Drifting characteristics of SVP drifters

G. Reverdin, S. Morisset (LOCEAN, CNRS)

L. Marie (LPO, IFREMER)

D. Bourras (LATMOS/MIO, CNRS)

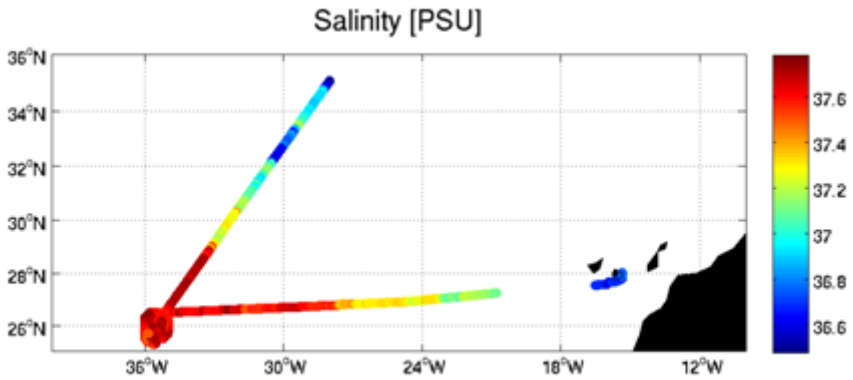
B. Ward (U. Galway, Ireland)

J. Salvador, J. Font (ICM/CSIC, Barcelona)

Strasse cruise 08-09 2013

Strasse cruise 16/08-13/09

- Measure oceanographic (currents, T, S) near-surface variabilityon time scales from hour to week and km to 100 km during stratified season in a region of contrasted properties stirred by eddies,
- With meteorological, air-sea fluxes, to better constrain the surface salinity budget



Phys. Oceanography/air-sea team
G. Reverdin, L. Marié, S. Morisset, D. Bourras, K. Salvador, B. Ward,
G. Sutherland, W. Asher, N. Rascle
N. Geyskens, C. Caudoux, A. G-B
O. Menage, S. Prigent,
F. Le Bars, M. Piedeleu

Comparisons of velocity measurements

4 long stations (3 days duration) with deployments of drifters and other drifting instruments (one profiling (turbulence, T-S), one measuring current profiles 3-60m (launches typically within a 1 km domain) RV Thalassa usually close-by day-time (station work, including ADCP profiles...); nigh-time, scanfish surveys (usually within 10 km of drifters)

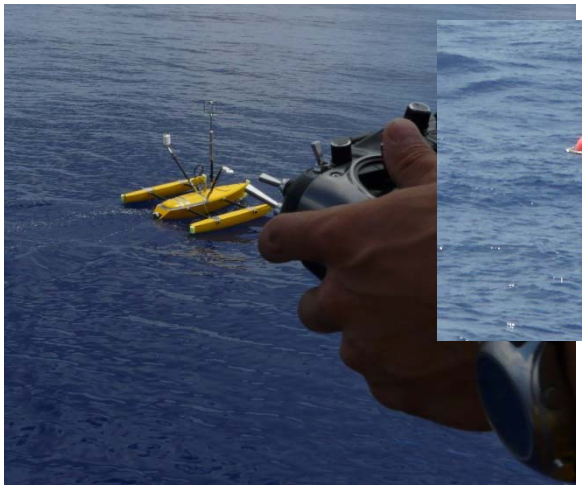
How compatible are the different instruments to map the currents (for example, at 15-m depth)?

SVP drifters (R> 40) drift//currents of < 0.5 cm/s (winds 7 m/s) (Niiler et al., 1995)

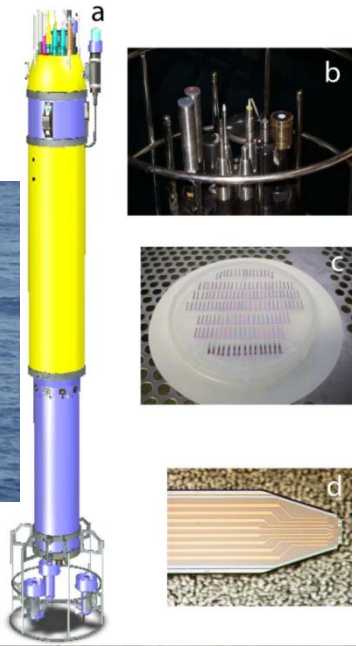
Autonomous drifting instrumentation

- Ocarina Trefle ASIP drifters SVP (-S)

Flux trimaran
7 hours

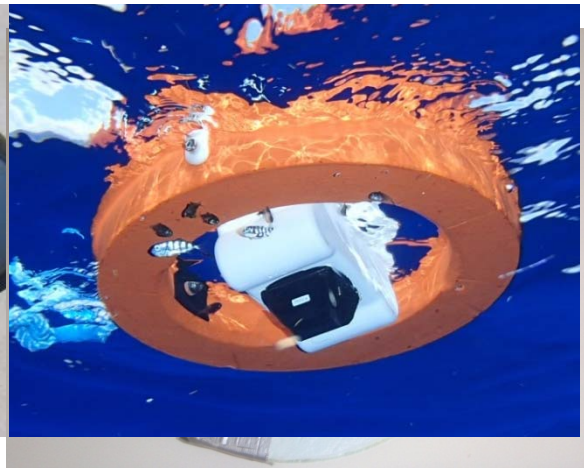


SVP-drifter (50m)
With platform
Waves + ADCP



5 mini-SVP
(Technocean)
+ 5 surpact
1 SVP-BS PacificGyre
1 SVP-S ICM/CSIC

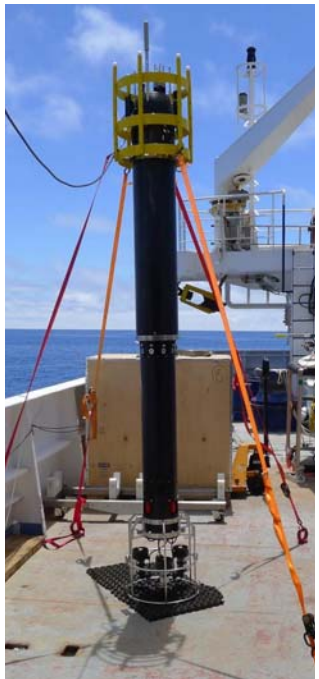
Supact measures
CT, wave spectrum
(wind)

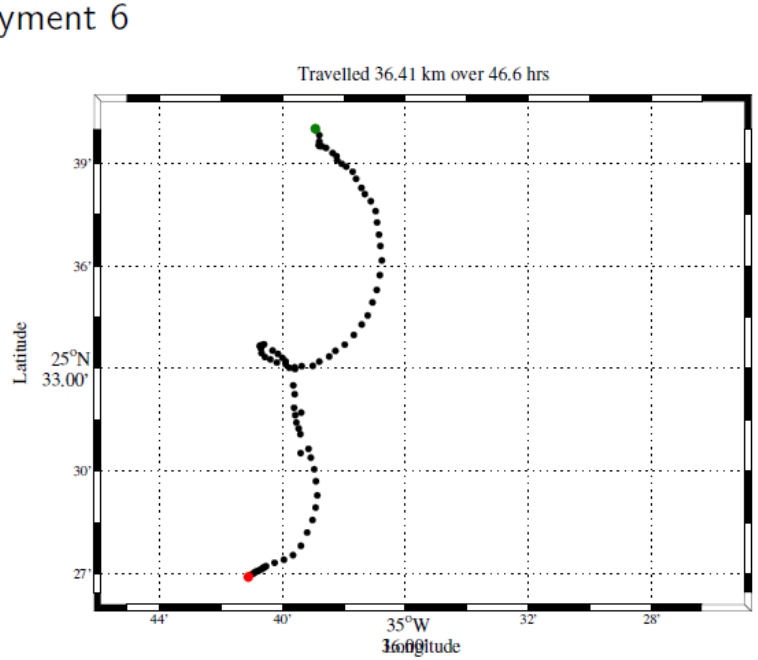


ASIP (9 deployments) B. Ward U. Galway (5-9 with 3-s gps positioning at surface)

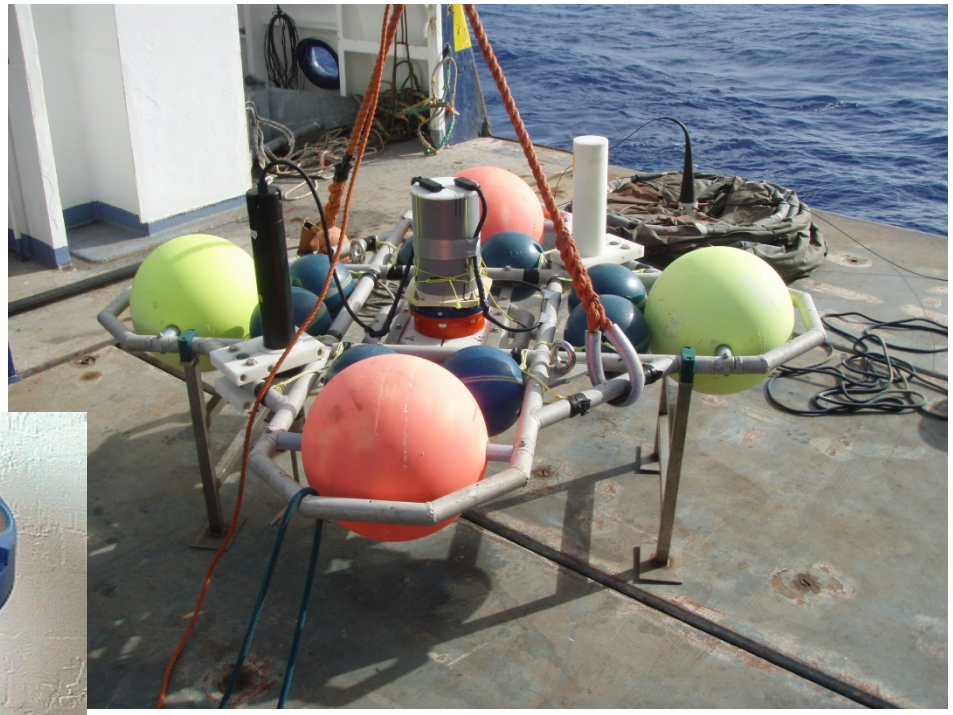
Stays at the surface between dives (typically, 15-20 minutes surface (2-m) and 8-9 minutes for a dive; except on the 9th)

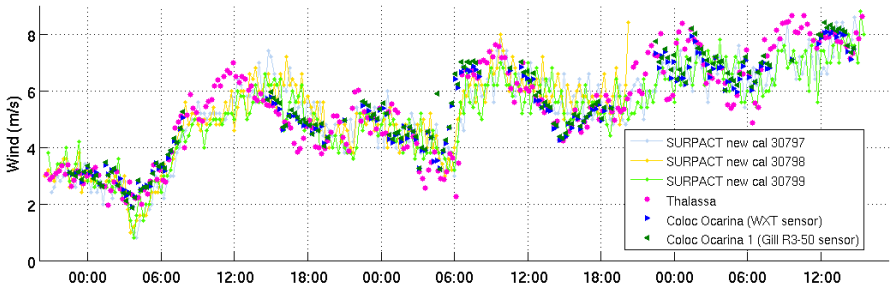
relative velocity downwind with respect to SVP drifters

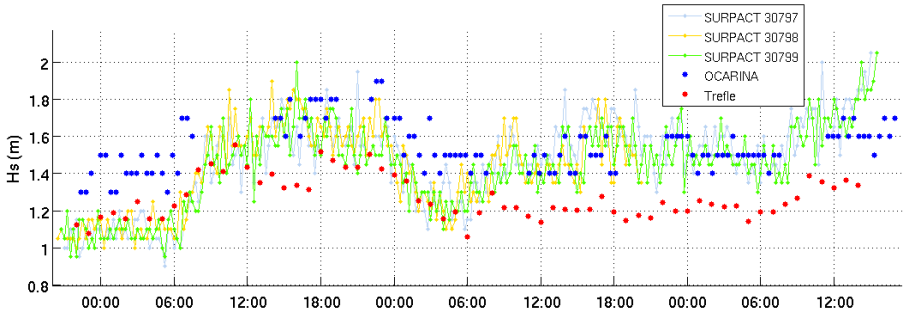


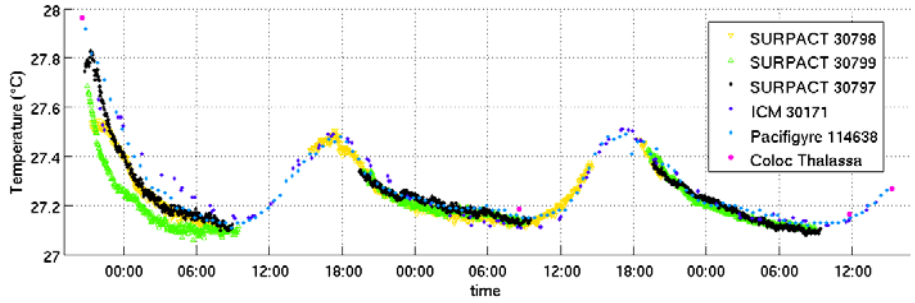


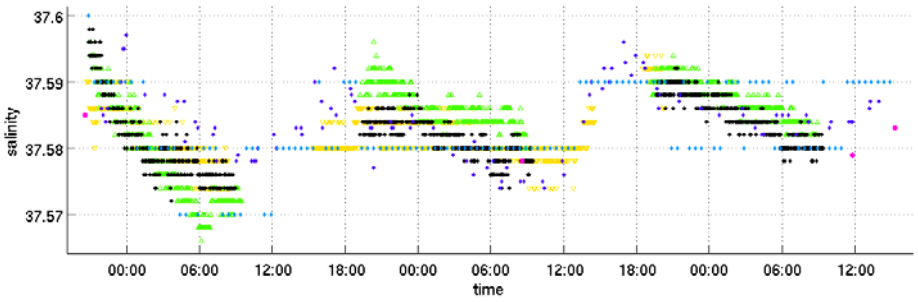
Trefle (L. Marie LPO)
attached to SVP (50m)

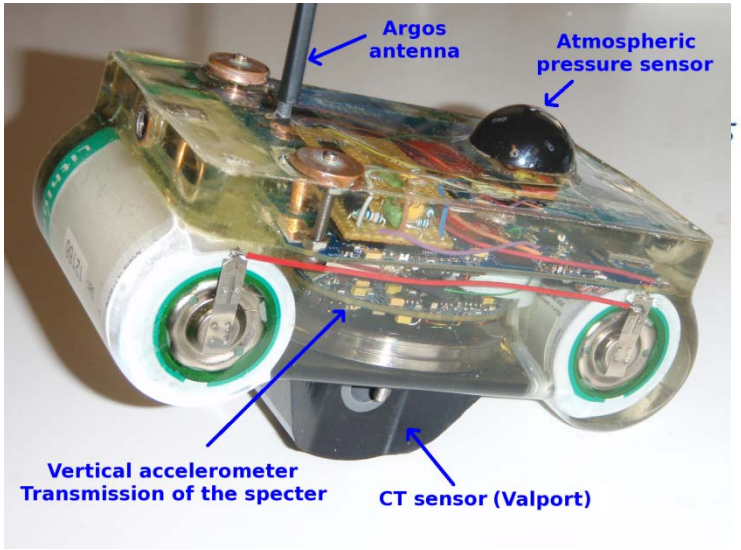












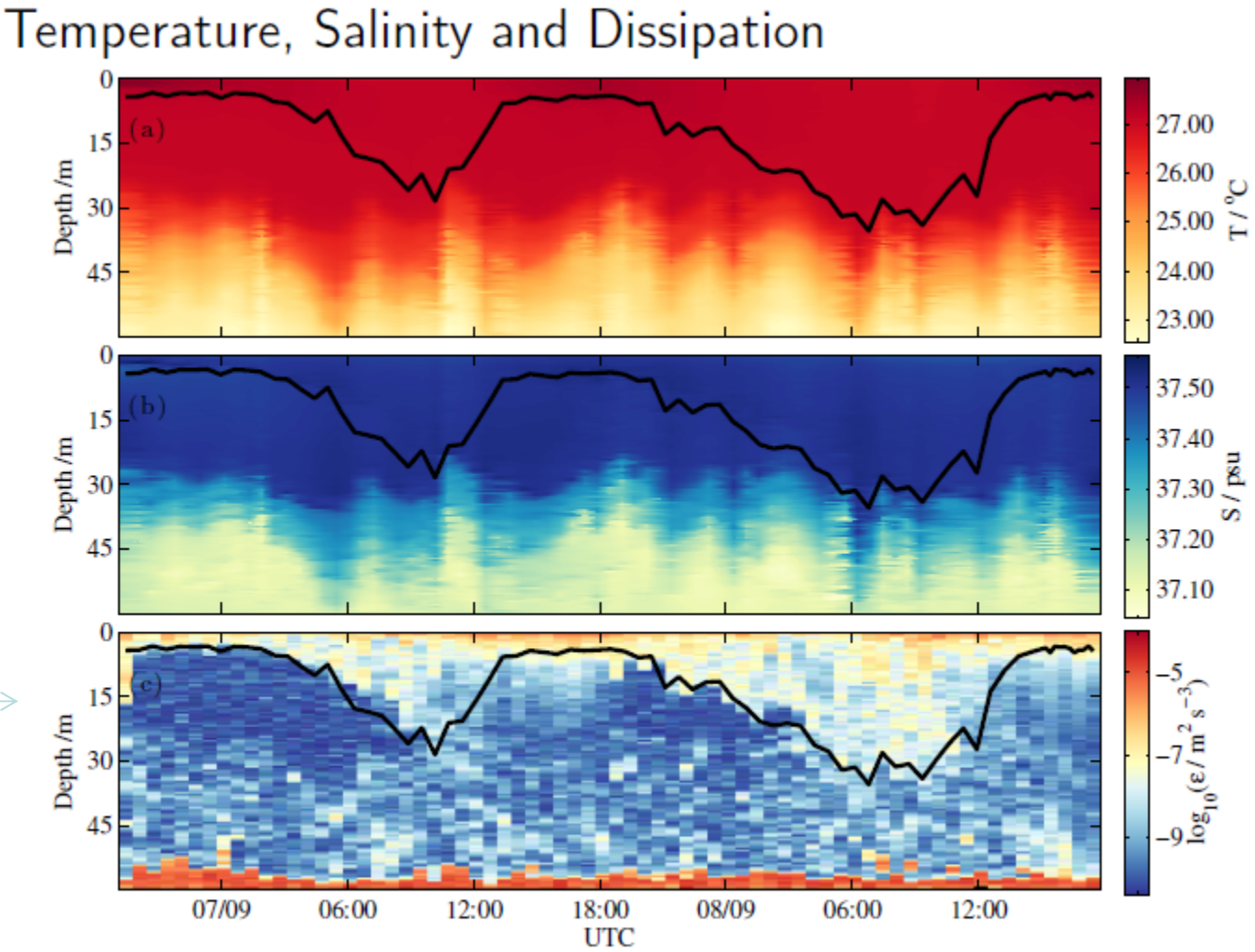
Surpact Simon Morisset
Site 4 with little hor. Gradients
(0.02 psu over 15 km)
Diurnal cycle in SSS &

Wind direction ~constant
(also seen on site 3)

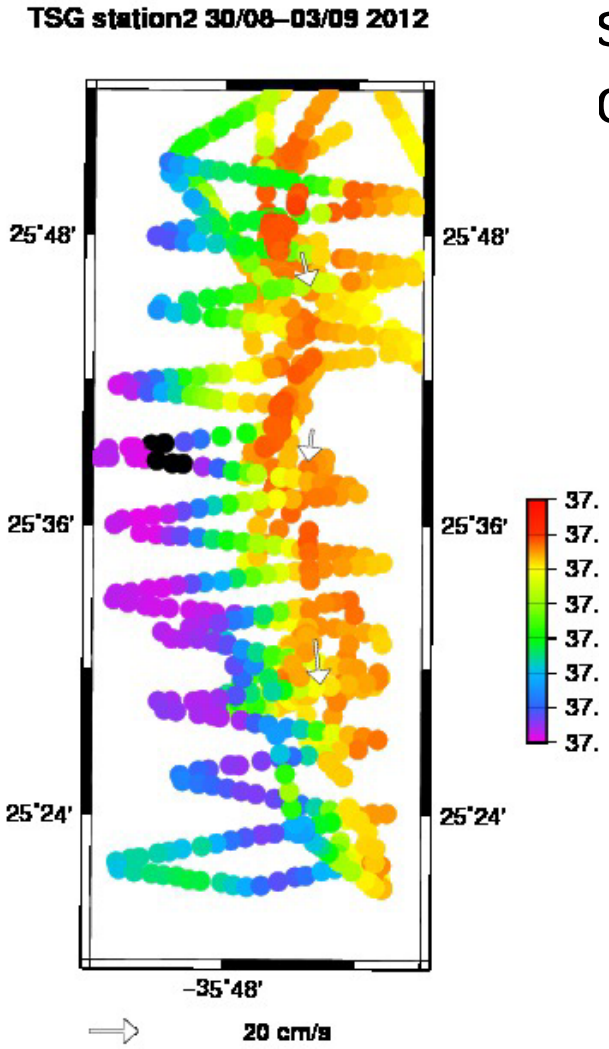
Wind Sites 2, 3, 4:
Range: mostly 4-8 m/s

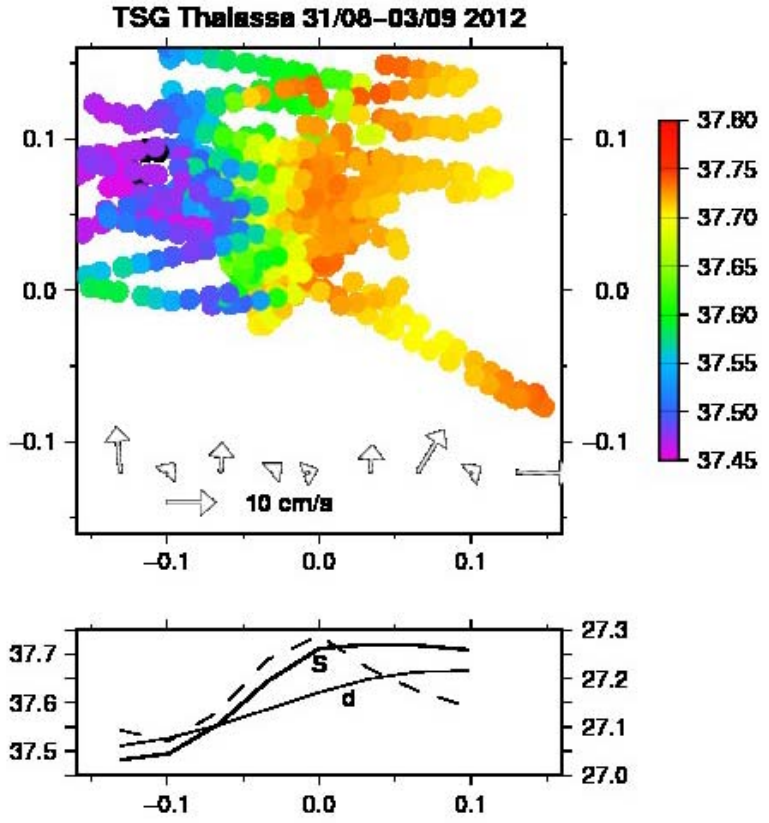
ASIP Deployment 7 (site 4)

15m often in stratified, not-turbulent layer

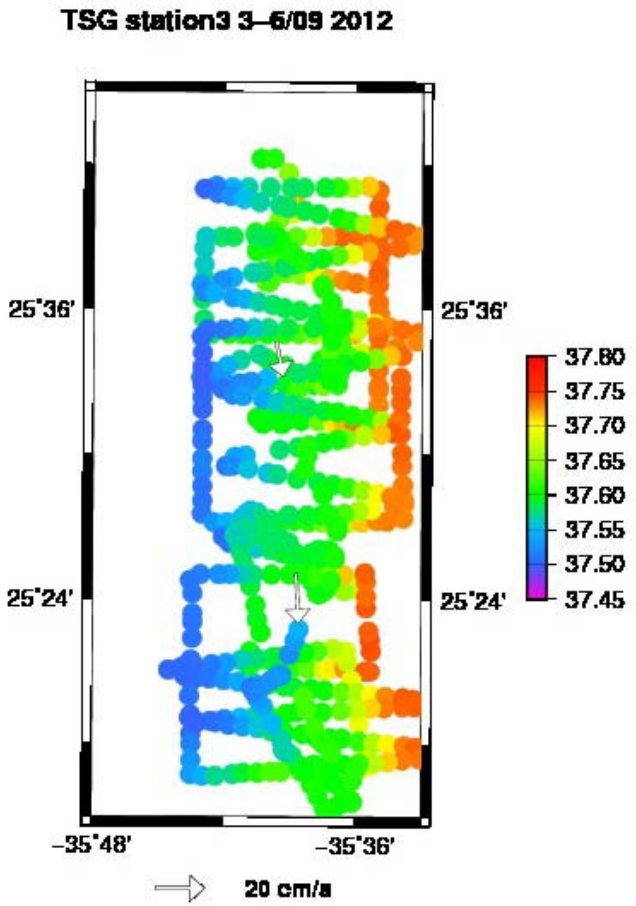


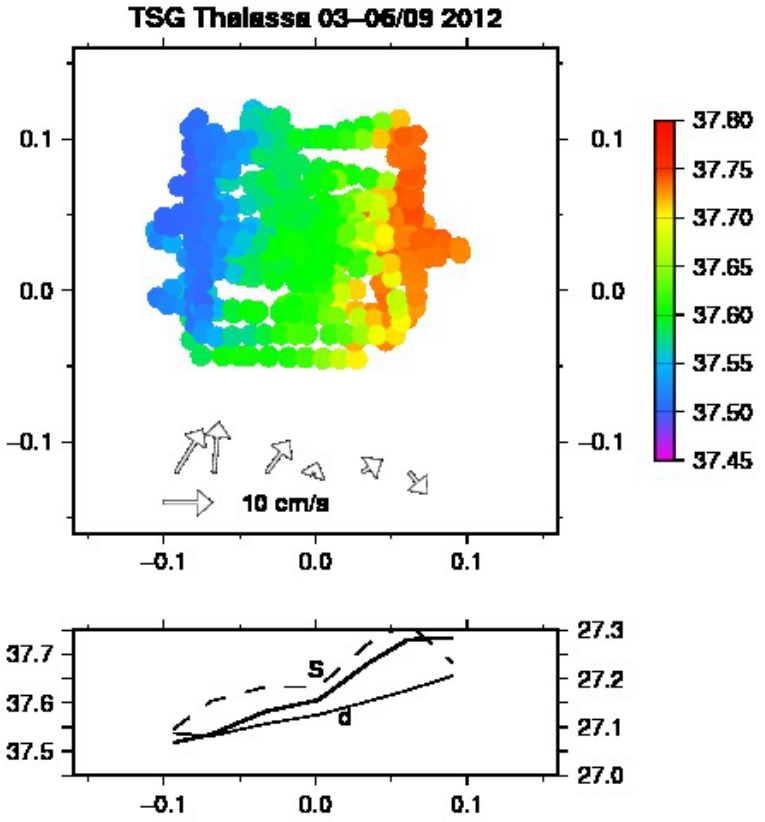
Site 2 in filament drifting quickly southward. Drifters near sharp west edge of filament in current maximum



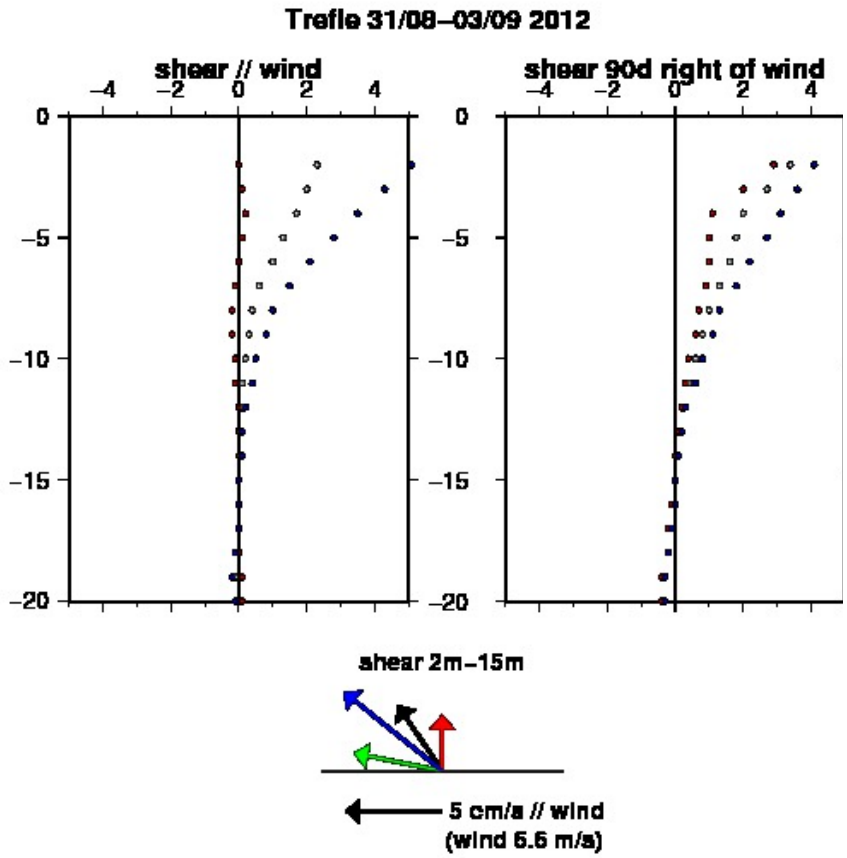


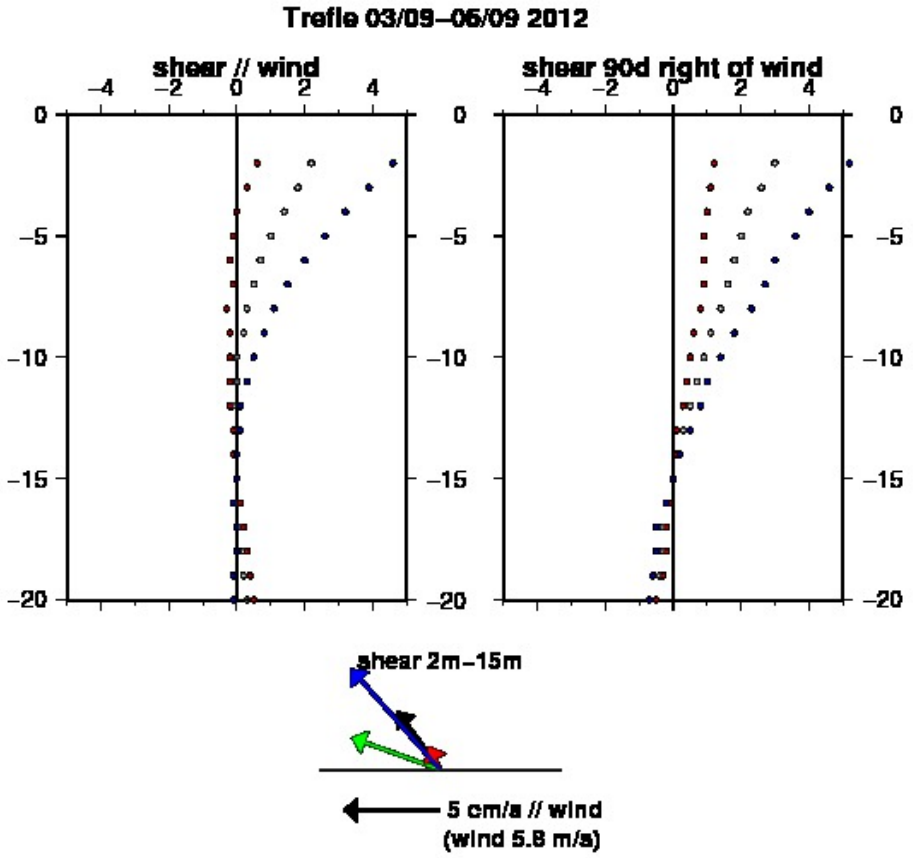
Site 3 in the gradient to the west of filament, moving quickly southward: sheared environment



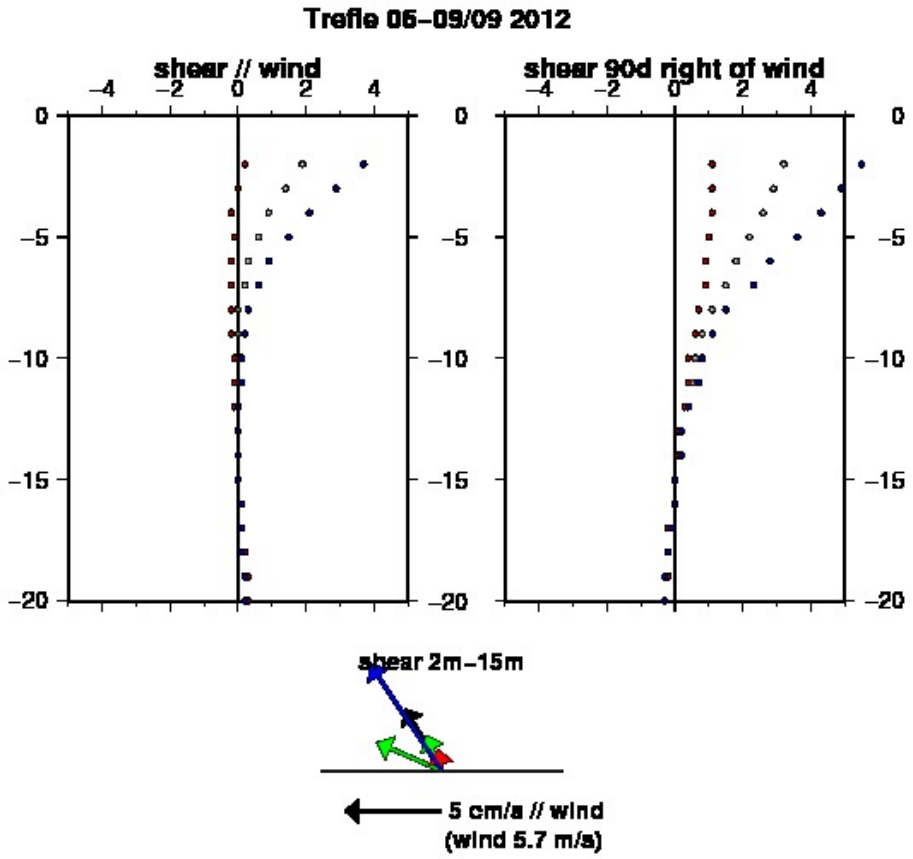


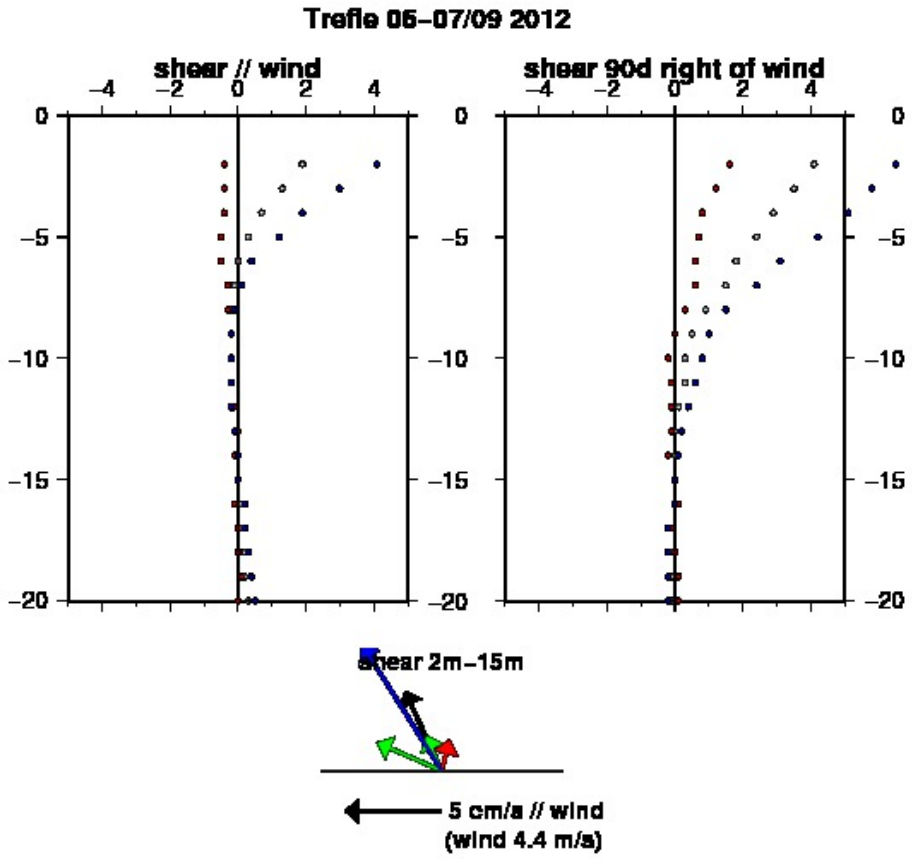
Profiles of shear (relative to 15-m currents)
Site 3 with a little larger shar near 15-m



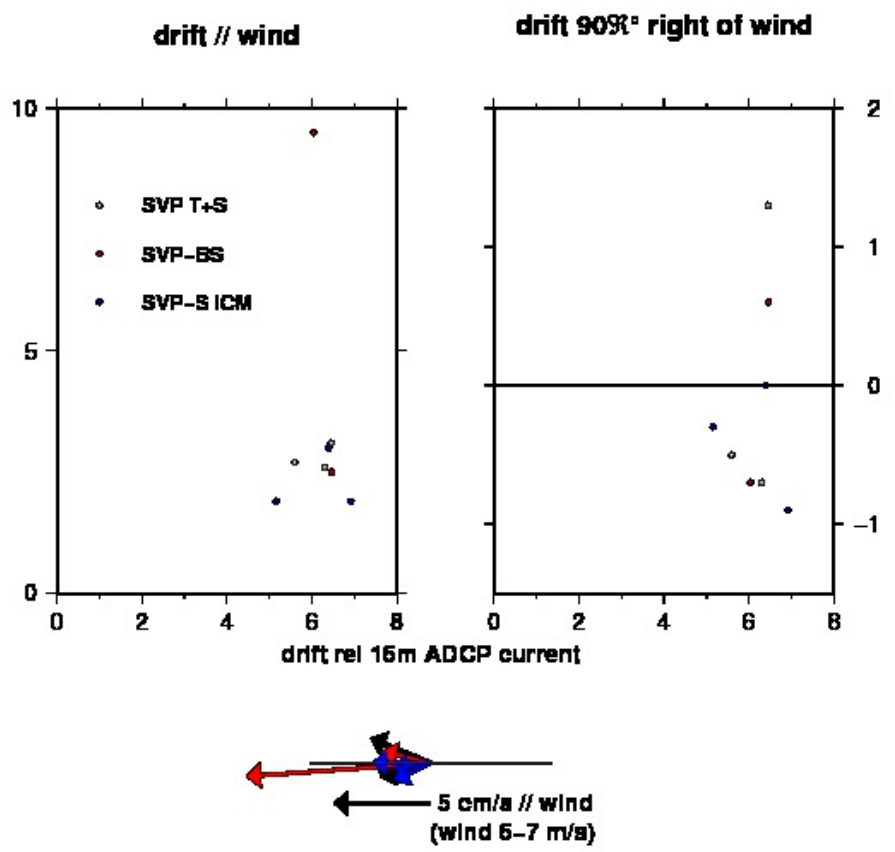


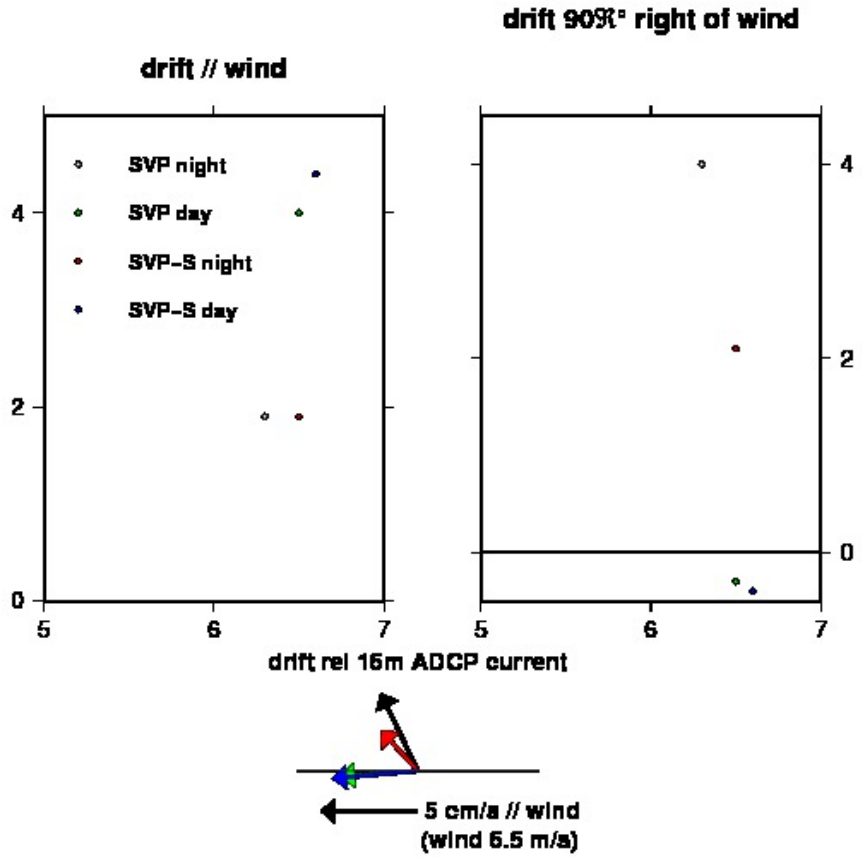
Green ASIP//SVP drifters


Trefle 06-09/09 2012
shear // wind
shear 90d right of wind
−4
−2
0
2
4
0
−5
−10
−15
−20
shear 2m−15m
5 cm/s // wind
(wind 5.7 m/s)


Trefle 06-07/09 2012
shear // wind
shear 90d right of wind
−4
−2
0
2
4
0
−5
−10
−15
−20
shear 2m−15m
5 cm/s // wind
(wind 4.4 m/s)

Drifters/ ship ADCP





Conclusions & Perspectives

- Down-wind drift of all the drifters/floats relative to Eulerian mean velocities at 15-m, including the SVP-BS, SVP-S drifters (at least 2-3 cm/s for 6.5 m/s winds)
- Large daily cycle of shear in upper layer, with shear orthogonal to wind direction left at night. Why? (check on smaller time intervals)? But indications of relative velocity of drifters also with this cycle...
- Is there an influence of convergence features, either at 15m or on surface elements (as for ASIP? Surpact influence on SVP drifters? SVP-S or SVP-BS drifters?)