Use of MODIS imagery for the assessment of the variability in intertidal microphytobenthos biomass at regional and global scales

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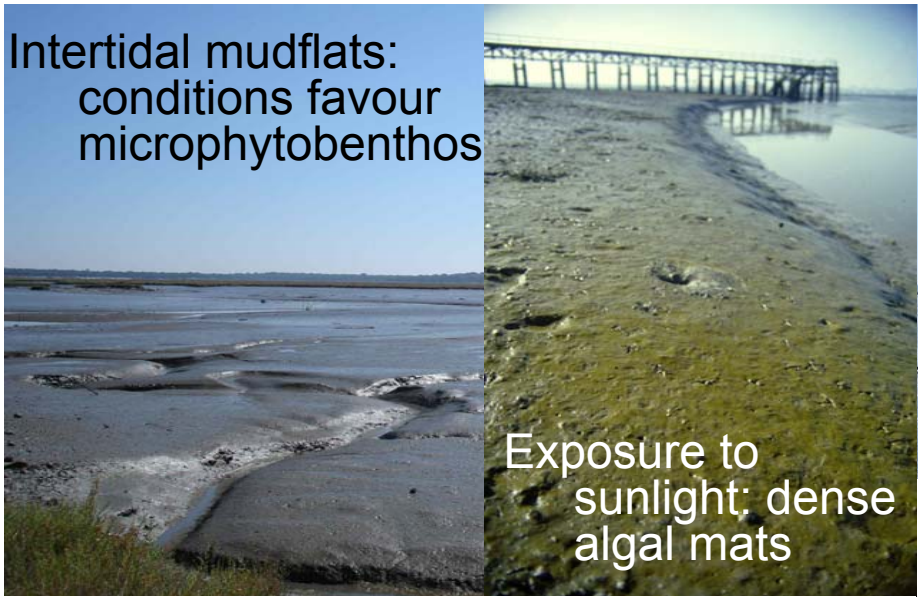
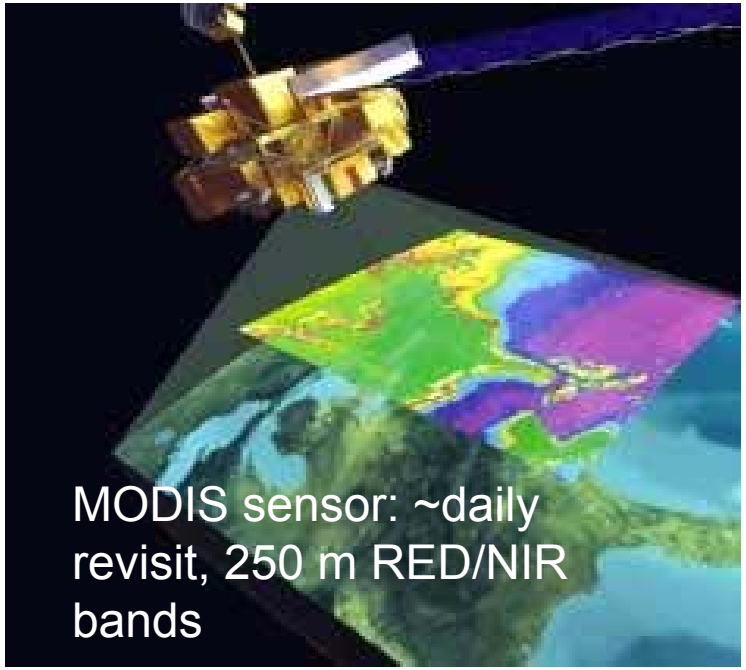
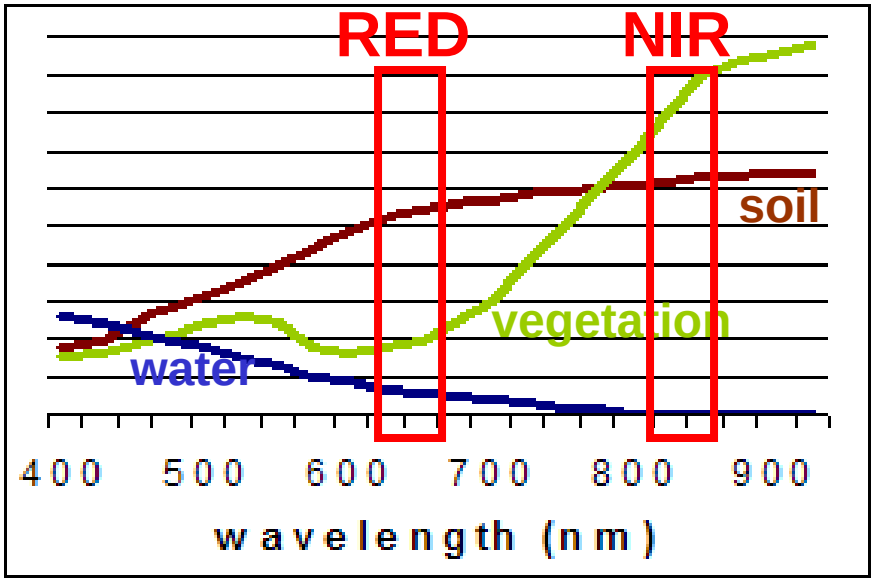
MareLac – MASTERS SCIENCE DEGREE COURSE GHENT UNIVERSITY
Advanced Studies in Marine and Lacustrine Sciences

Introduction



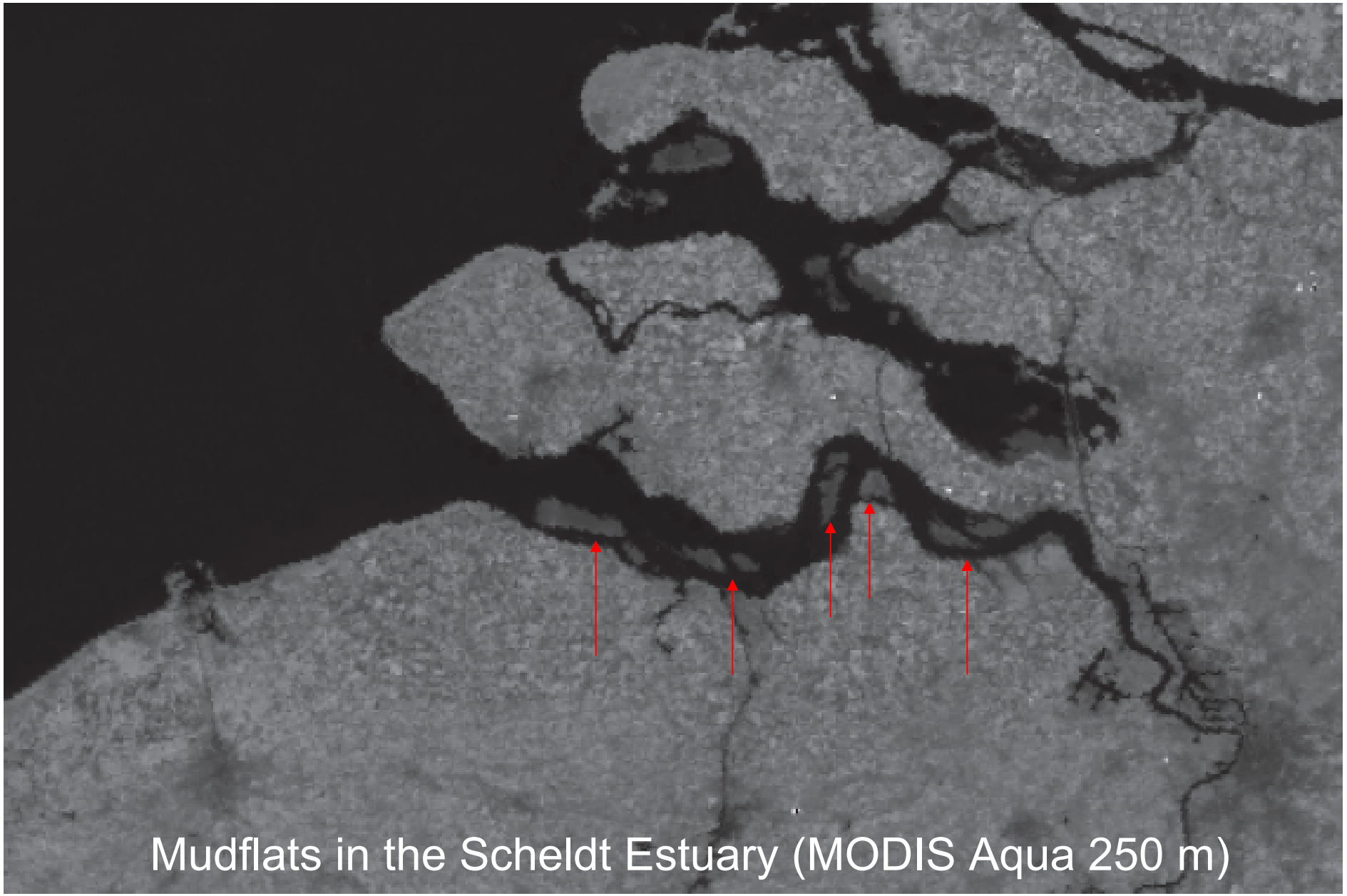




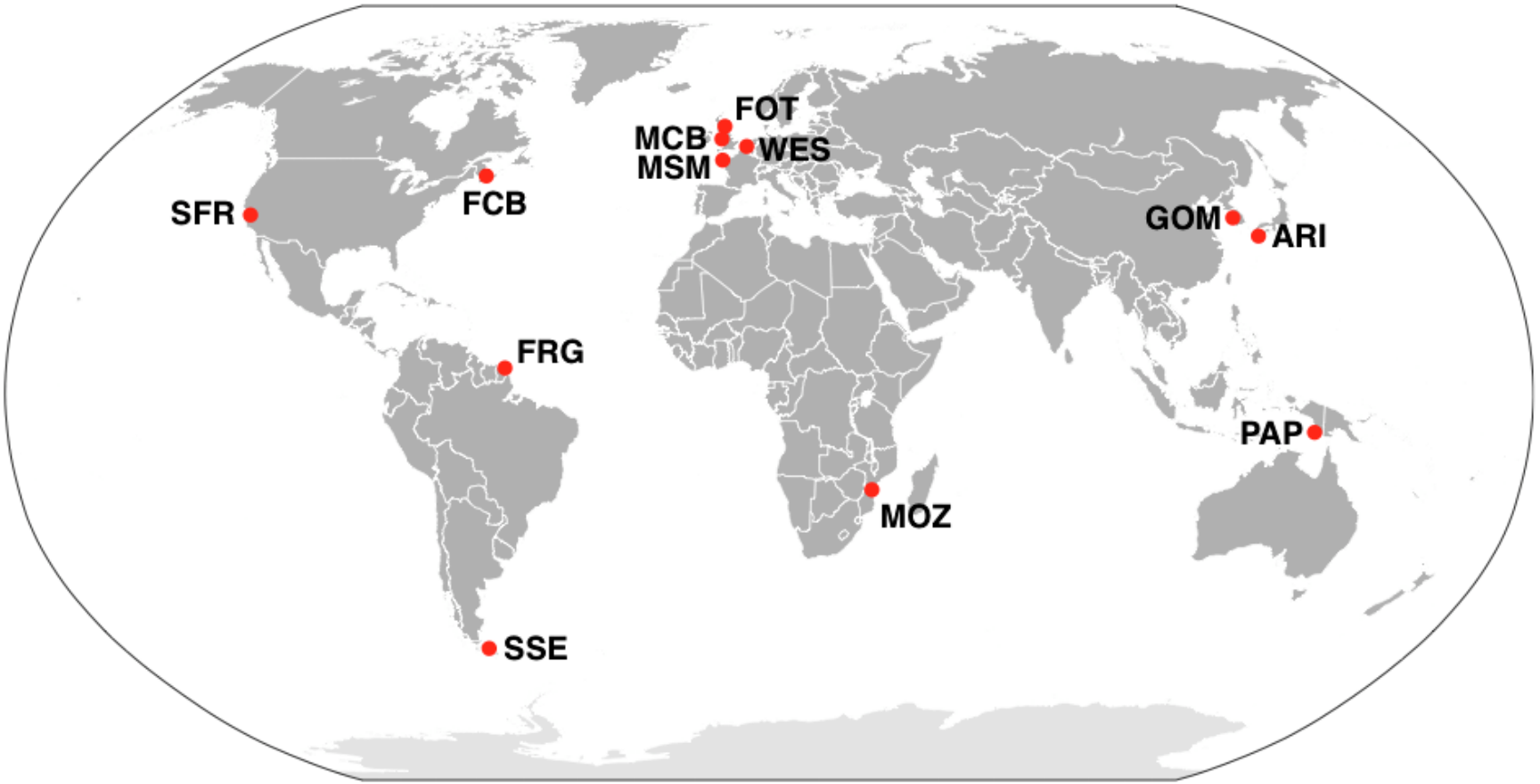
NDVI: NIR-RED / NIR+RED

water: negative
soil: low positive
vegetation: positive

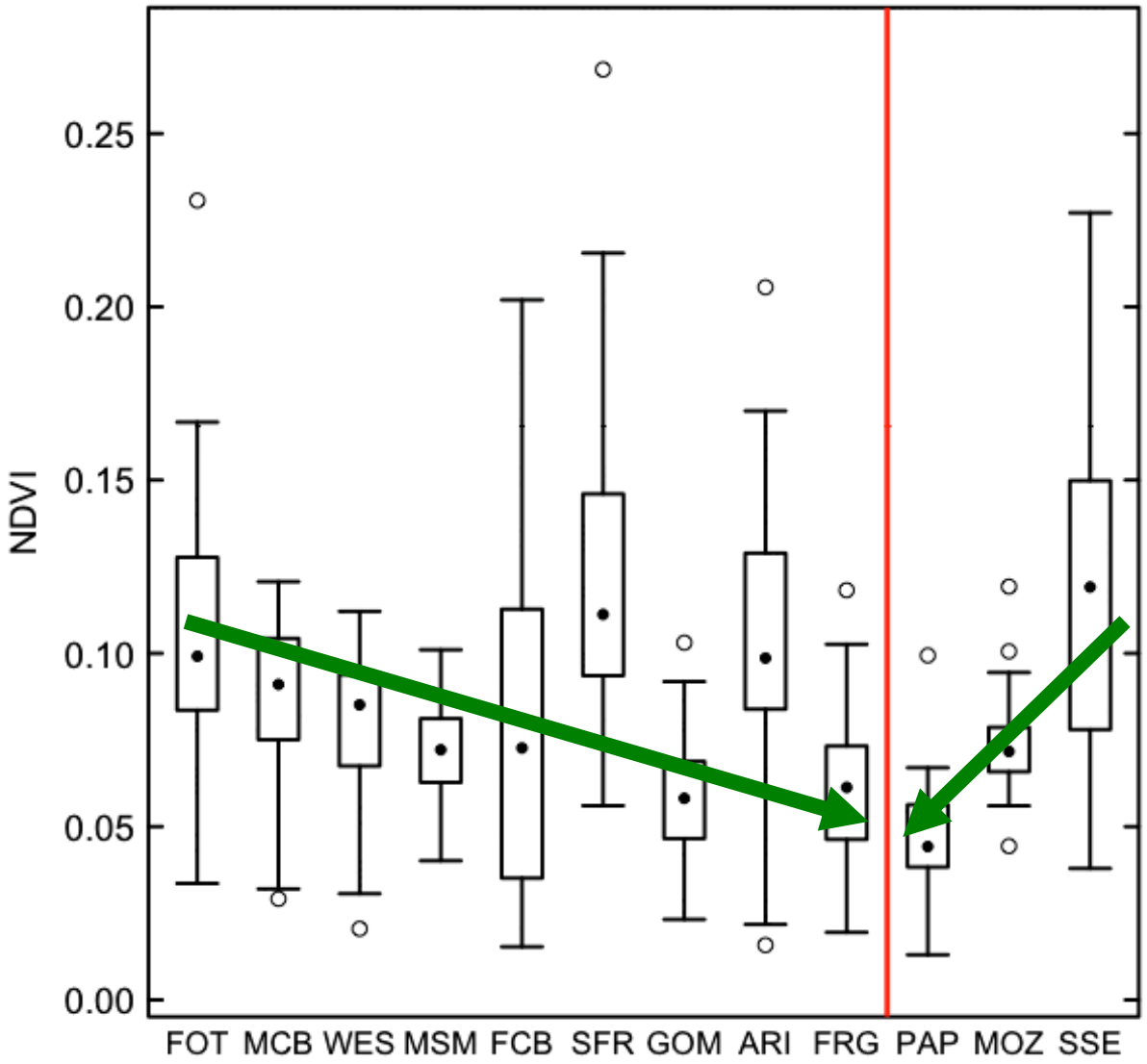
image sources: http://geologicalintroduction.baffl.co.uk/, http://sweet.ua.pt/ http://afis.meraka.org.za/wamis/


Mudflats in the Scheldt Estuary (MODIS Aqua 250 m)

Study Sites

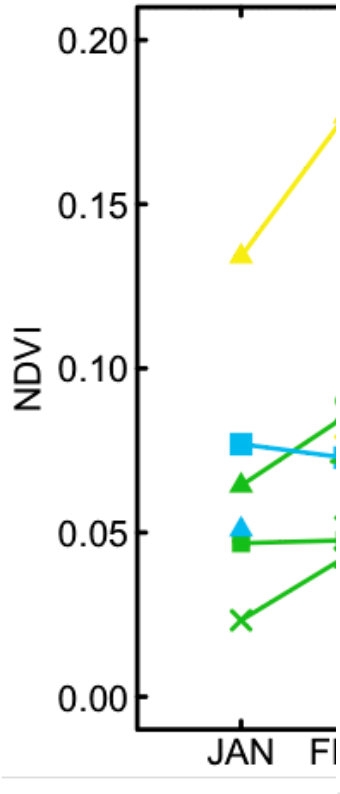


Latitudinal Effects

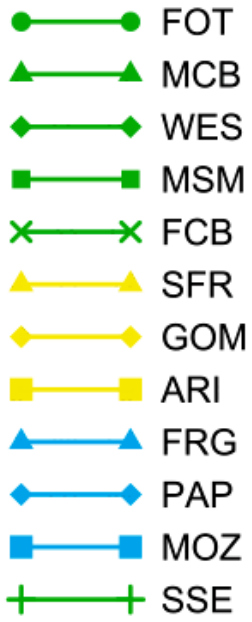


Lower mudflat NDVI towards the equator (red line)

Annual Variation

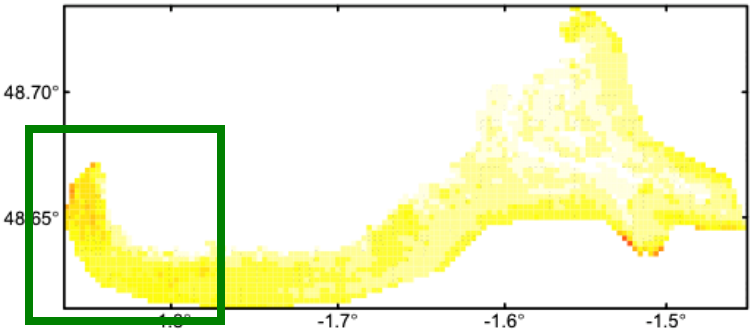


Code	Temperature		Precipitation	
	r_s	p	r_s	p
FOT	**0.647**	0.023	-0.143	0.658
MCB	**0.791**	0.002	-0.418	0.176
WES	**0.656**	0.021	-0.328	0.298
MSM	**0.907**	0.001	-0.448	0.145
FCB	**0.648**	0.023	-0.158	0.624
SFR	-0.567	0.055	**0.783**	0.003
GOM	0.164	0.611	–	–
ARI	0.300	0.343	**0.900**	0.001
FRG	0.095	0.768	-0.190	0.553
PAP	-0.058	0.858	0.314	0.320
MOZ	-0.492	0.104	-0.255	0.425
SSE	**-0.715**	0.009	-0.082	0.800



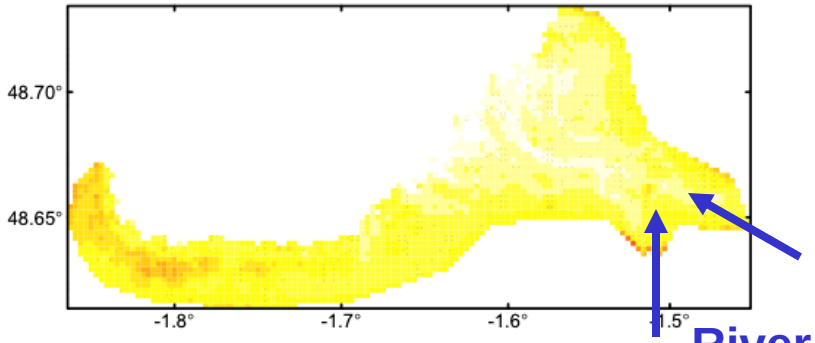
	Pattern	Correlation
Temperate sites	seasonal	temperature
Med/Subtropic sites	site specific	precipitation
Tropic sites	–	–

Spatio-temporal variation
Mont Saint-Michel bay



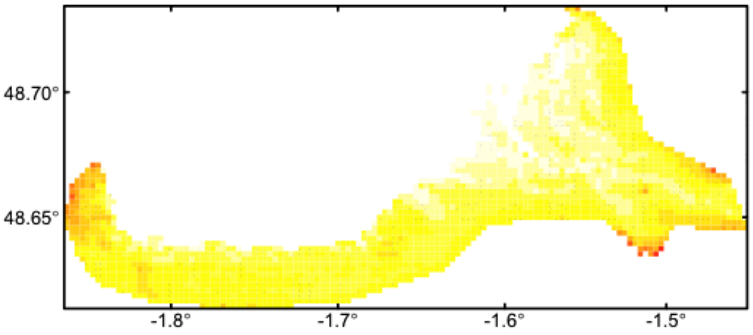
Most sheltered part

(e) MSM, winter

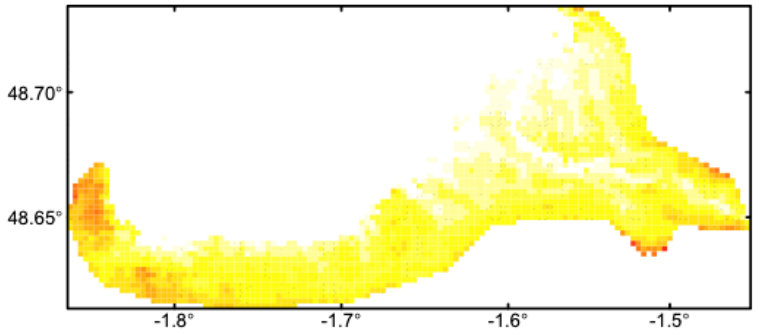


River mouths

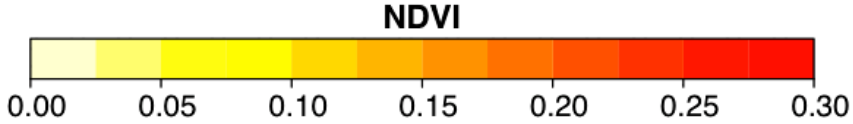
(f) MSM, spring



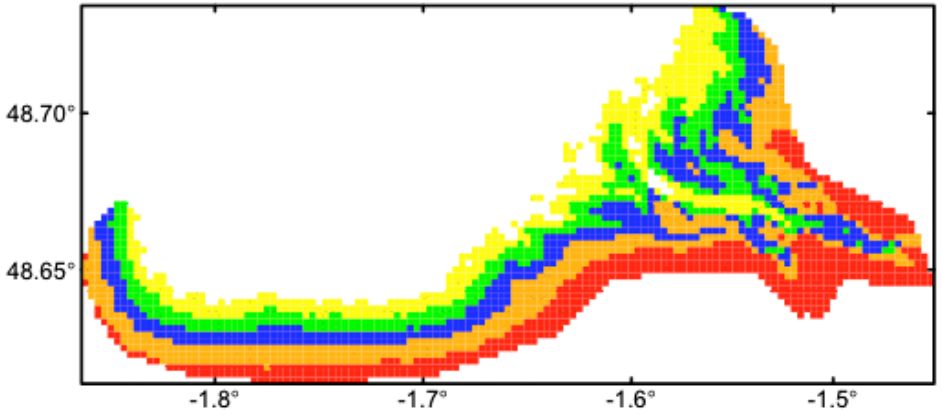
(g) MSM, summer



(h) MSM, autumn



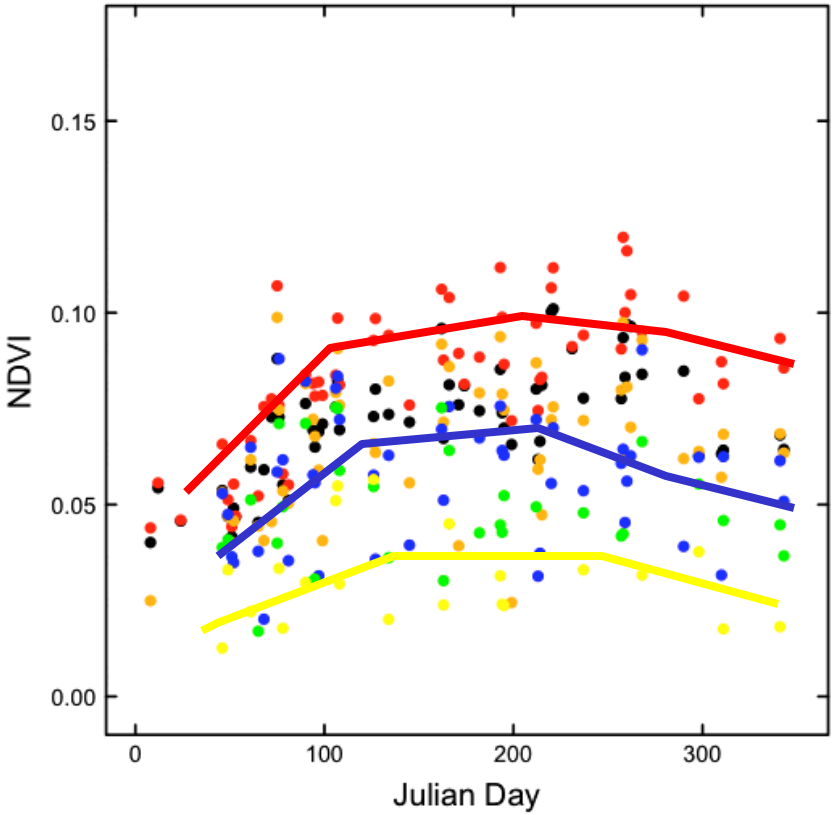
Elevation effects



Percentage of images containing each pixel

- 0-20%
- 20-40%
- 40-60%
- 60-80%
- 80-100%

Similar patterns on different elevation zones, yet lower values due to different mudflat exposure times.



Conclusions

- MODIS imagery is valuable for research on large intertidal areas
- Spatial and temporal advantages over classical methods
- Perspective: we found a signal in the mudflat data, but **no ground truth!**