# MODIS processing
over SeaSWIR test sites

Bouchra Nechad & Kevin Ruddick

Royal Belgian Institute for Natural Sciences

Data acquisition

- 3 sites:
  - Scheldt
  - Gironde
  - La Plata River
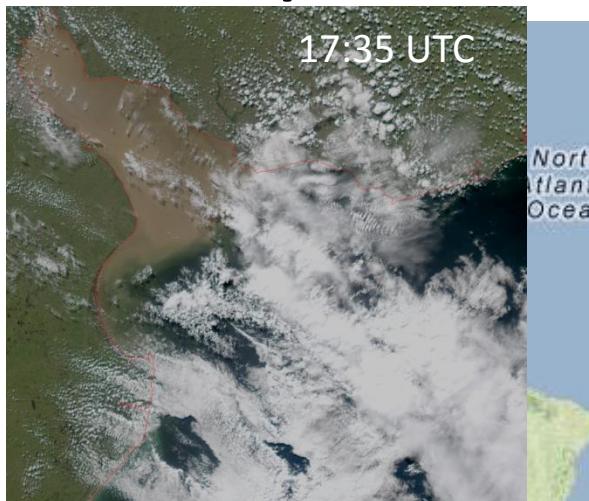
MODIS images: 7th April 2003

17:35 UTC

11:20 UTC

13:00 UTC
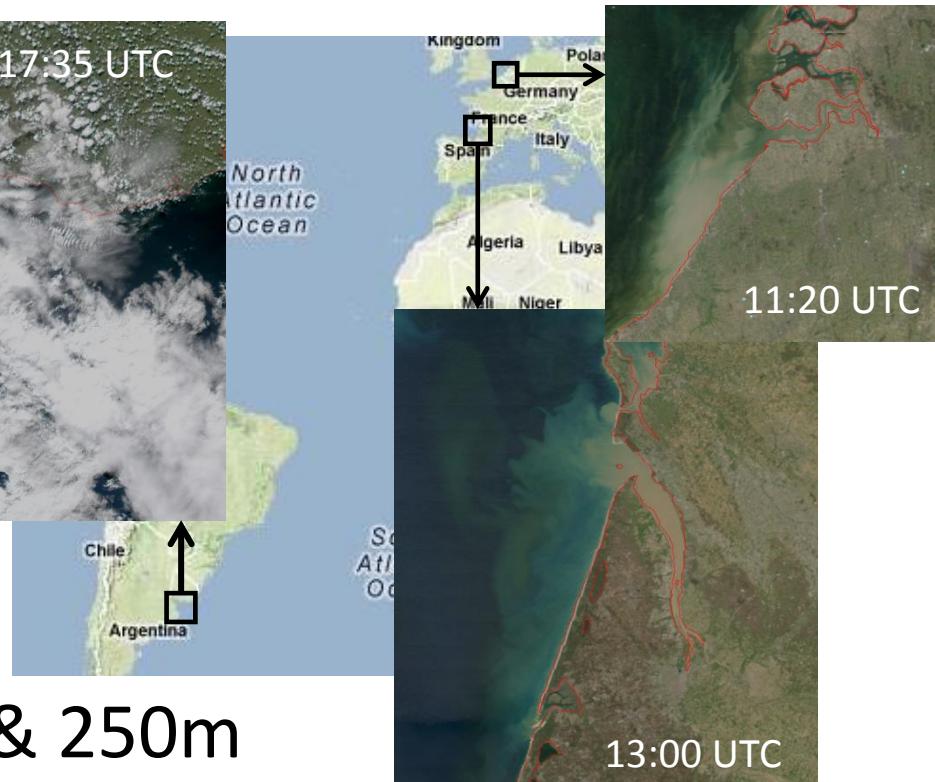
- Spatial resolution: 1km & 250m

- AQUA + TERRA L1A: sub-scened data from http://oceancolor.gsfc.nasa.gov

L1A data

Regions	AQUA Jun 2002 – Dec 2012			TERRA Mar 2000 – Dec 2012		
	Number of files	Total size (GB)	Overpass (UTC)	Number of files	Total size (GB)	Overpass (UTC)
Scheldt	5970	39	12-14	7400	48	10-12
Gironde	4950	40	12-14	6160	48	10-12
La Plata	5200	145	17-19	6300	431	13-15
Total	14.1K	224	-	19.8K	527	-

Table 1: Number of MODIS AQUA and TERRA images over the test sites, time range of satellite overpass, and estimation of the total size of L1A data for the missions up to December 2012.

- ~850 GB of data {L1A + spacecraft attitude and ephemeris}
- 1.5day/year (AQUA+TERRA) data to be staged and downloaded

L1B data

Regions	AQUA GEO, L1B 1KM, HKM, QKM		TERRA GEO, L1B 1KM, HKM, QKM	
Period	April 2003	06/02 – 12/12	April 2003	03/00 – 12/12
Scheldt	2.5	318	2.4	370
Gironde	3.8	483	3.7	570
La Plata	6.7	851	12.6	1940
Total size (GB)	13	1652	18.7	2890

Table 2: Estimation of the total size of L1B data (in GB) and the associated geolocation data, for the periods indicated above, based on data from April 2003

- ~5.5 TB of L1A and L1B
- Software: SeaDAS v6.0
- Automated scripts to handle L1A to L1B/GEO, L1B to L2

L2 data

- Atmospheric corrections:
  - NIR (Stumpf et al 2003, Bailey et al 2010): 748 and 869 nm
  - SWIR (Wang 2007, Wang et al. 2011): 1240 and 2130 nm
    - SWIR-v: variable aerosol model (pixel-by-pixel)
    - SWIR-f: fixed aerosol model (Dogliotti et al. 2011)

- Output data:
  - Daily R_{rc}, Tau_a, Angström, R_{rs}, CHL
  - Daily RGB maps

- Post-processing:
  - HDF to gridded/binned files
  - TSM & turbidity, at 1Km + 250m
  - CHL
  - Climatology (monthly, seasonal, annual)

References

- Bailey, S.W., Franz, B.A. and Werdell, P.J., 2010. Estimation of near-infrared water-leaving reflectance for satellite ocean color data processing. Optics Express, 18: 7251-7527.

- Dogliotti, A., Ruddick, K., Nechad, B. and Lasta, C., 2011. Improving water reflectance retrieval from MODIS imagery in the highly turbid waters of La Plata River, The Sixth International Conference on "Current problems in optics of natural waters" (ONW'2011), St. Petersburg, Russia.

- Stumpf, R.P., Arnone, R.A., Gould, R.W., Martinolich, P.M. and Ransibrahmanakhul, V., 2003. A partially-coupled ocean-atmosphere model for retrieval of water-leaving radiance from SeaWiFS in coastal waters., Algorithm Updates for the Fourth SeaWiFS Data reprocessing. NASA Technical Memorandum, pp. 51-59.

- Wang, M., 2007. Remote sensing of the ocean contributions from Ultraviolet to Near-Infrered using the SWIR bands: simulations. Applied Optics, (submitted).

- Wang, M. and Shi, W., 2005. Estimation of ocean contribution at the MODIS near-infrared wavelengths along the east coast of the U.S.: Two case studies. Geophysical Research Letters, 32(L13606).

- Wang, M., Shi, W. and Tang, J., 2011. Water property monitoring and assessment for China's inland Lake Taihu from MODIS-Aqua measurements. Remote Sensing of Environment, 115: 841-854.