

Assessing sub meso-scale activity in the Algerian Basin using glider data

Role in the horizontal water mass distribution

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Outline

- 1 Introduction
- 2 Method of identification of LIW
- 3 Mean state of LIW from 1960 to 2018
- 4 Sub-mesoscale structures observed by gliders

Introduction

There are 4 main water masses in western Mediterranean. Focus on **LIW**
⇒ Warm and salty water mass (300-700m).
Spread ⇒ cyclonic along coast

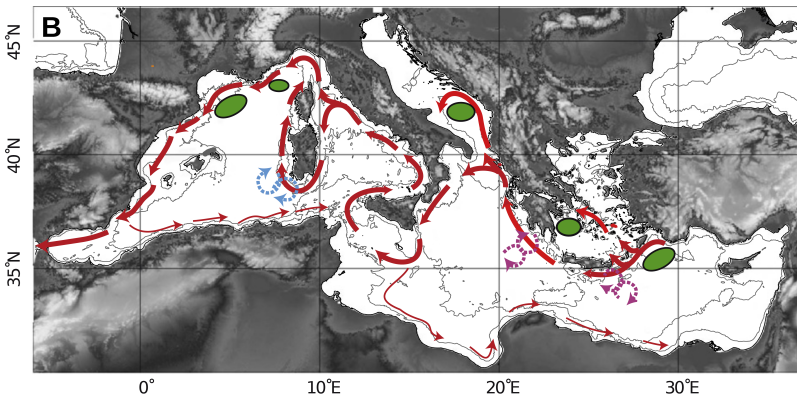


FIGURE – Intermediate water mass circulation in the Mediterranean sea

[Durrieu de Madron et al., 2011]



Introduction

2nd important characteristic : Isobaric and profiling floats drifting at 600 and 1200-2000 dbar \Rightarrow 2 cyclonic loops following f/H contours [Testor *et al.*, 2005]
Escudier *et al.*, [2016], showed pattern of anticyclonic eddies follow these loops.

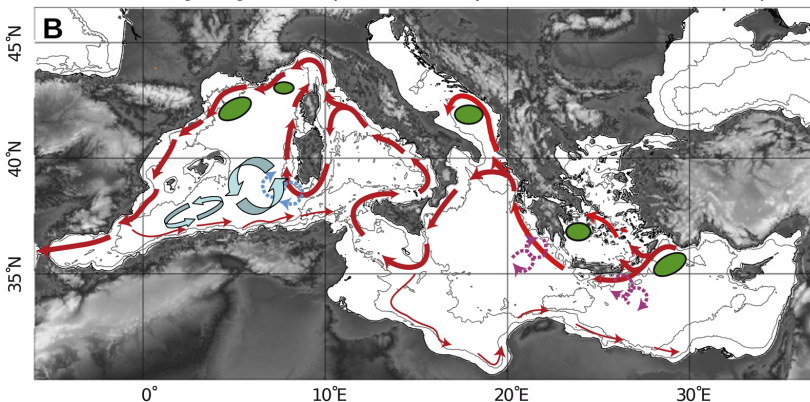


FIGURE – Intermediate circulation with Algerin gyres indicated.

Identification of LIW

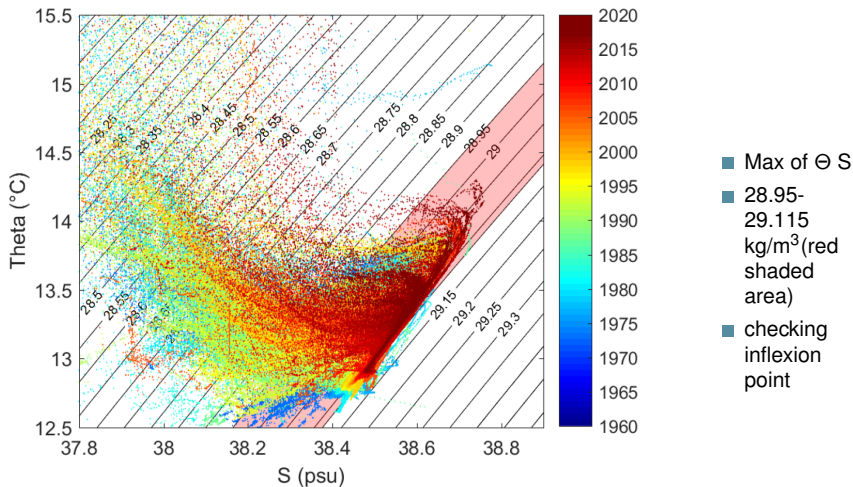
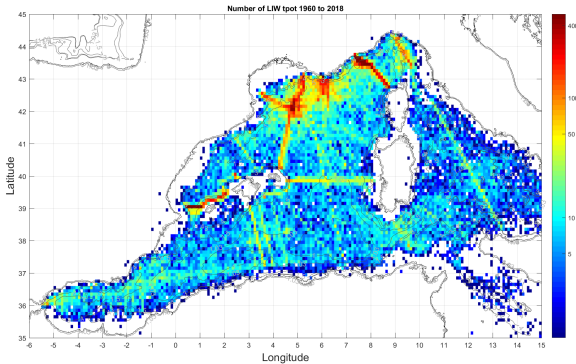


FIGURE – Sample of Θ -S Diagrams in the western Mediterranean sea

Description of data



Data sources

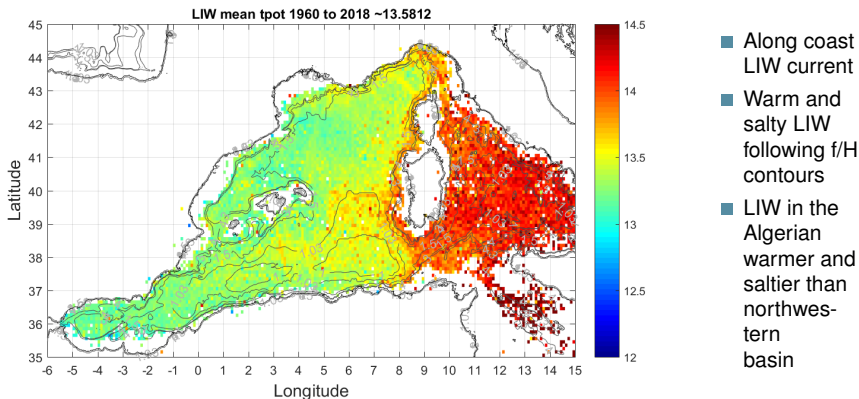
- Medar/Medatlas dataset,
- World Ocean Database,
- CORIOLIS data
- MOOSE and SOCIB websites
- ...

Data platforms

- Ship,
- XBT, MBT,
- Floats
- **Gliders**



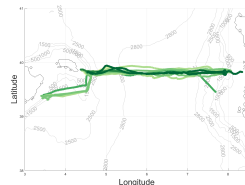
LIW mean state from 60 years of data



Description of data (gliders)

Minorca - Sardinia transects

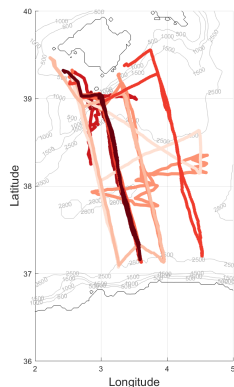
Mission name	date start	number of days	number of casts
Sardegna-Oct2012	23.10.2012	8	48
Sardegna-Jan2013	31.01.2013	30	446
Sardegna-Oct2013	15.10.2013	30	675
SMART2-Apr2017	06.04.2017	21	356
SMART2-Nov2017	02.11.2017	16	210
SMART3-Apr2018	23.04.2018	30	298



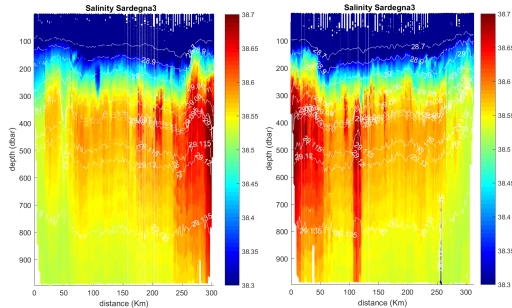
Lightest color : oldest mission
darkest color : most recent mission

Description of data (gliders)

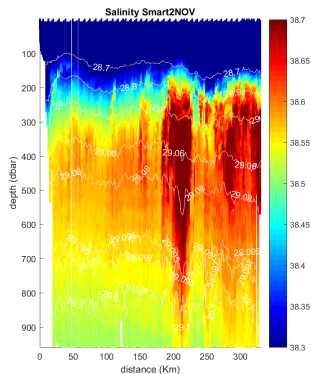
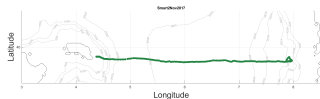
Mallorca - Algiers			
Mission name	date start	number of days	number of casts
ABACUS1-Sep2014	15.09.2014	30	338
ABACUS1-Nov2014	18.11.2014	30	425
ABACUS2-Oct2015	19.10.2015	30	1156
Algbasin-May2016	25.05.2016	9	876
ABACUS3-Nov2016	04.11.2016	30	906
ALNITAK-Jun2017	26.06.2017	17	1298
ABACUS4-Nov2017	15.11.2017	29	843
ABACUS4-Mai2018	15.05.2018	24	501



Glider sections (examples)

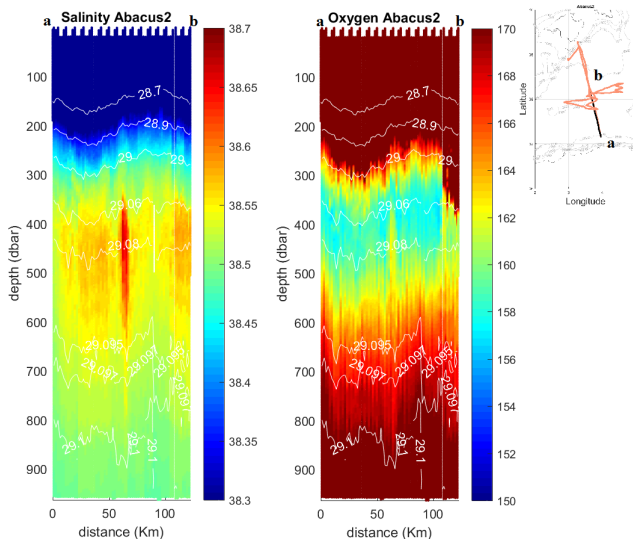


Glider sections (examples)

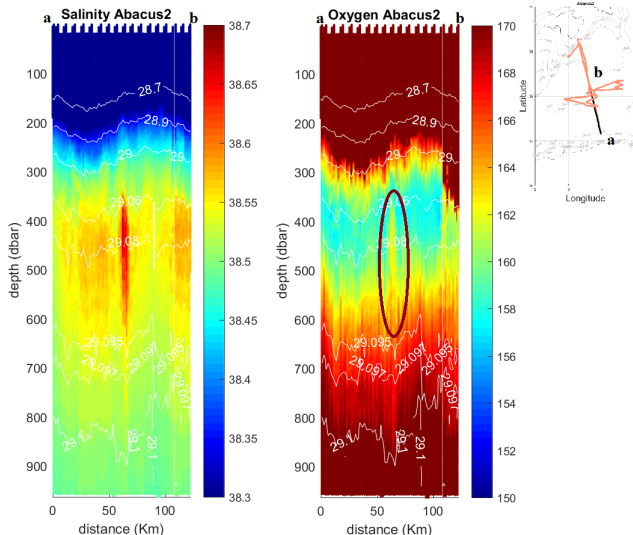


- Heterogeneous characteristics
- patchy transport

Glider sections (examples)

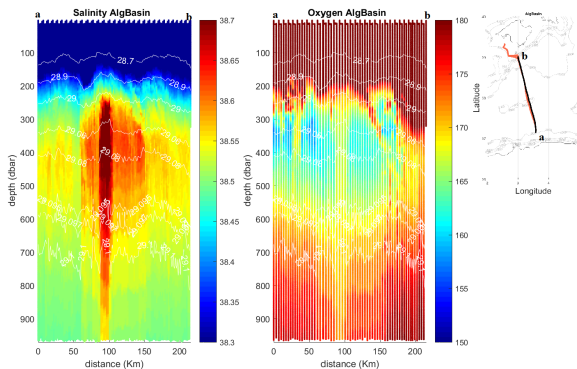


Glider sections (examples)

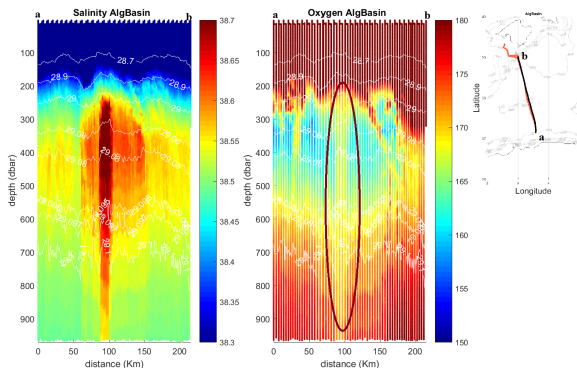


- ~ 10 km radius
- warm and salty anomaly
- Oxygen anomaly associated

Glider sections (examples)



Glider sections (examples)



- ~ 15 km radius
- warm and salty anomaly
- Oxygen anomaly associated

Summary

- Mean state : warm and salty LIW in southwestern Mediterranean following Algerian gyres.
- Meso and sub-meso scale structures transport LIW from Sardinian vein towards the interior of the basin.
- Importance of gliders in observing the fine structures and their effect on the water column.