

A Diurnal Warming dedicated Matchup Data Base

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Motivation (1)

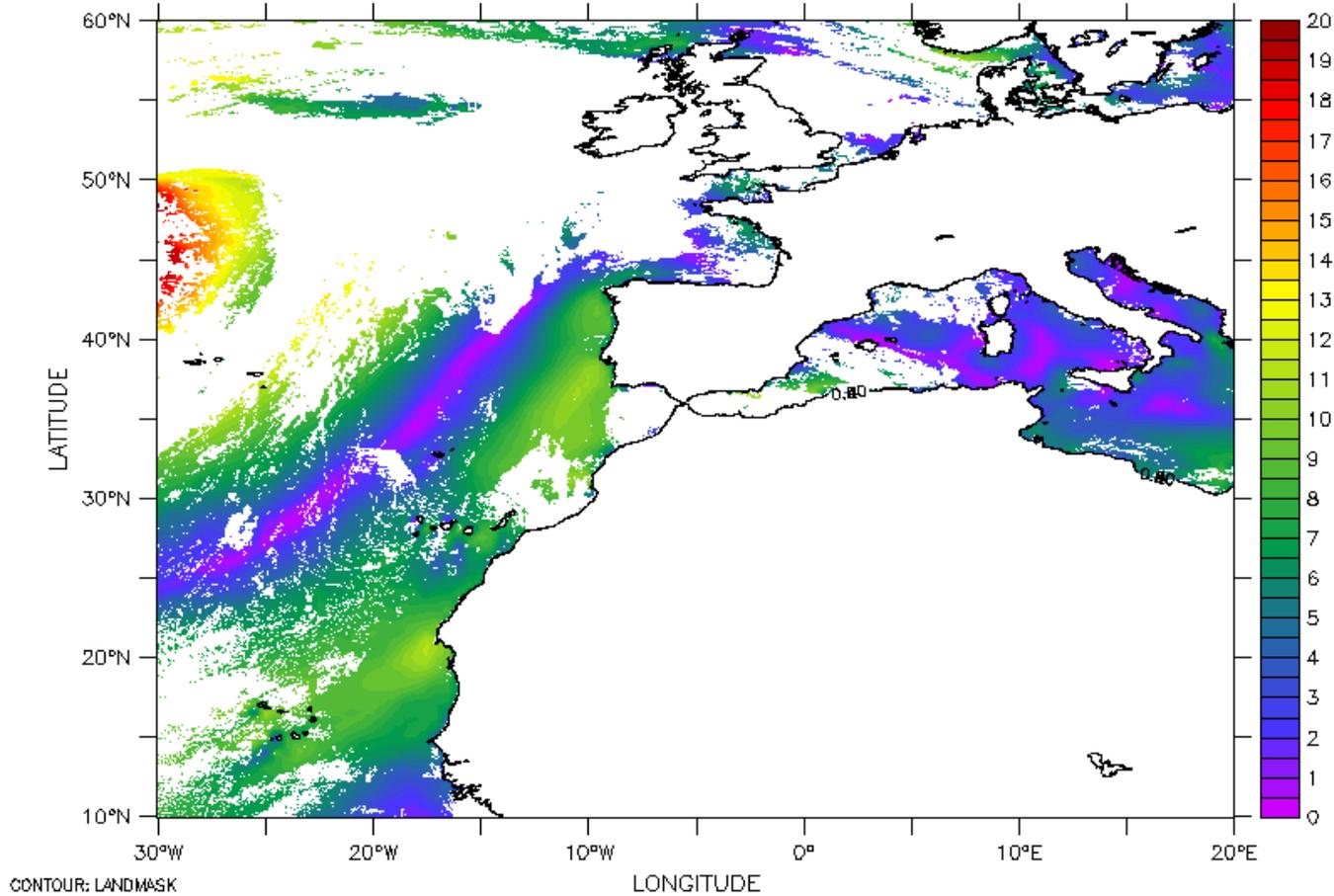
- Bt simulat
- Difference
- Diurnal wa

METOP-A
~21 LST

FERRET Ver. 6.71
NCMA/PMEL TMAP
23-JAN-2013 06:34:21

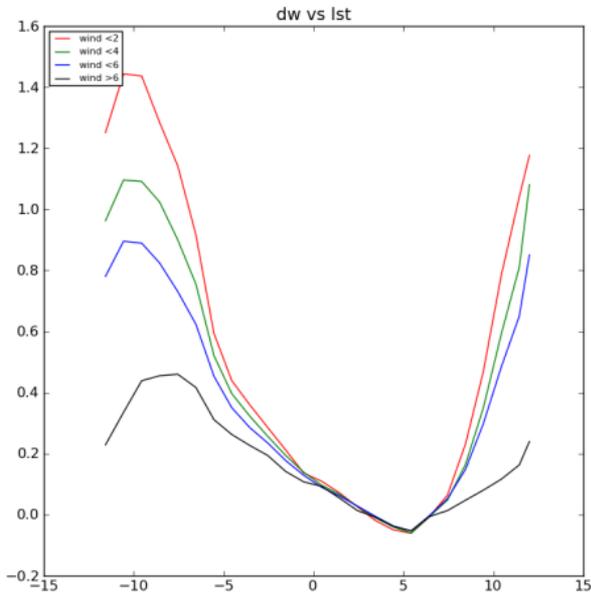
DATA SET: btsglb_metop02_20120531_000000
METOP BT simulation experiment

ounted for



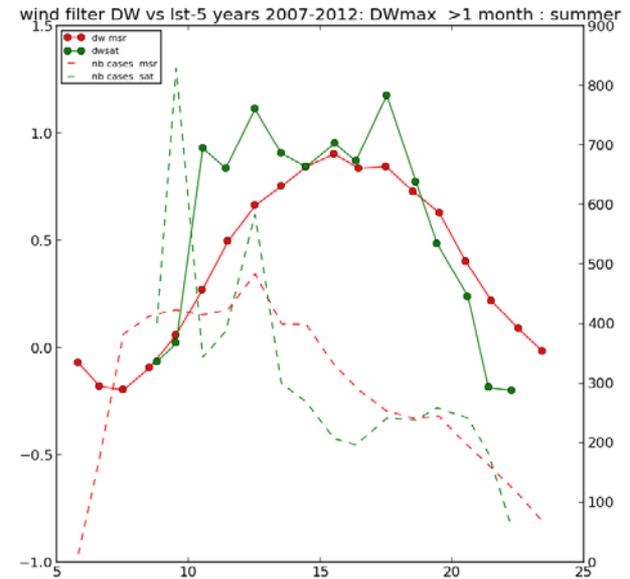
Motivation (2)

SST varies at short time scales....



Typical summer SST cycle in the Mediterranean as a function of LST and wind speed, averaged over the last 10 days in August. (METEOSAT-9/SEVIRI From Tomazic et al, 2013)

Even in permanent daylight conditions....



Summer SST cycle in the Arctic in permanent daytime conditions for diurnal amplitude larger than 1K (METOP-A/AVHRR)

A DW dedicated Matchup database

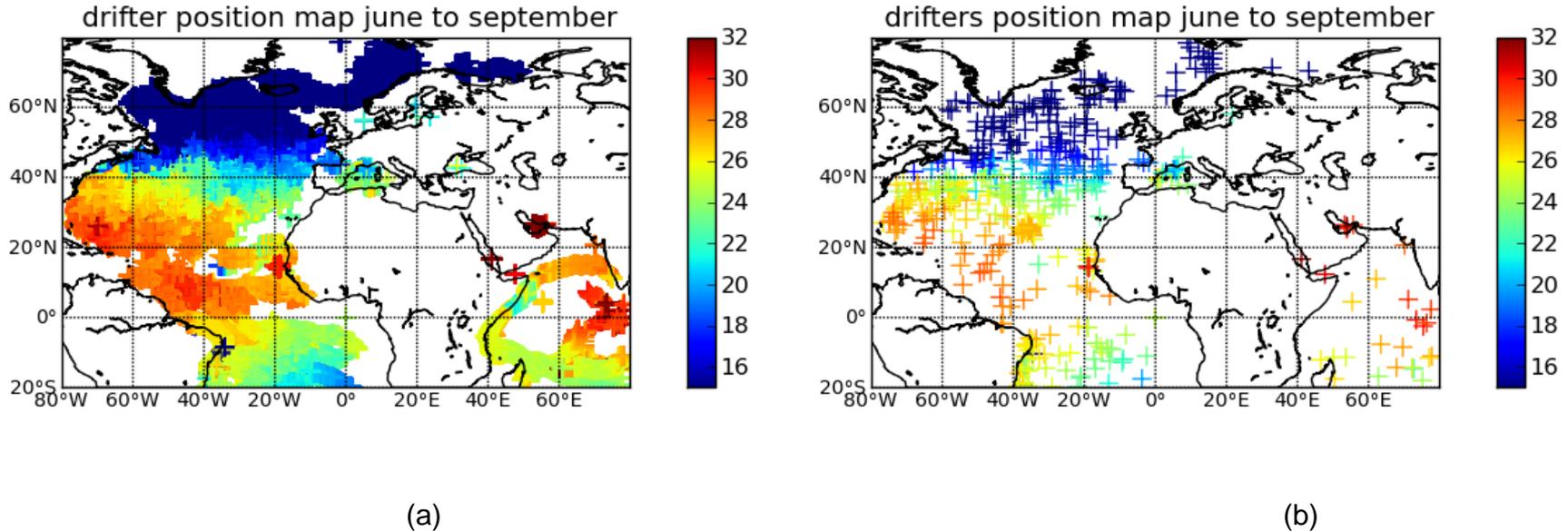
Overview

- DW dedicated MDB based on SEVIRI data.
- 20 S to 80 N and 80 W to 80 N
- June to September 2012.
- daily files in ~1 GB netCDF4 format.

Content

- **Continuous** drifting and moored buoy measurements
- “sst” and “flx” data in a 5-pixel square box in satellite coordinates
- box is centred at the nearest pixel to the buoy position
- Model outputs:
 - air temperature at 2m, air humidity at 2m,
 - surface pressure and integrated water vapour
 - wind speed at 10m

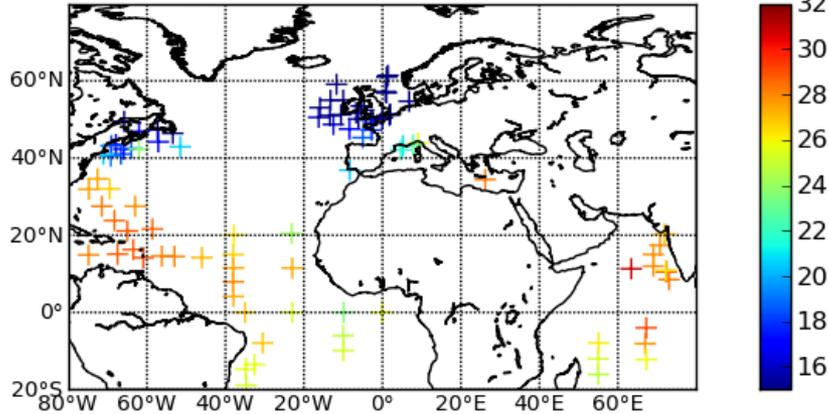
Drifter location



Drifting buoy position map using SEVIRI quality levels 2-5 : a) all records; b) mean positions of each buoy

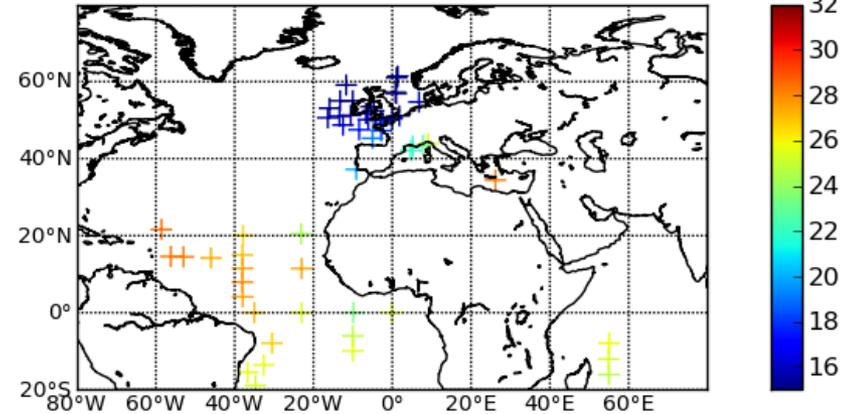
Mooring locations

mooring position map june to september



(a)

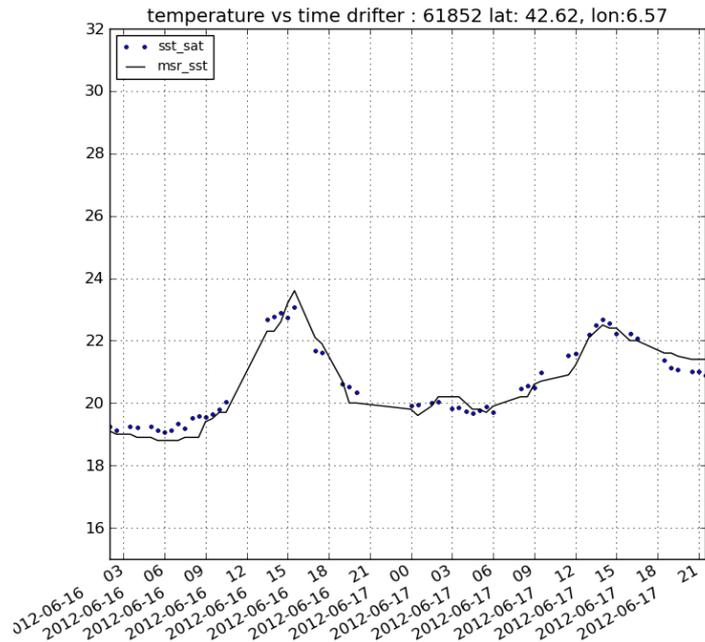
mooring position map june to september



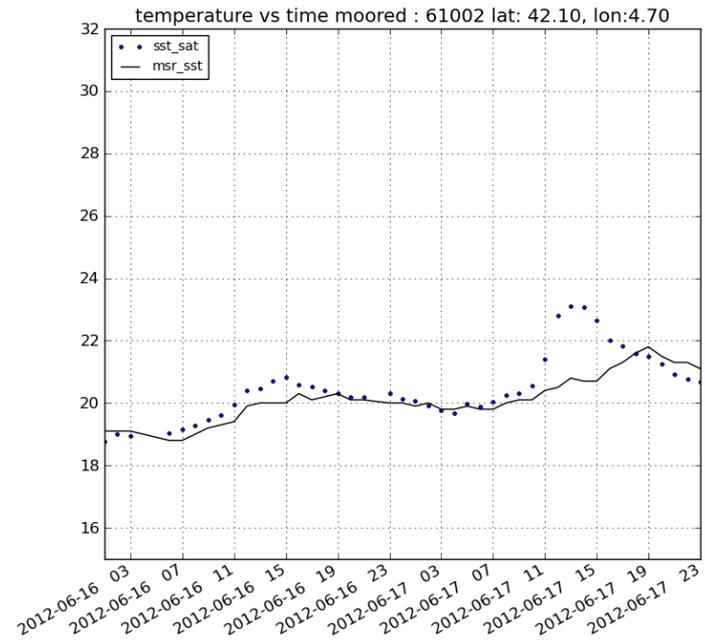
(b)

Moored buoy position map a) all SEVIRY quality levels; b) SEVIRI quality levels 3-5

Time series (SST)



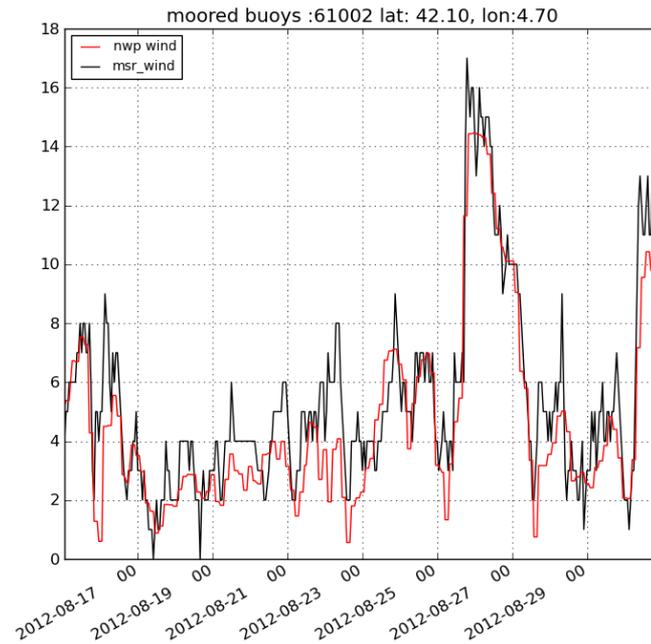
(a)



(b)

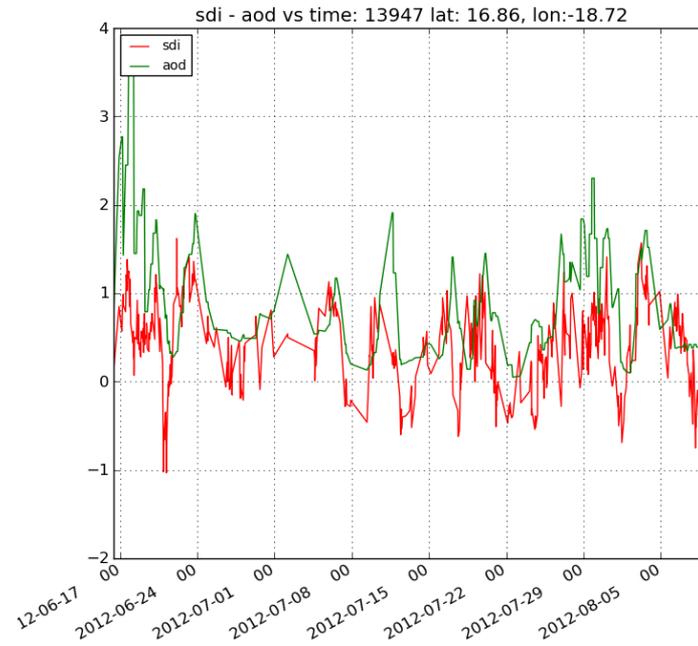
SST time series of buoy measurements (solid line) and SEVIRI SST (dots)
a) for drifting buoy 61 852: b) for moored buoy 61 002 over two days in June

Time series (wind)



Surface wind at moored buoy 61002 in August 2012, according to buoy measurements (black) and NWP model outputs (red).

Time series (SDI vs AOD)



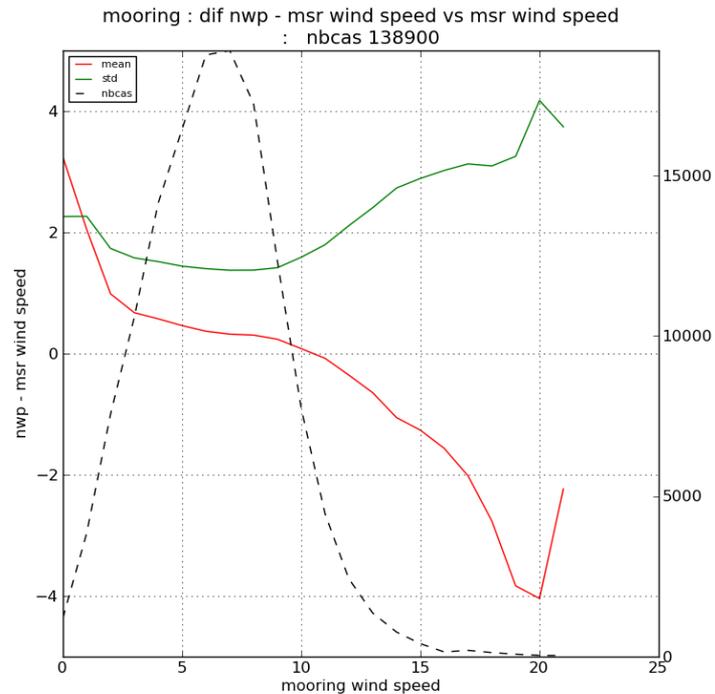
SDI and AOD time series in June July 2012

SST validation results

SEVIRI SST validation results for quality levels 3 to 5 and sdi < 0.

		Day			Night	
	N	δ	σ	N	δ	σ
Drifters	44460	-0.05	0.63	21357	-0.05	0.64
Moorings	7300	0.13	0.62	3183	-0.01	0.56

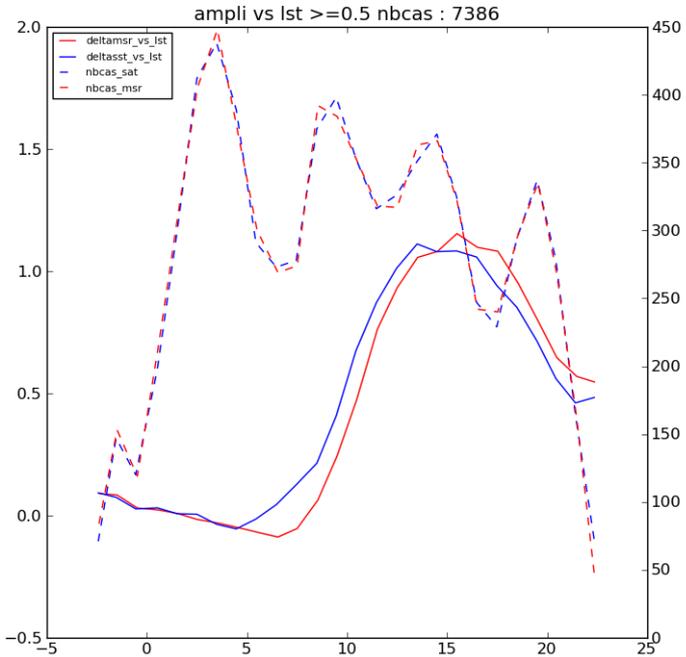
Model wind validation



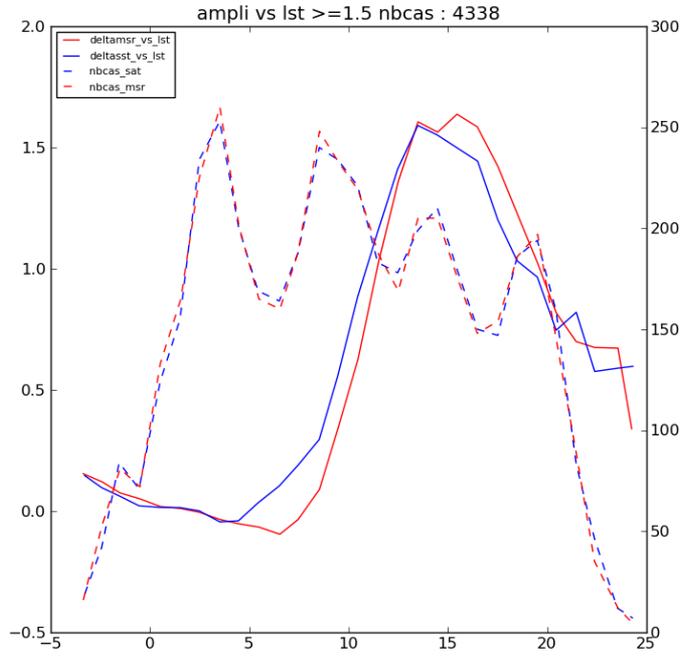
Model compared to moored buoy wind speed

SEVIRI vs drifting buoy DW estimates

DW max > 0.5



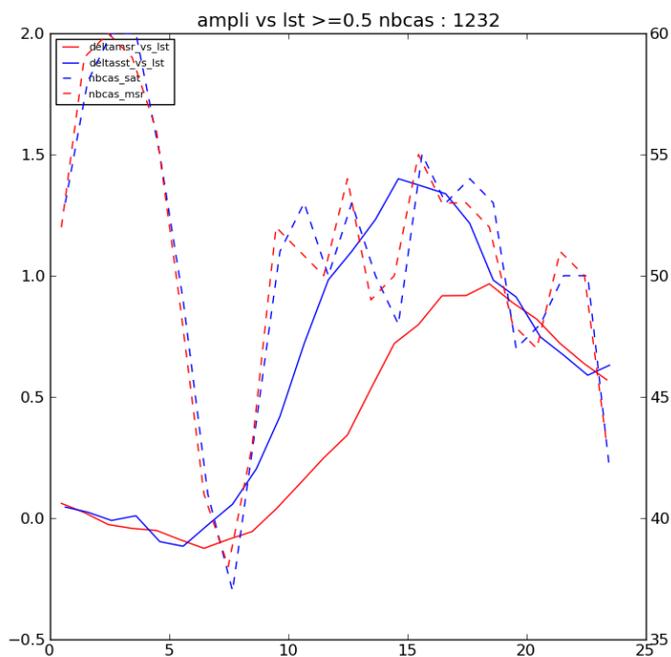
DW max > 1.5



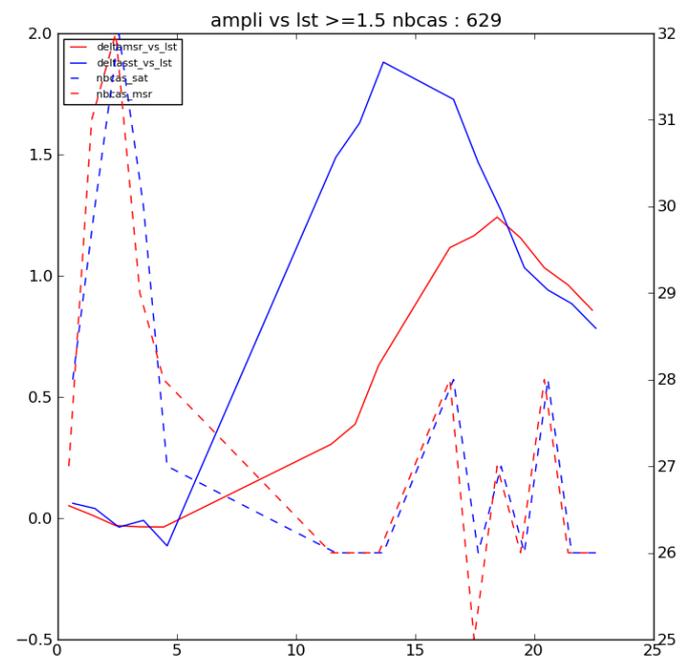
Drifting buoys (August 2012)

SEVIRI vs moored buoy DW estimates

DW max > 0.5

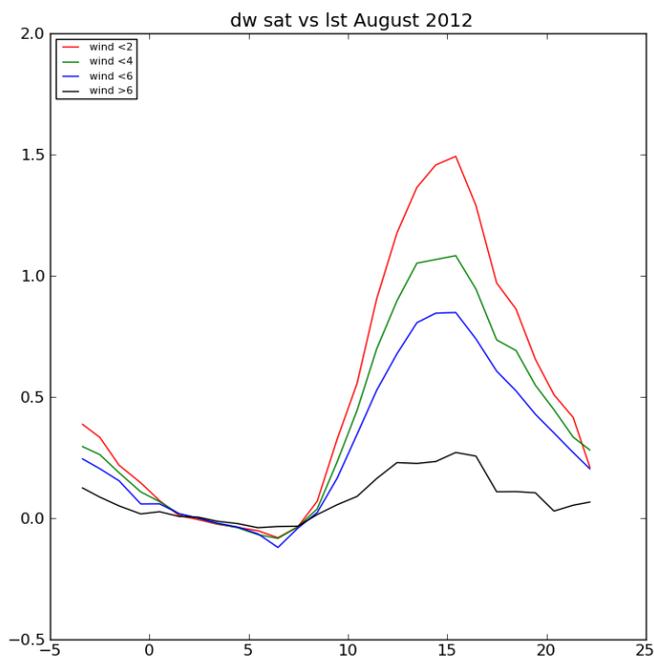


DW max > 1.5

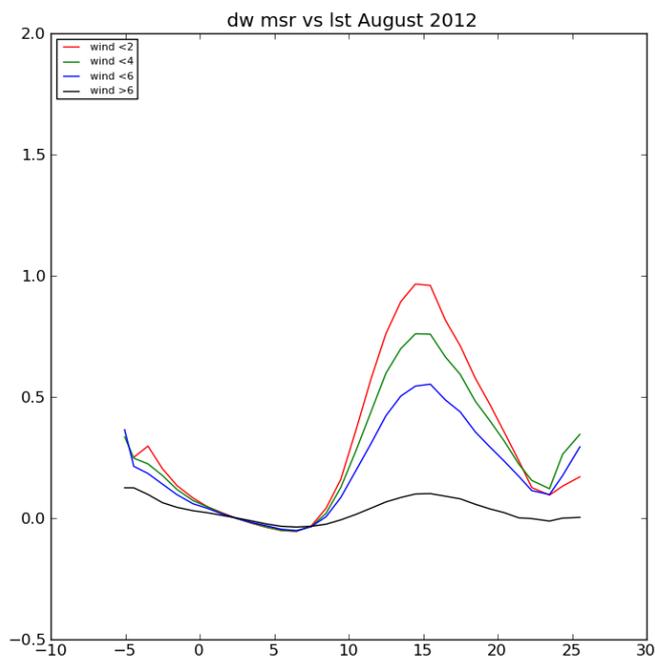


Moored buoys (summer 2012)

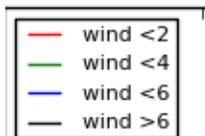
Mean SST DW cycles as a function of wind



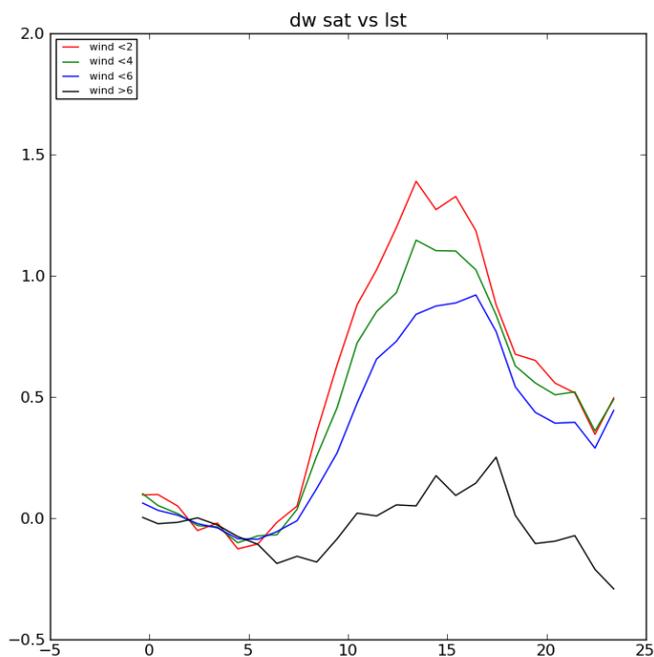
SEVIRI



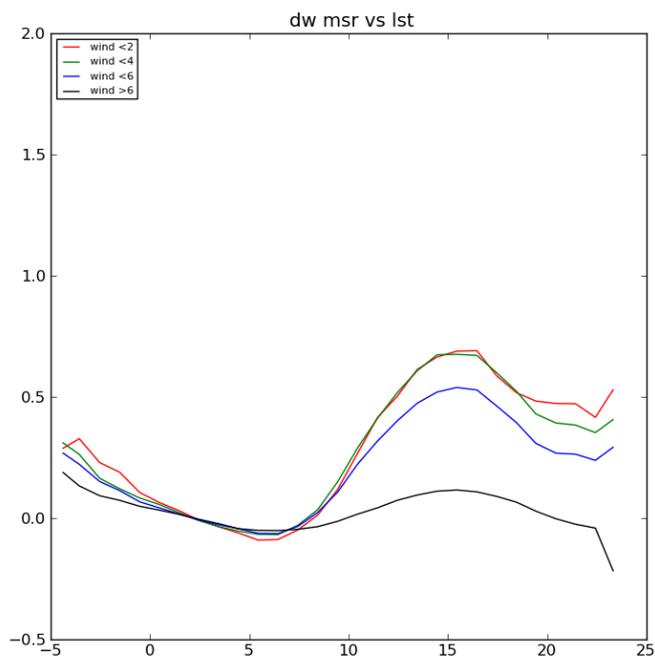
Drifting buoys



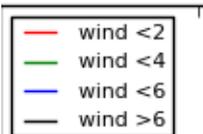
Mean SST DW cycles as a function of wind



SEVIRI



Moored buoys



Permanent daytime diurnal warming (Arctic)

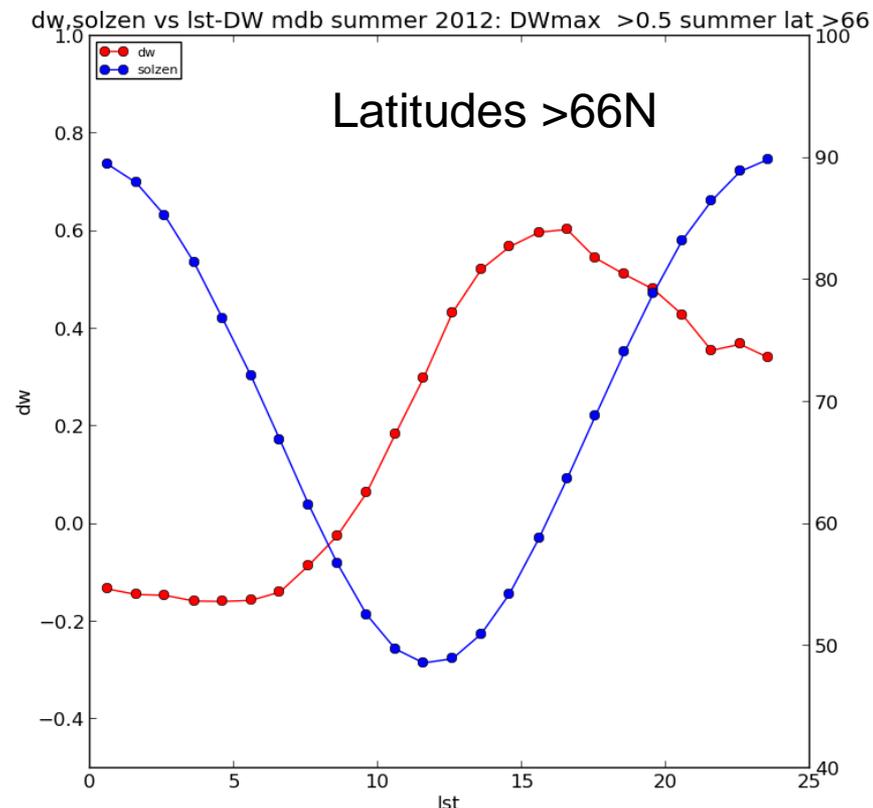
Buoy derived DW (daily max >0.5)

Same method as that
used for SEVIRI
(*Le Borgne et al, RSE, 2011*)

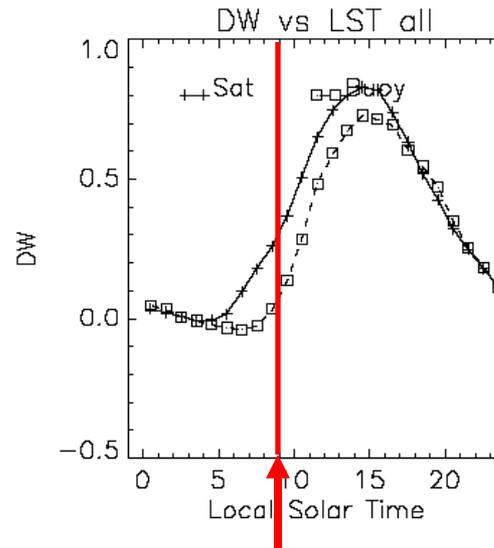
Arctic, Summer 2012

Foundation SST:
mean SST for LST < 10
Or LST > 20

DW=SST-Found. if wind below 8ms-1
Data from the CMS DW dedicated MDB



Conclusion (still many mysteries...)



AATSR, METOP,... Local time

Anyone interested please contact

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