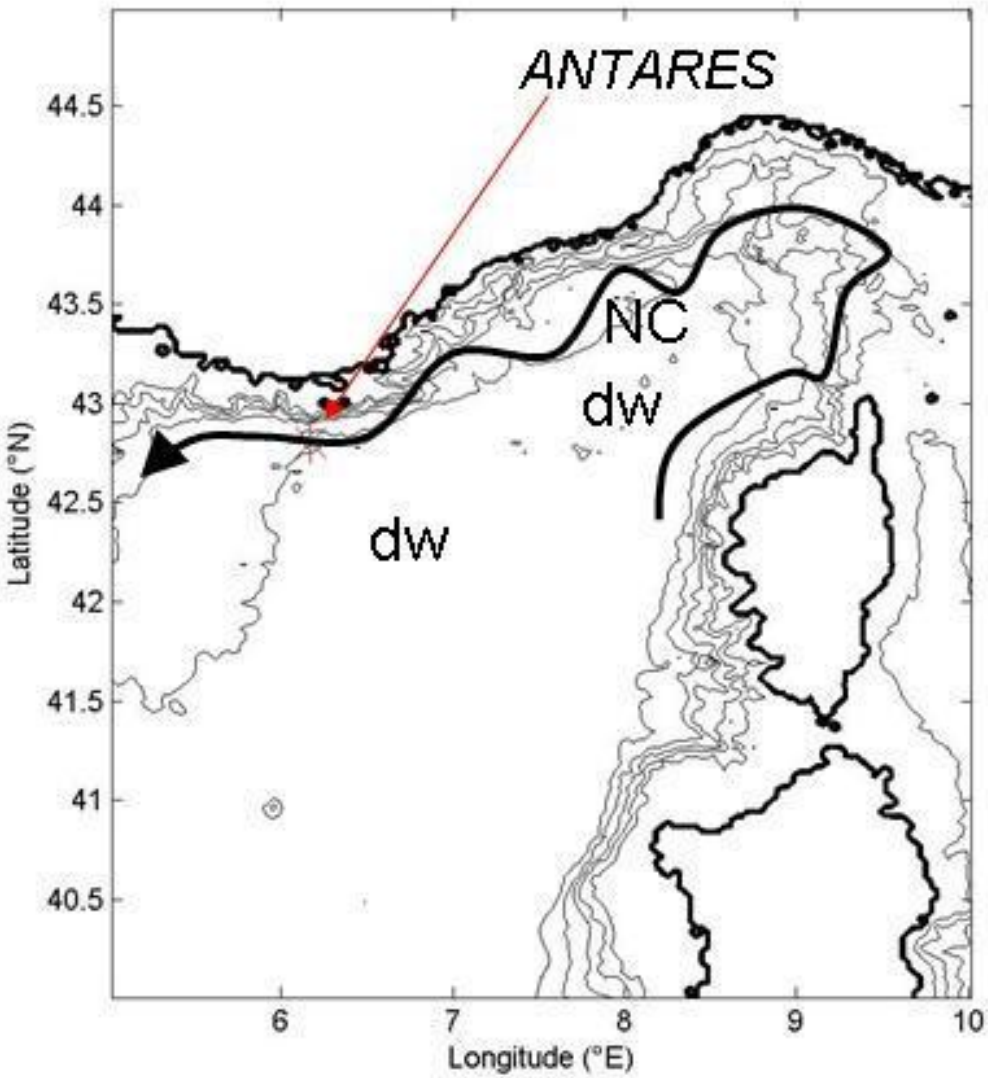
Royal Netherlands Institute for Sea Research

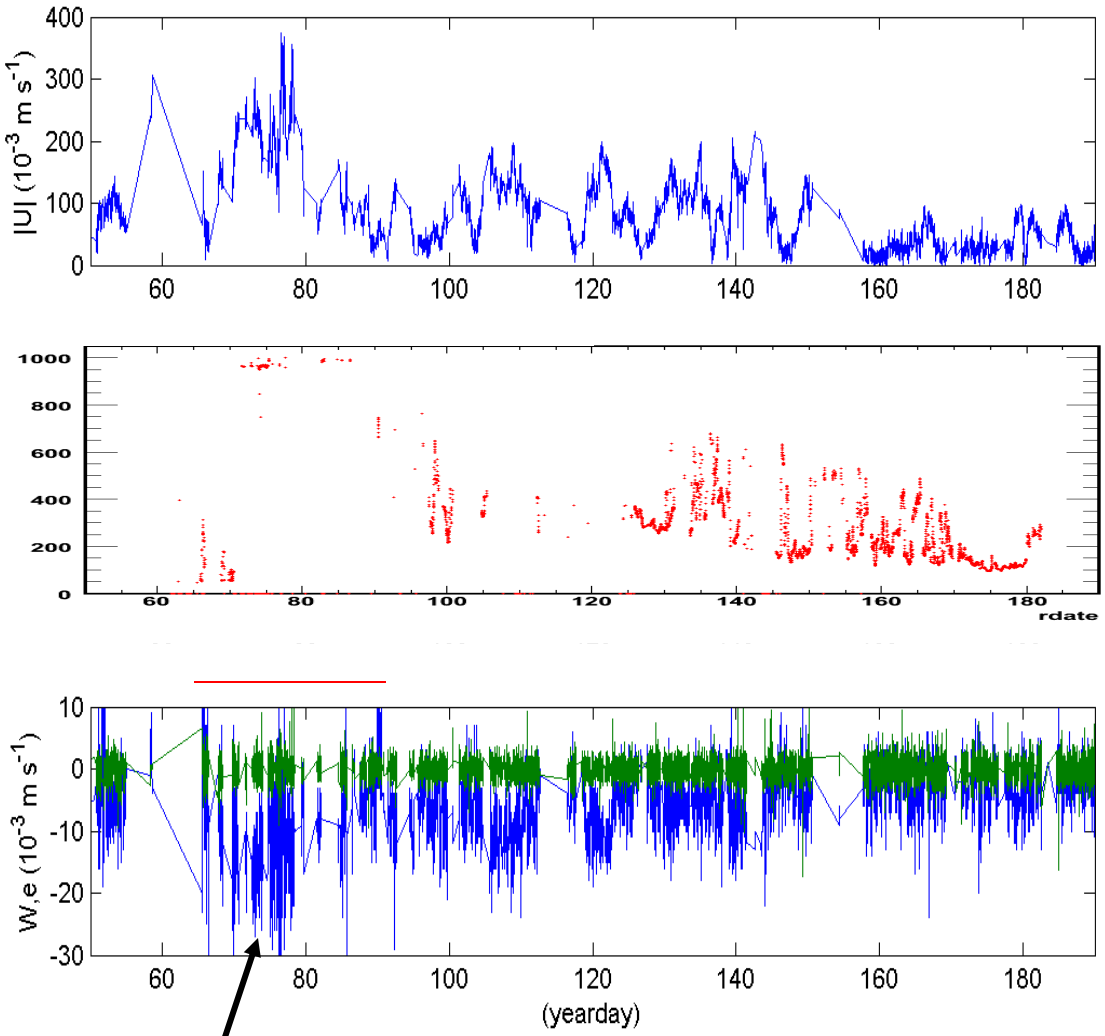
Measurements of currents

(from the deep Mediterranean Sea)

Hans van Haren


ANTARES
NC
dw
dw
44.5
44
43.5
43
42.5
42
41.5
41
40.5
Latitude (°N)
6
7
8
9
10
Longitude (°E)

ANTARES baseline and acoustic data: 2006



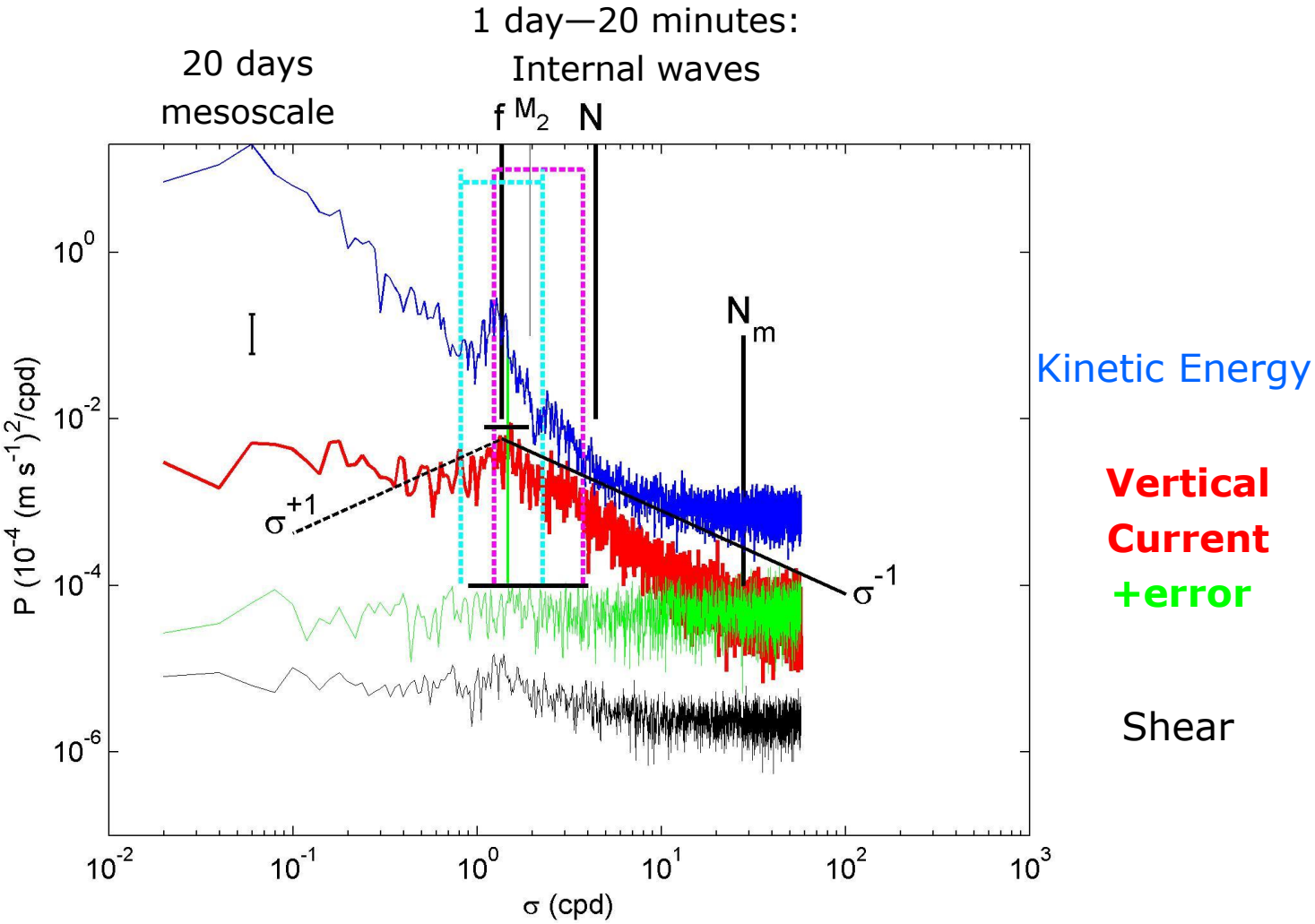
Current Amplitude 0.35 m/s max

Baseline+ Echo Amplitude

(Error) Vertical current

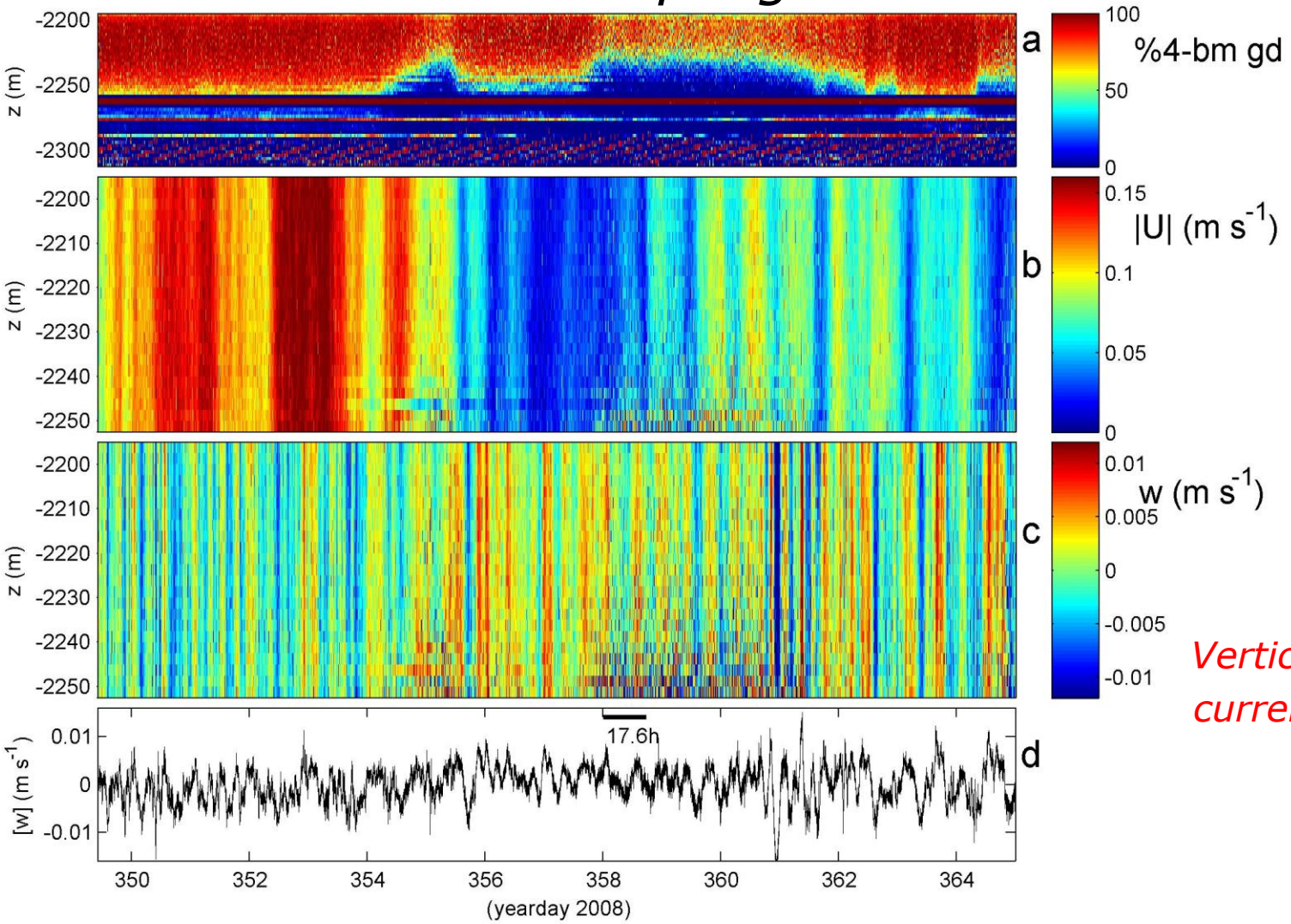
0.01 m/s ~ 1000 m/day

Large downward currents (W)!



f inertial frequency
N buoyancy frequency
M_2 semidiurnal tidal frequency

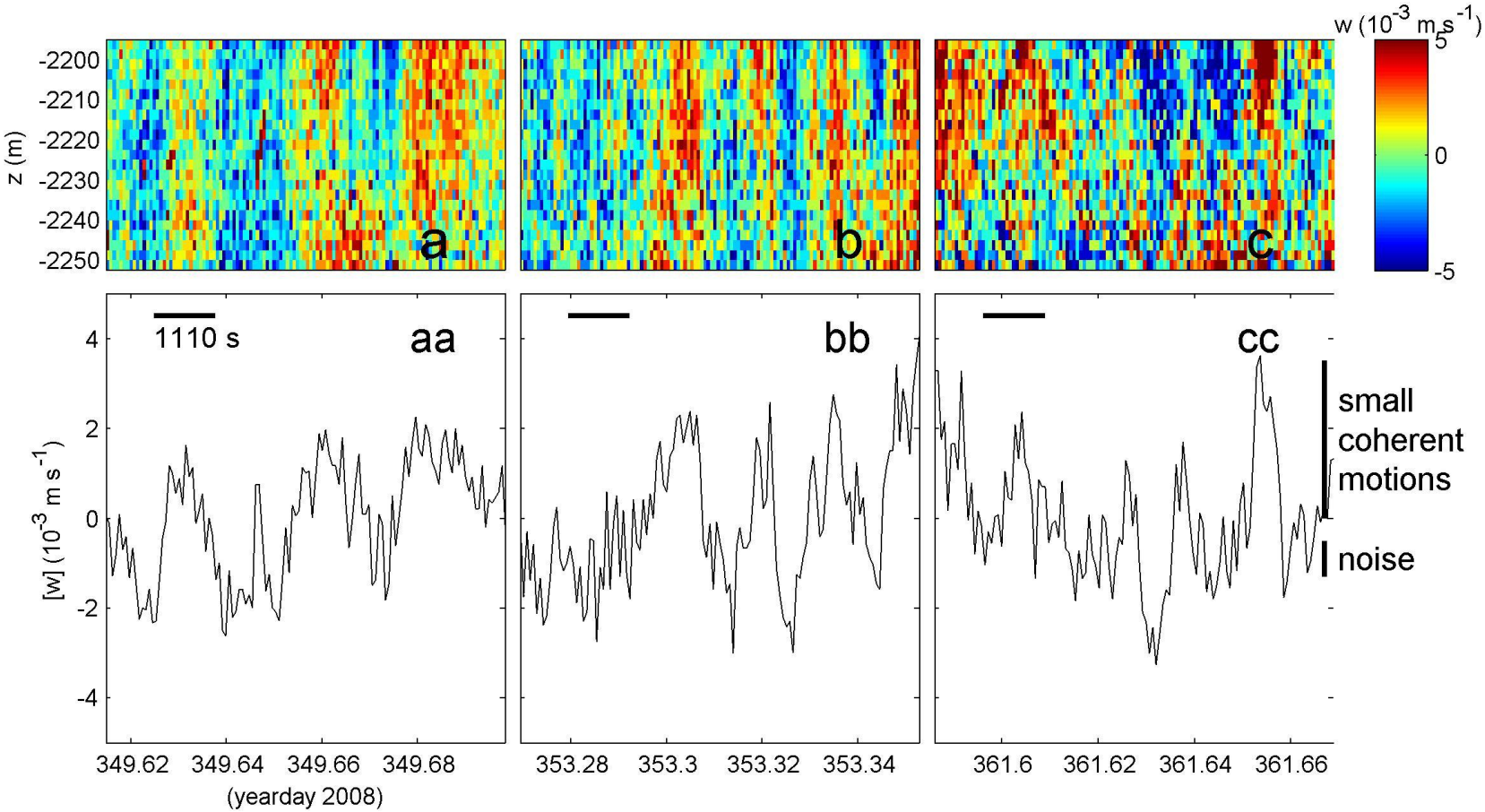
Some detailed Antares observations:
1 minute sampling rate



Vertical current

Some detailed Antares observations

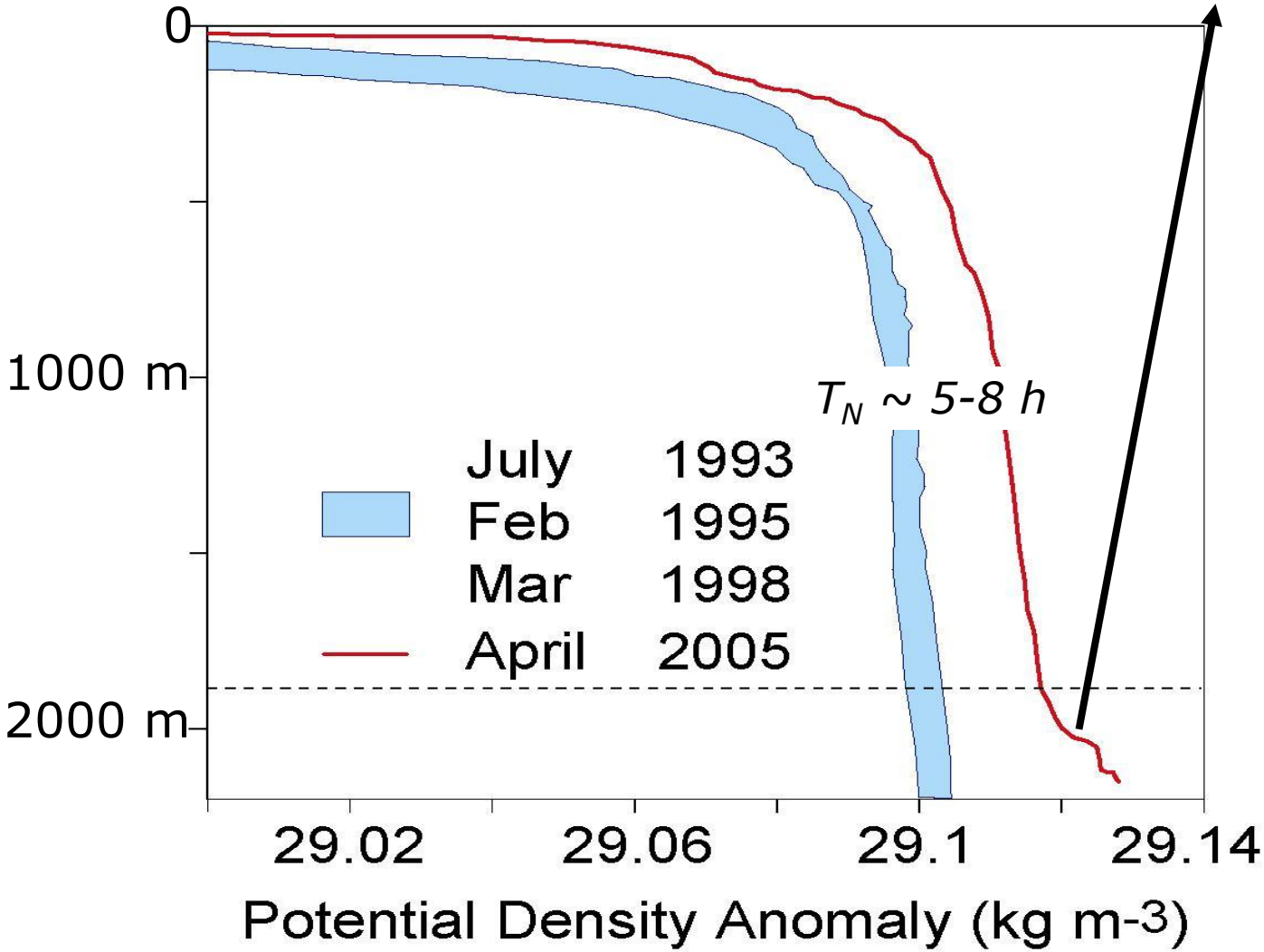
Vertical current



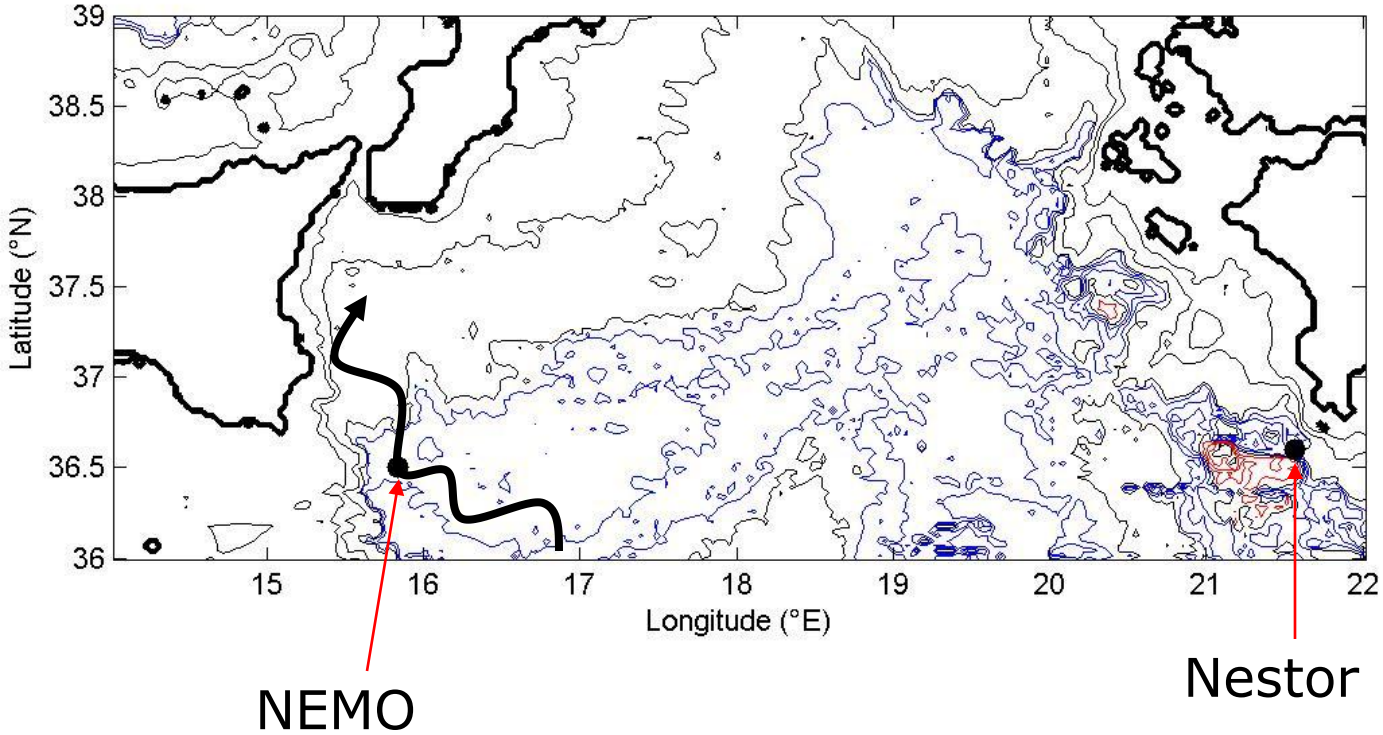
Very high frequency internal waves (<1 hour)

→ "strong" stratification

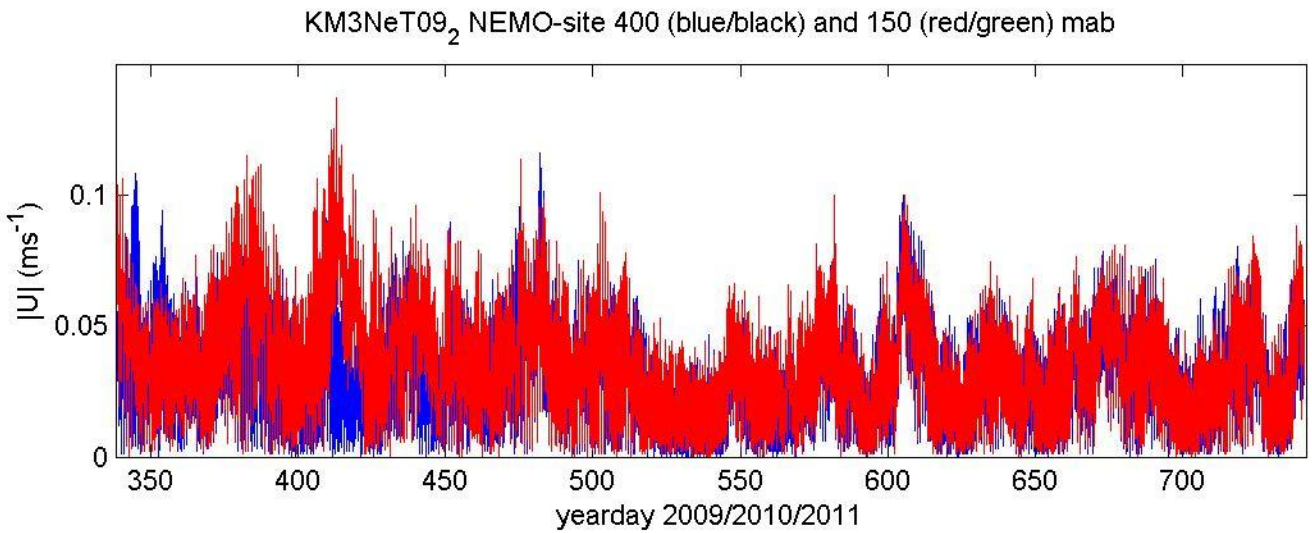
"New" water stratification; T_N ~ 1 hour



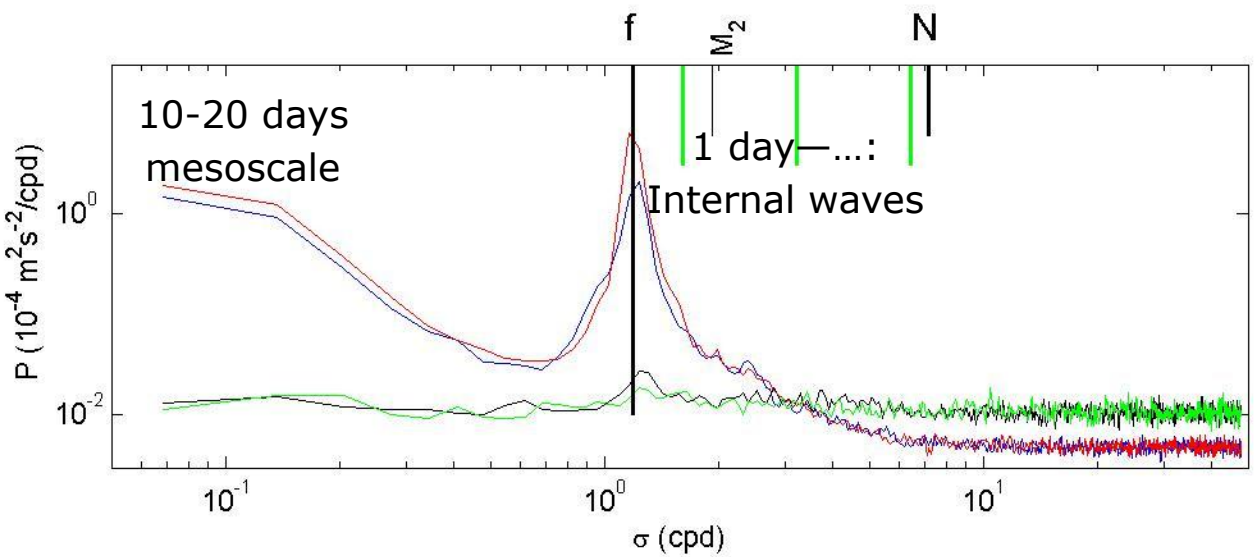
Current measurements Ionian Sea



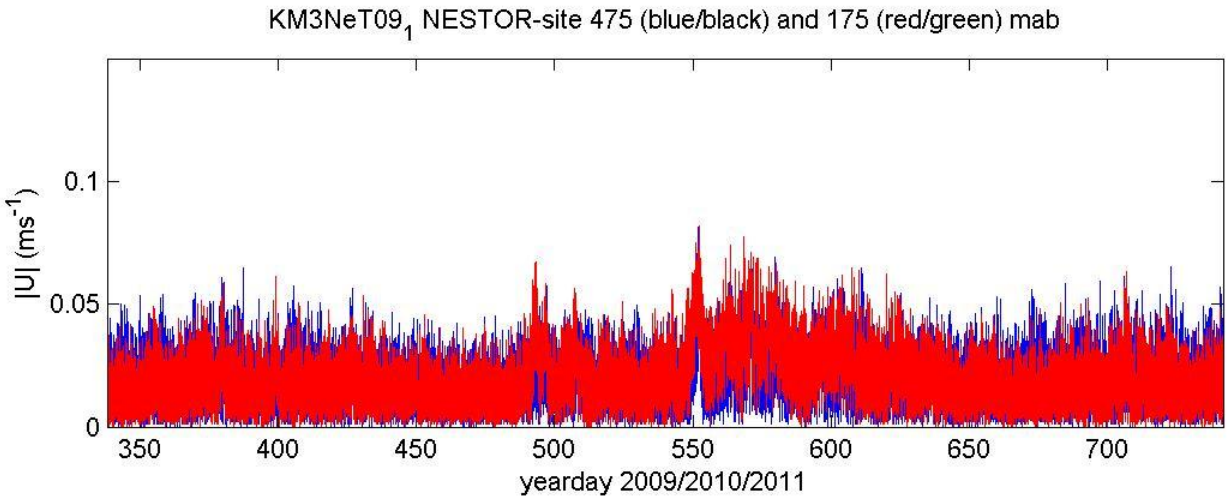
Current amplitude time series



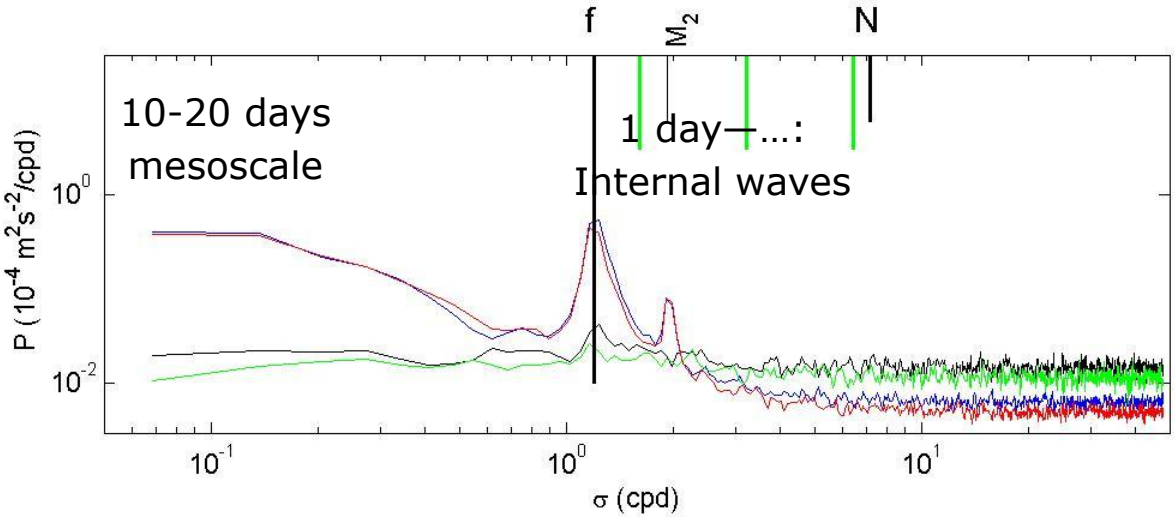
NEMO:
0.14 m/s max
More intense
near-bottom



Rotation earth
(inertial)
and mesoscale

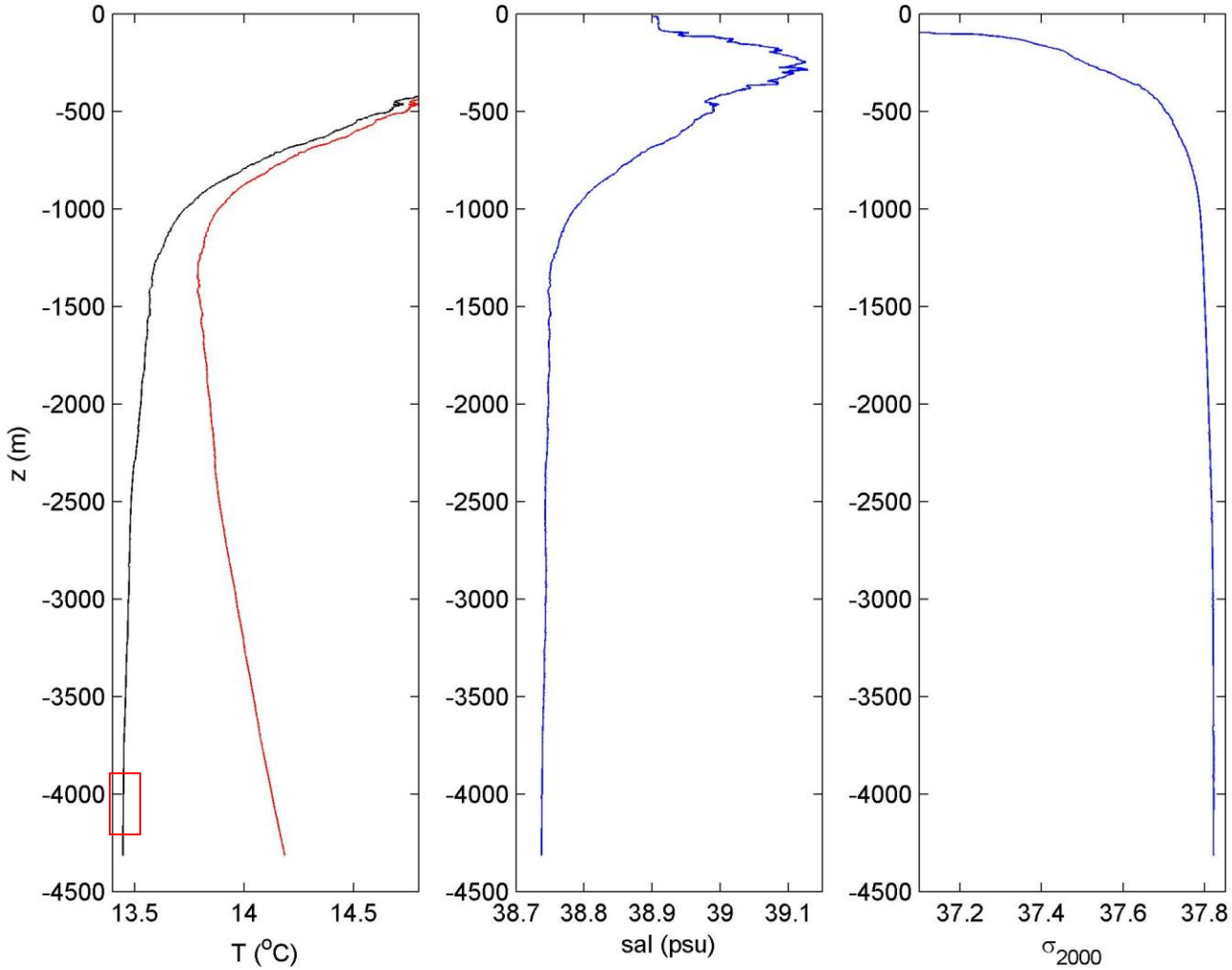


NESTOR (Pylos, Greece): 0.08 m/s max

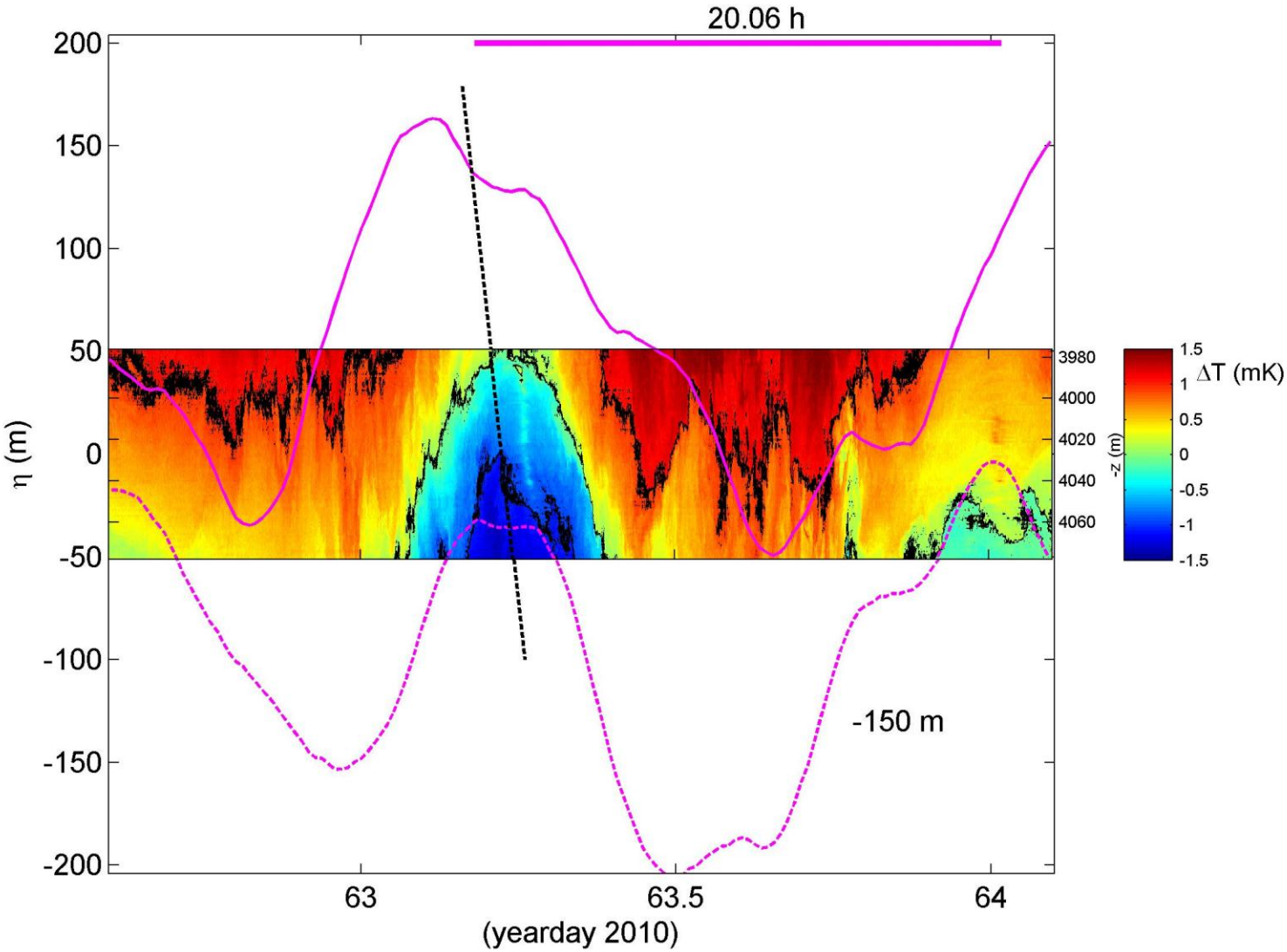


Rotation earth (inertial+weak tide) and mesoscale

CTD-hydrography



1.5 days 1-Hz sampling 100 temperature sensors total 0.003°C range



Conclusions

-Mediterranean Sea currents dominated by inertial and mesoscale motions

-High-frequency (few hours periods) internal waves

-Up- and down motions over 100 m vertically

-Associated turbulence

The end