

SPOT4 (Take5) – Contribution of Sentinel-2 to coast management

Take 5 User's Day
2/10/2013 – CNES Toulouse

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Coastal zone management : a major issue

- **EU Policies**
 - Water FD
 - & Bathing Water D
 - Marine Strategy FD
 - & Birds/Habitats D
- **Regional context**
 - **River / Estuary**
 - SPM quantification and fluxes
 - WQ impact on mesohaline fish species
 - Tidal flat productivity
 - **Estuary / Bays**
 - Coastline erosion and submersion risk management
 - Dredging activities and environmental harbor management
 - Habitat changes – Mesohaline species : Eel, Acsipenser sturio,...
 - Waste water management from major urban coastal zones
 - Maximum turbidity zone detection (MTZ) and associated underoxygenation
 - **Estuarine plumes**
 - Bathing water quality
 - Impacts on bivalve farming areas



Copernicus constellation : a major data provider for coastal observatories

- **Observations at regional scales**
- **Frequent update**
- **SAR and/or MR/HR colour acquisitions**

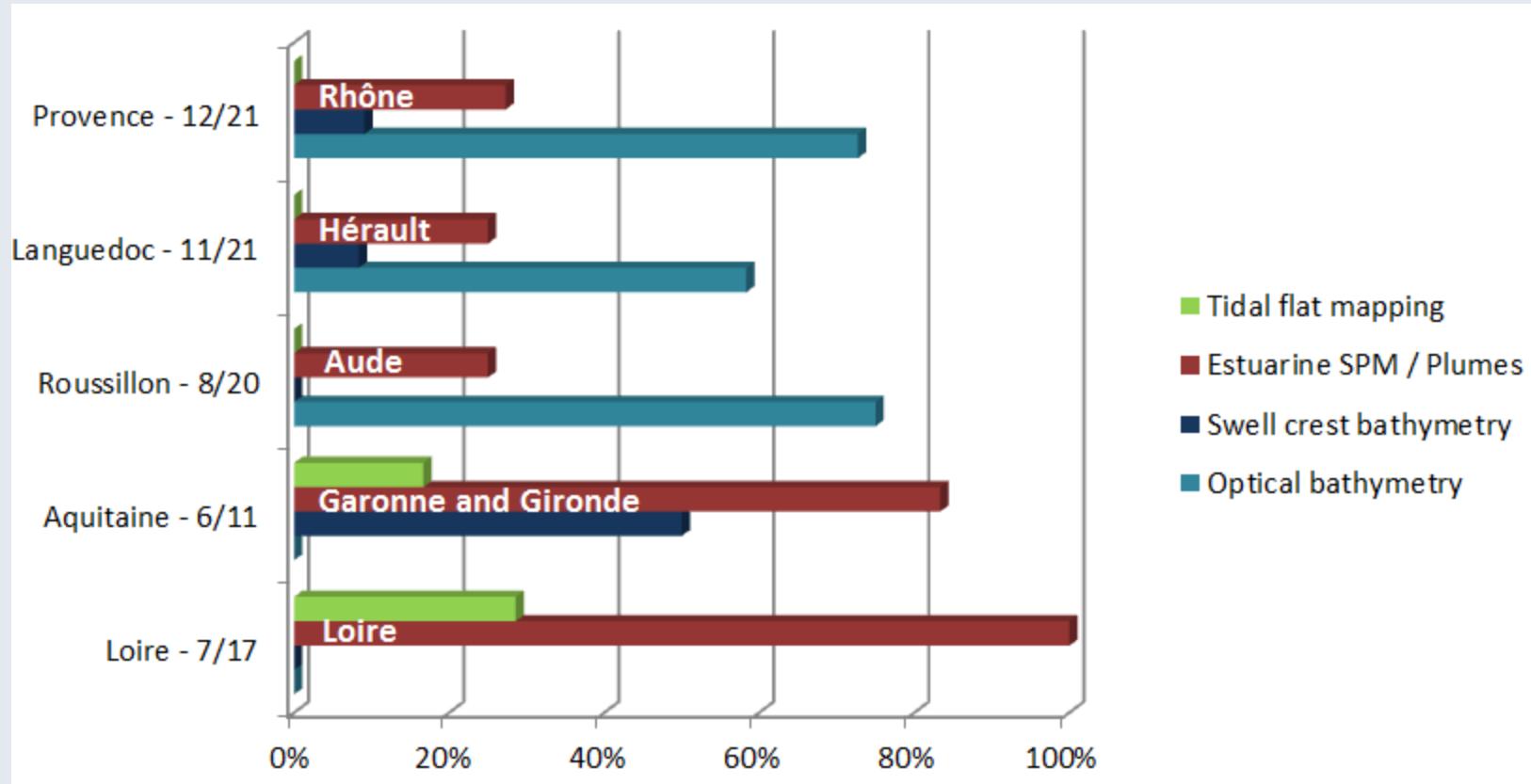


Remotely sensed INDICATORS and USES

- Estuarine SPM – WFD, MTZ observation & urban waste water management
- Biofilms & intertidal habitats – WFD, Biodiversity & conservation, Bottom morphology & role against tidal flood
- Coastal bathymetry - Bottom morphology & protection against erosion and submersion, Navigation security

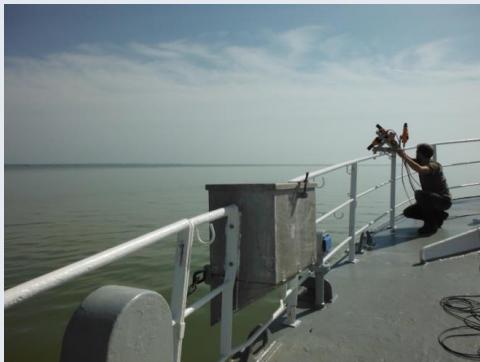


Preliminary Take5 database analysis – 2A products

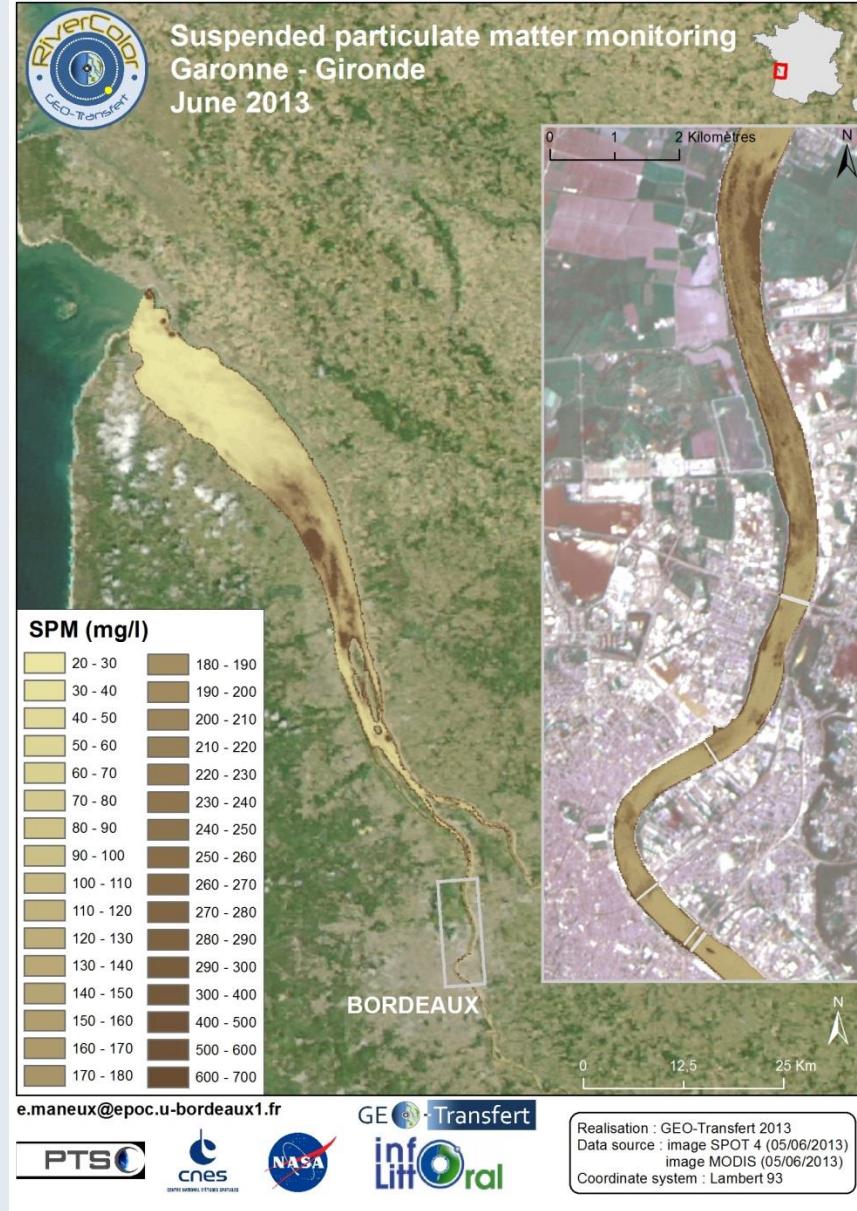
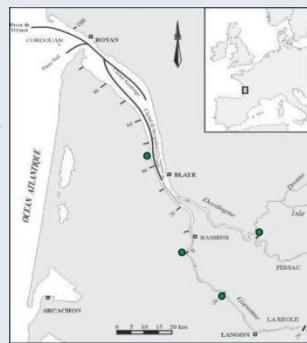


Estuarine SPM : Gironde / Garonne

- Calibration:
 - MODIS: Doxaran et al.2002
 - SPOT4: INFOLITTORAL-1 / RIVERCOLOR

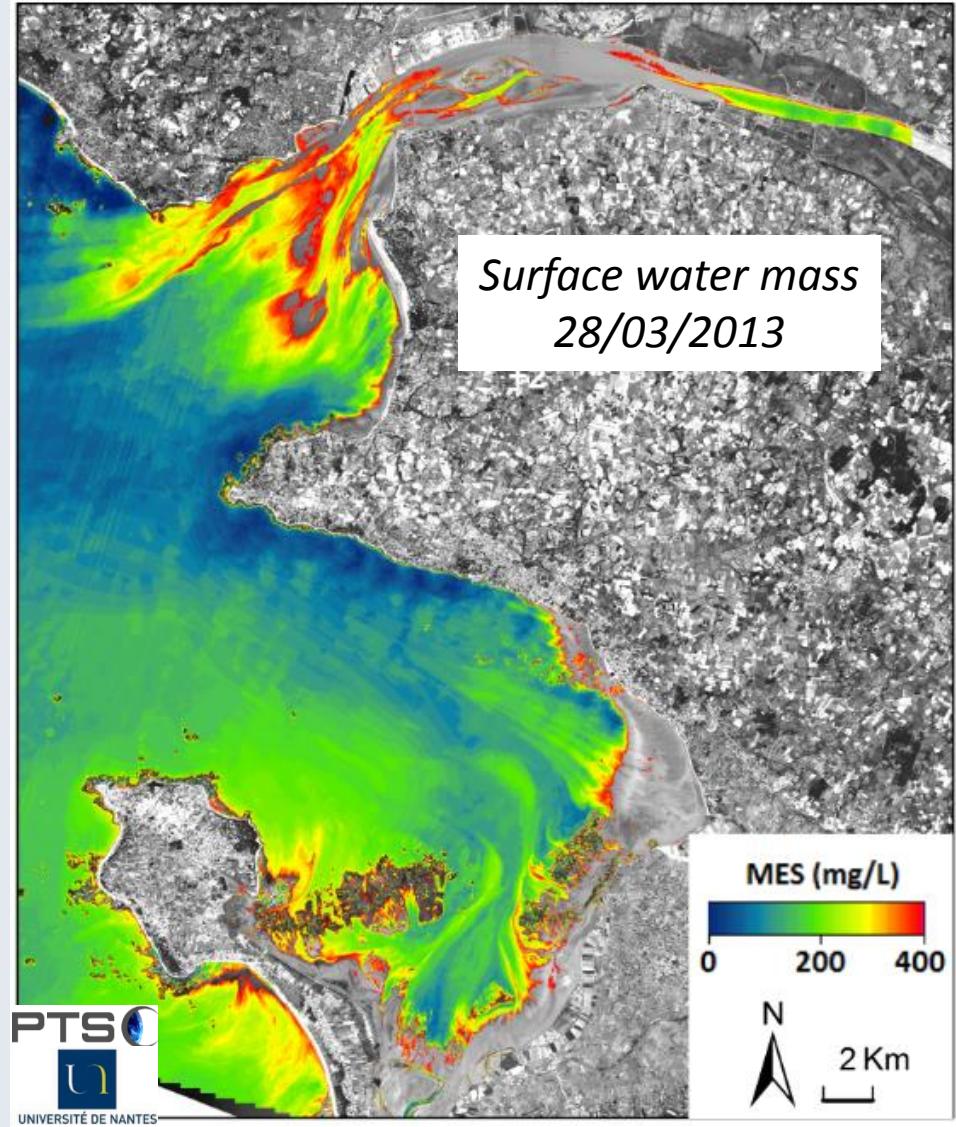
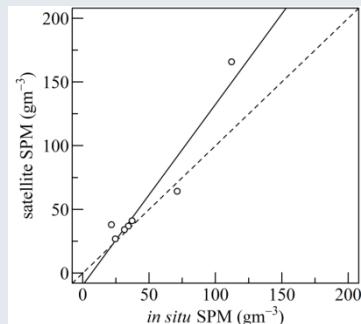


- Validation
based on the
MAGEST
network



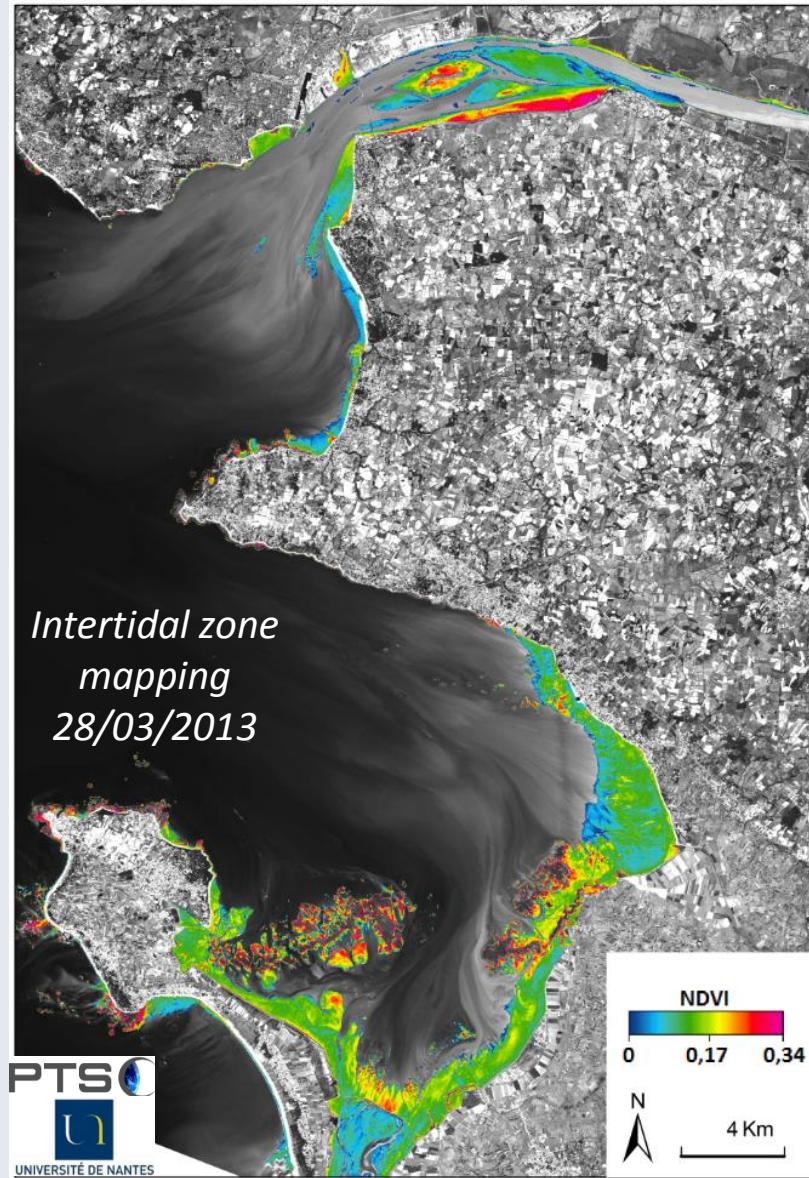
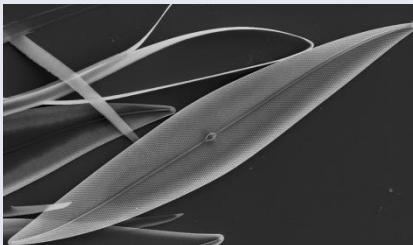
Estuarine plume : Loire

- Doxaran et al.
(2002)
- Proxy : XS3/XS1



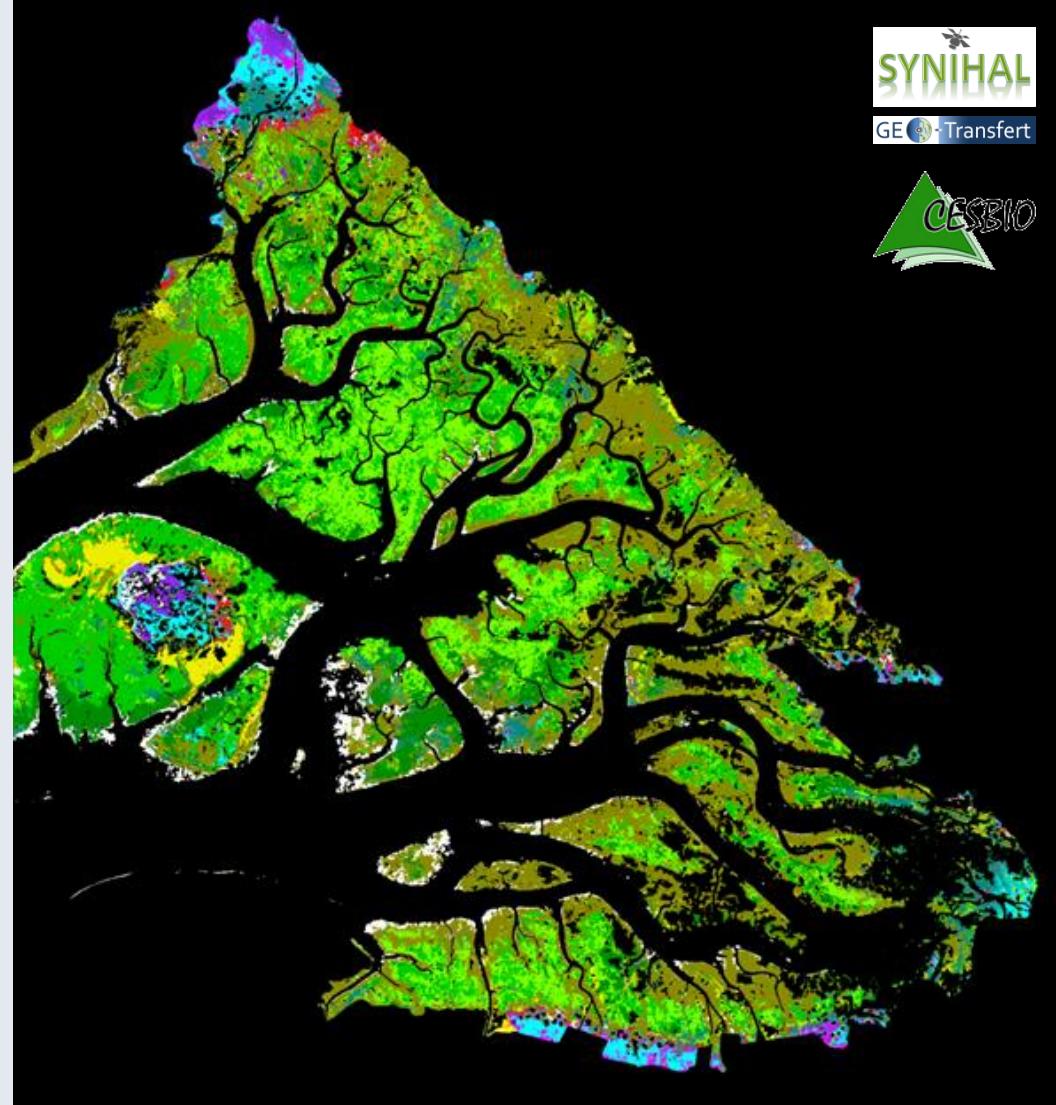
Biofilms : Loire and Bourgneuf bay

- Méléder et al.
(2003)
- Proxy : adapted
NDVI

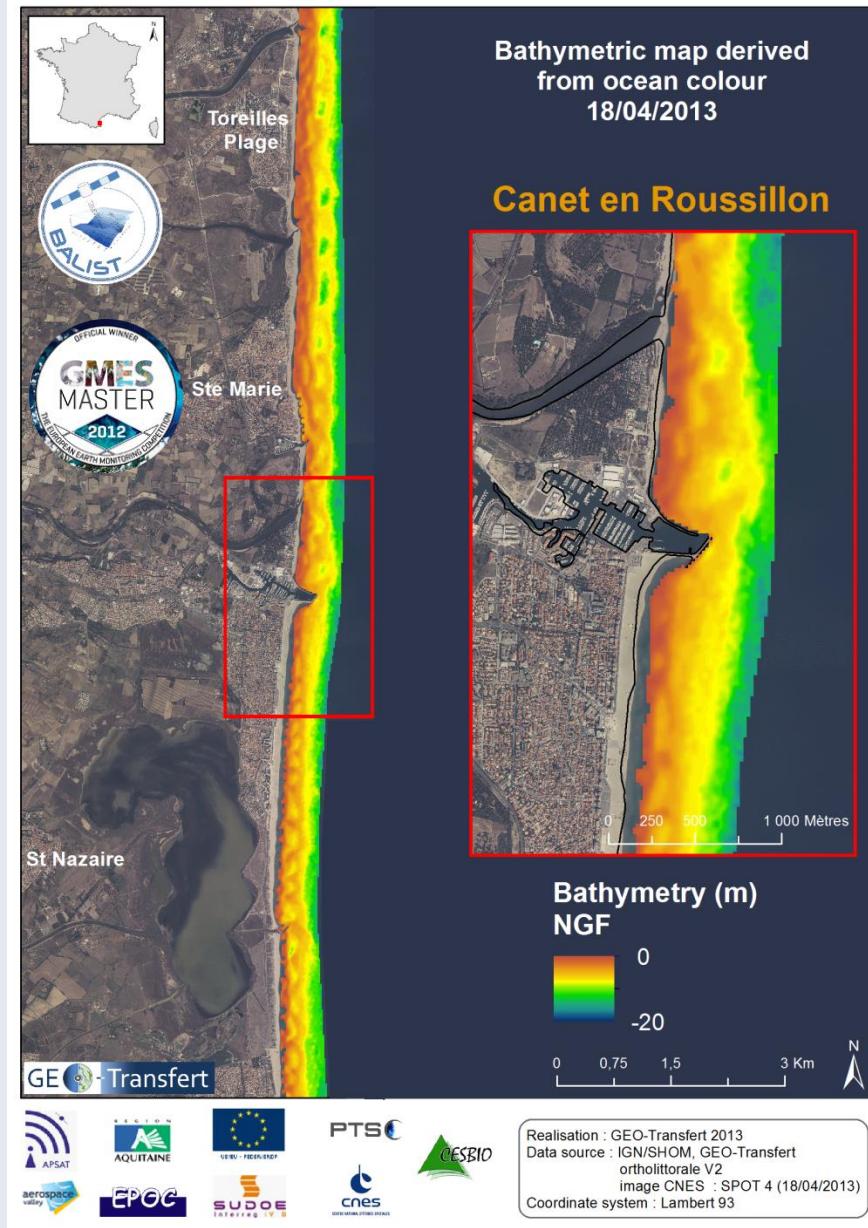
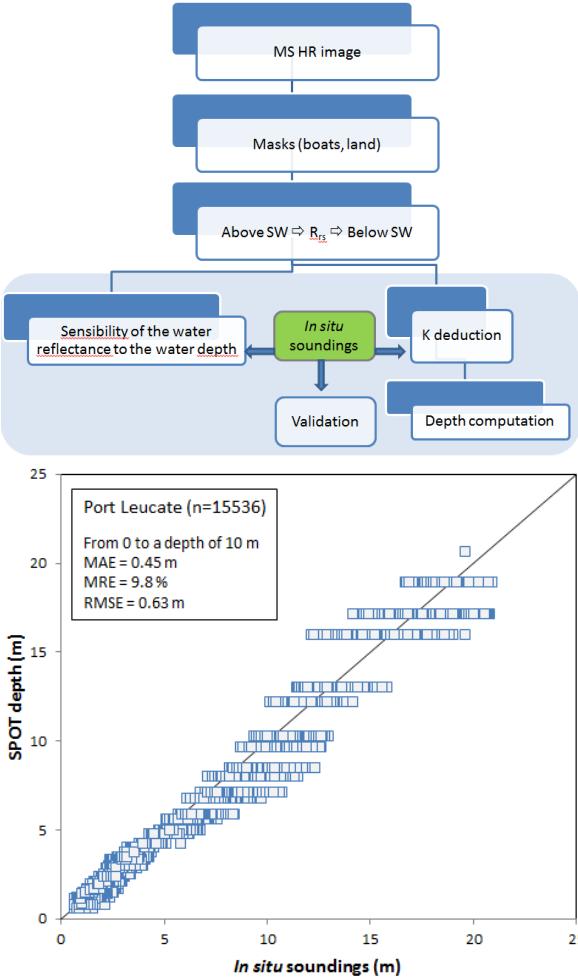


WFD habitat mapping

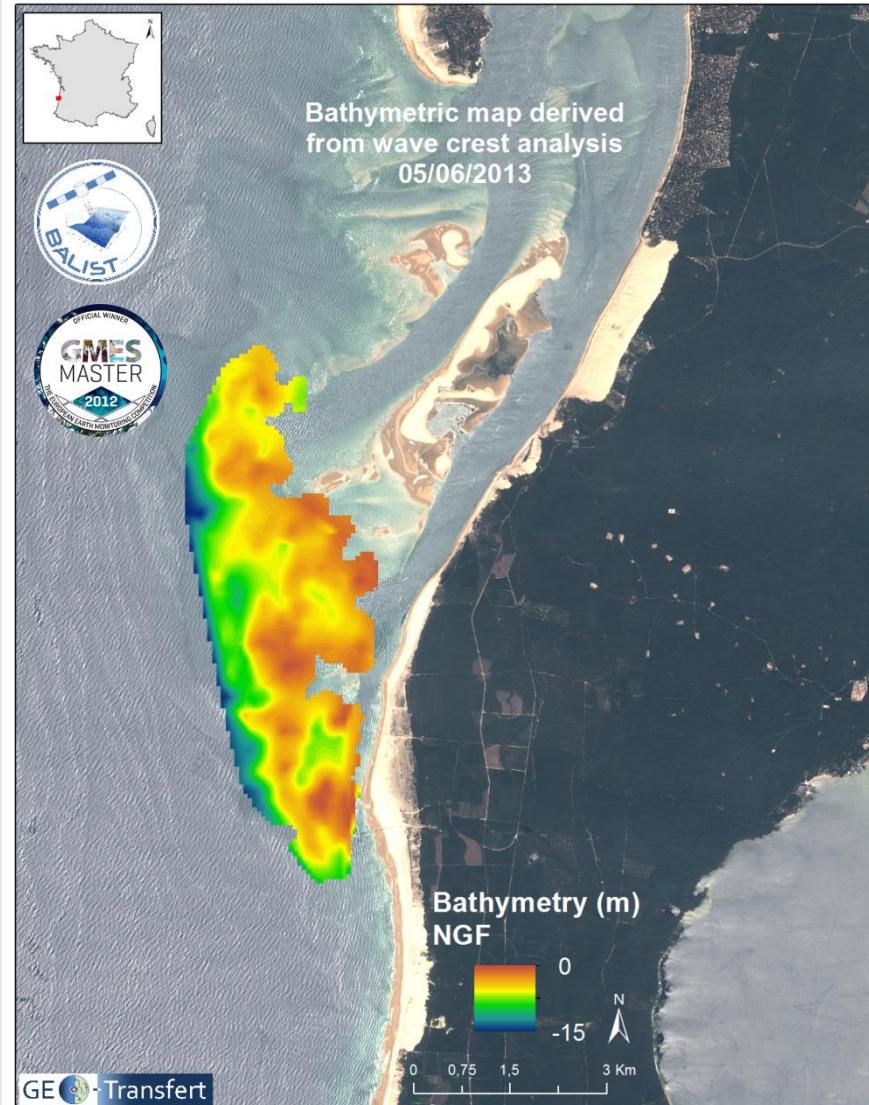
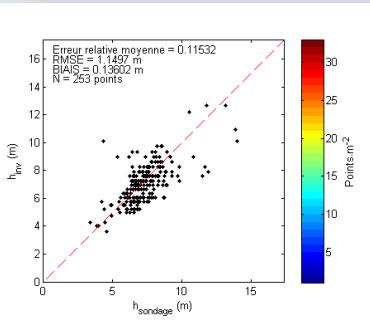
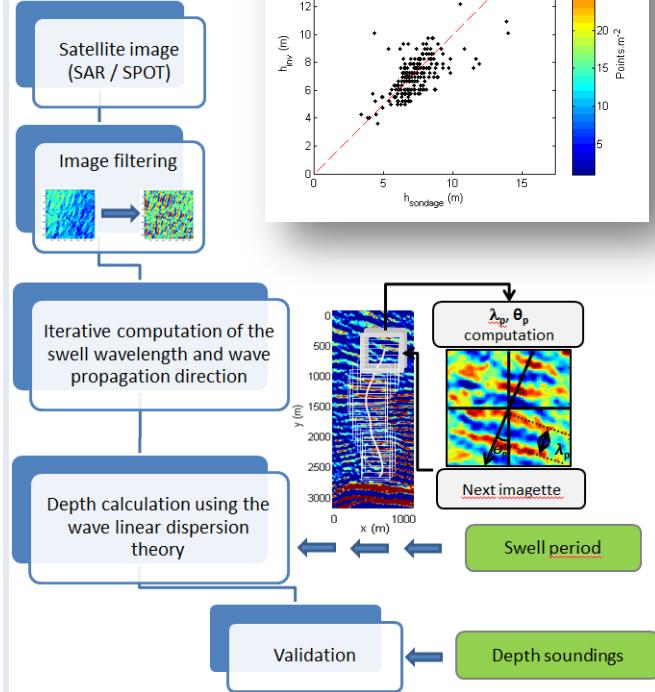
- Fusion of classifications
 - Mahalanobis Distance: 4 SPOT scenes
 - ICM: 2 SAR acquisitions



Optical bathymetry: Roussillon



Swell crest inversion : Aquitaine



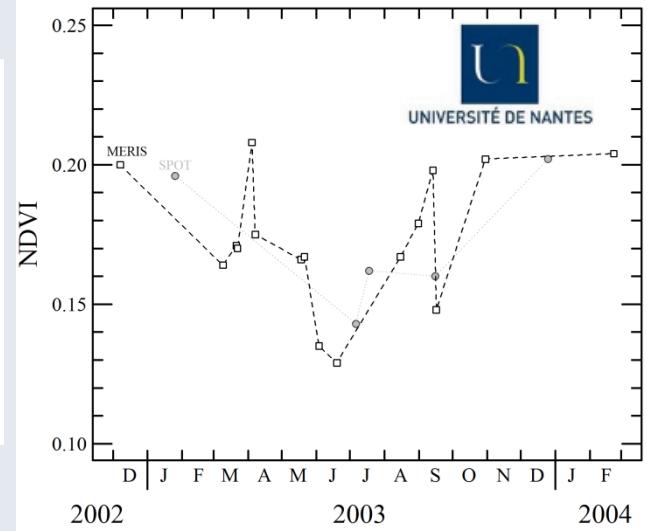
Realisation : GEO-Transfert 2013
Data source : IGN/SHOM, GEO-Transfert
processed image : SPOT 4 (05/06/2013) CNES
displayed image : Pléiades (24/06/2012) CNES
Coordinate system : Lambert 93

Perspectives: SPM

- Paper in prep:
 - Remote-sensing of highly turbid waters at high spatial resolution application to aquaculture management along the West coast of France by Gernez et al.
- Multi-sensor SPM algorithms are still under development
- ETM observatory:
 - RIVERCOLOR observatory of the MTZ in the Gironde due by early 2014
 - MODIS and SPOT/LANDSAT integration to prepare S2 + S3 use in the ETM monitoring

Perspective: Tidal flats

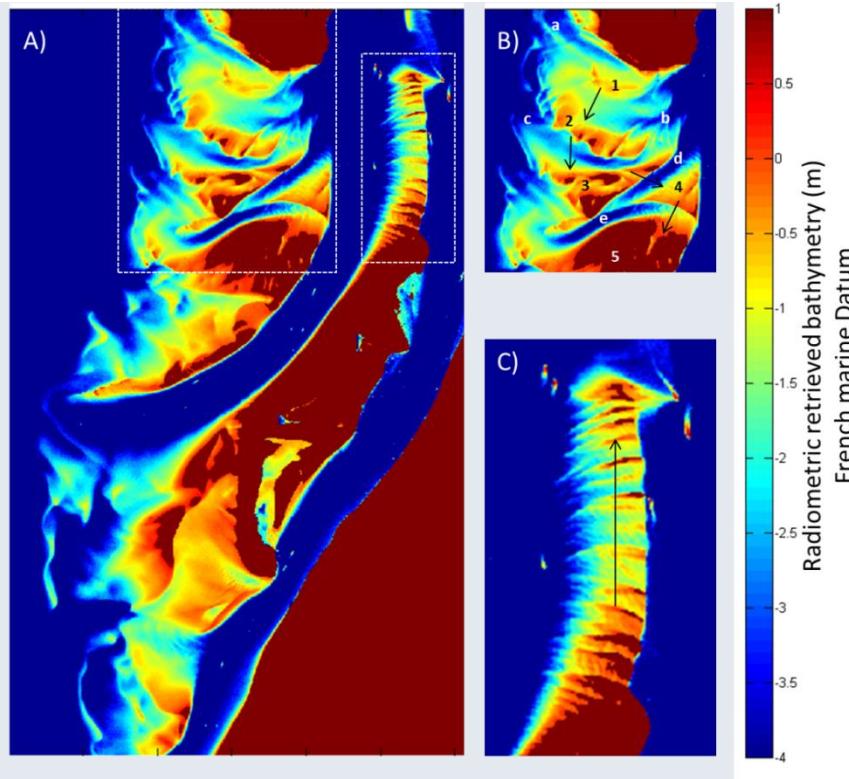
- MPB saisonnal to interannual variability analysis using SPOT & MERIS to prepare Sentinel 2 (MSI) / Sentinel 3 (OLCI) use



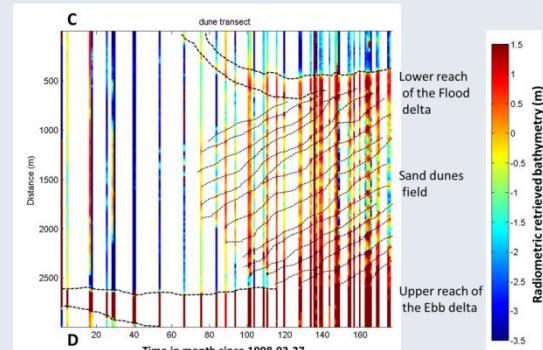
- Intertidal habitat mapping of western Europe lagoons using TSX and SPOT to prepare Sentinel 1 and 2 combined use

Perspective: Bathymetry

- Swell crest inversion:
Publication in prep by
Robinet et al. (2013)
- Tests are being made in
Languedoc / Provence with
validation data (DREAL
Languedoc Roussillon)
- Bathymetry service
demonstrators soon
displayed by GIP ATGeRi and
SIG Languedoc Roussillon
- Sentinel-2: monitoring
nearshore environment at
high spatial and temporal
frequency (e.g. : Storm
events scale)

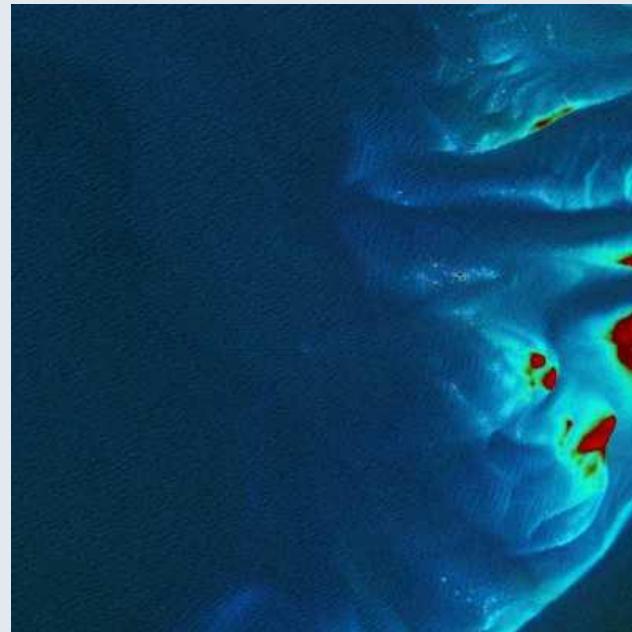


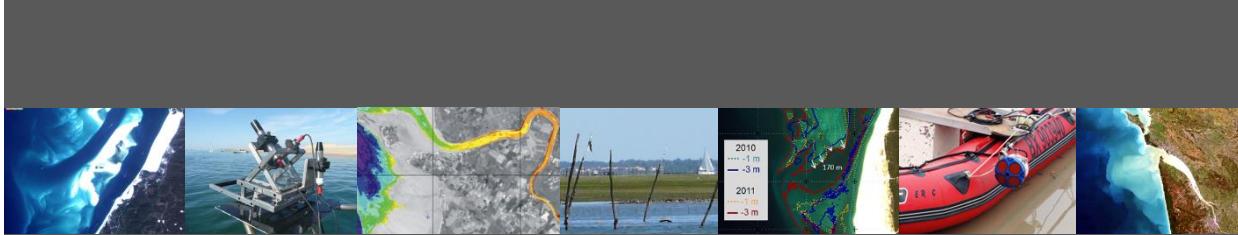
MORITO Project:
Bathymetric retrieval at
seasonal scale with
SPOT-5 Kalideos
Database over two
decades (1986 – 2012) +
SPOT4(Take5)



Perspectives- Atmospheric correction

- Improvement of atmospheric correction for SPOT4-5 and Pleiades : add of sunglint corrections and adjacency effect correction (Driss BRU, PhD, EPOC, Bordeaux 1)
- Example of a SPOT5 zoom of the exit of The Arcachon Bay (01/07/2011) scene, before and after sunglint removal method (Lyzenga Method, Lyzenga et al.(2006))





Thank you!

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GE Transfert

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