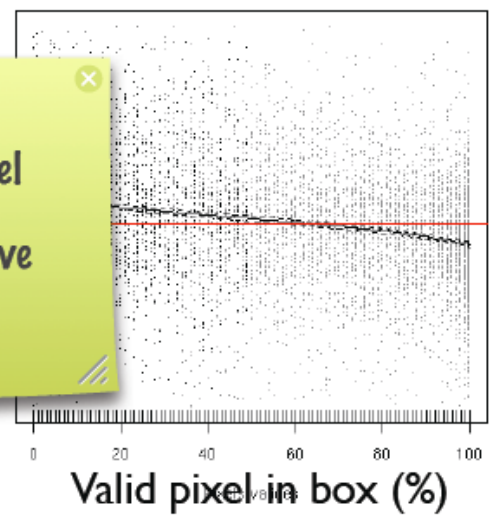
AATSR bias to subskin estimation



- Principle :

Predict
L2P informations (speed, proximity co statistics)

the more you have valid pixel in box, the smoother curve decrease



- ❖ Statistical m
- ❖ Operational
- ($Y = \alpha^{(0)} + \sum_{i=1}^p$
- ❖ Updated in
- ❖ In test: non linear models.

❖ regression trees, non parametric models ($Y = \alpha^{(0)} + \sum_{i=1}^p f^{(i)}(X^{(i)})$)

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

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**