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Particle transport in the central Ionian Sea

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L. Berline, Andrea M. Doglioli, Anne Petrenko, Stéphanie Barrillon, Boris Espinasse, et al.. Particle transport in the central Ionian Sea. EGU, Apr 2021, Vienna, France. <hal-03375974>

HAL Id: hal-03375974

<https://hal.science/hal-03375974v1>

Submitted on 13 Oct 2021

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Léo Berline, Andrea Michelangelo Doglioli, Anne Petrenko, Stéphanie Barrillon, Boris Espinasse, Frederic A.C. Le Moigne, François Simon-Bot, Melilotus Thyssen, François Carlotti

Introduction

Ionian Sea considered as oligotrophic, but at the crossroad of 3 main water masses, with complex surface circulation.

Few data on horizontal particle distribution.

Methods

- High resolution sampling using MVP mounted with CTD-LOPC-Fluorometer (end of May 2017)
- Hull mounted ADCP
- Regular CTD stations and underway flow cytometry
- Backward Lagrangian tracking w/geostrophic velocity
- Satellite SST and Chl-a

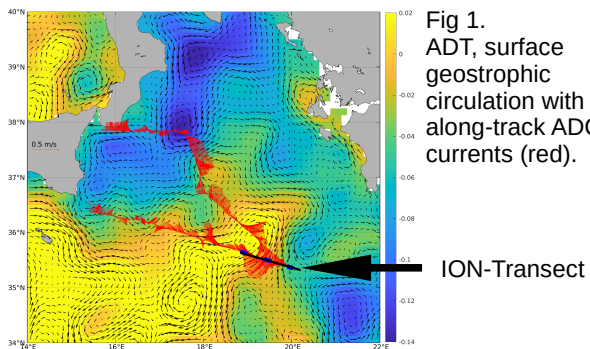


Fig 1. ADT, surface geostrophic circulation with ship along-track ADCP currents (red).

ION-Transsect

Main findings

- Strong particle abundance heterogeneity at short scales
- Long distance suspended particle transport as hypothesis
- 3 regions of origin, with different particle [C]: Western Ionian (Atlantic Water) with moderate particle [C], Northern Ionian with high particle [C], eddy with low particle [C]

Fig 2. Distribution of variables along ION-Transsect

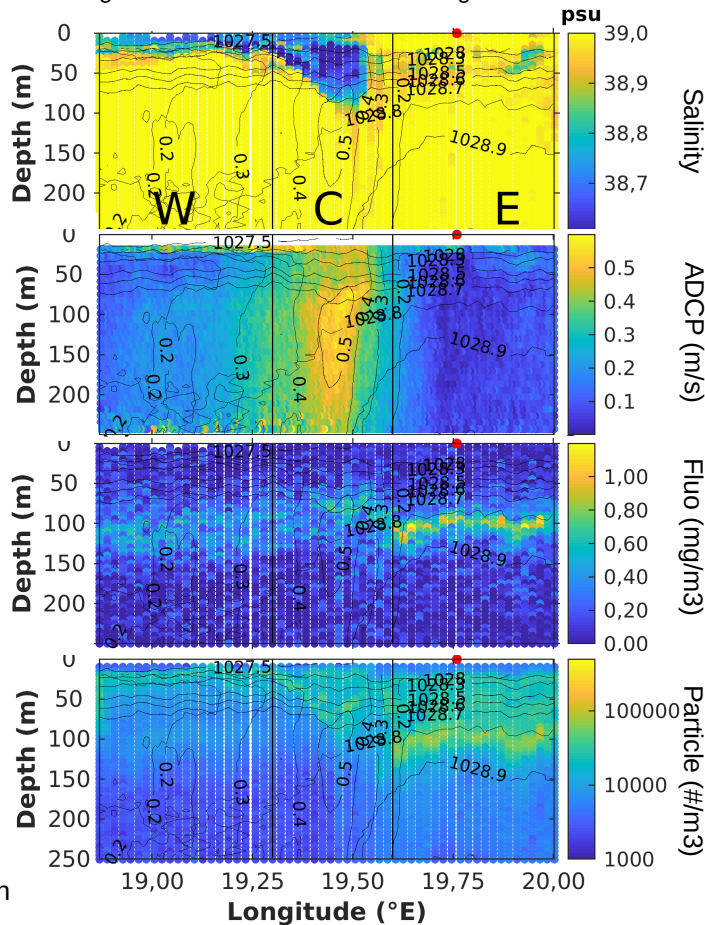


Fig 3. Backward Lagrangian simulations. Seeding in white polygon. Positions of numerical particles one month before sampling (black dots), and trajectories splitted by main origin (colors)

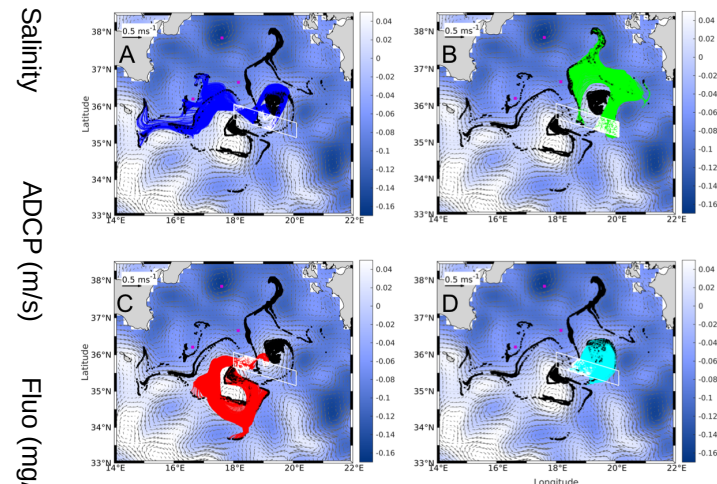
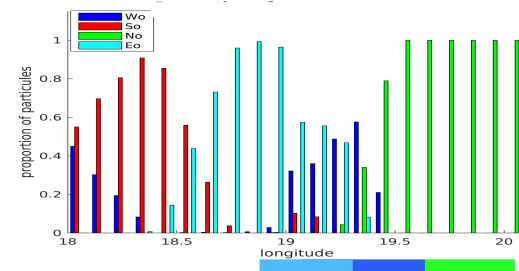


Fig 4. Along transect proportion of each particle origin from Lagrangian tracking



Introduction

PEACETIME cruise in late spring (May 2017)
Northern and center Ionian Sea.

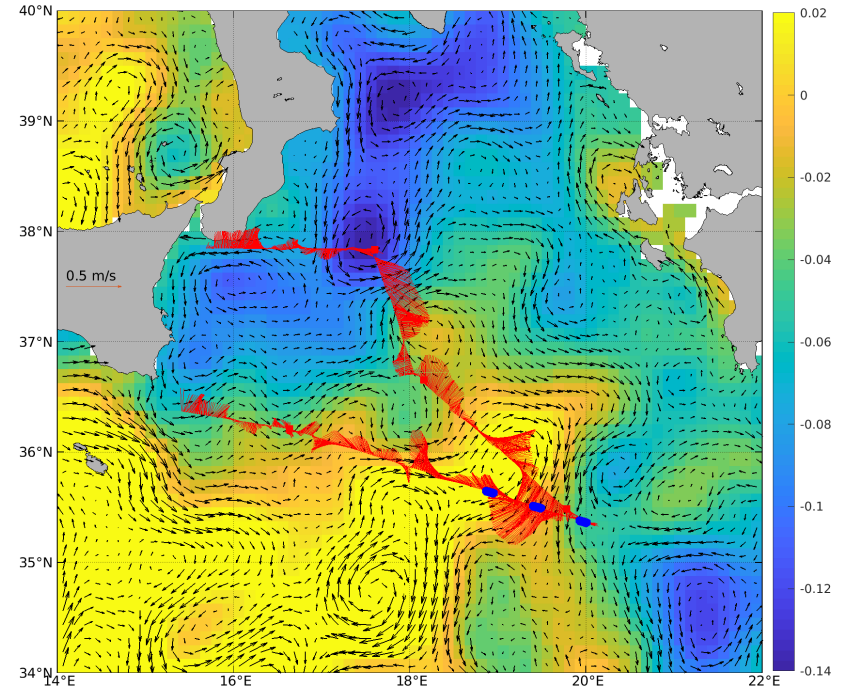
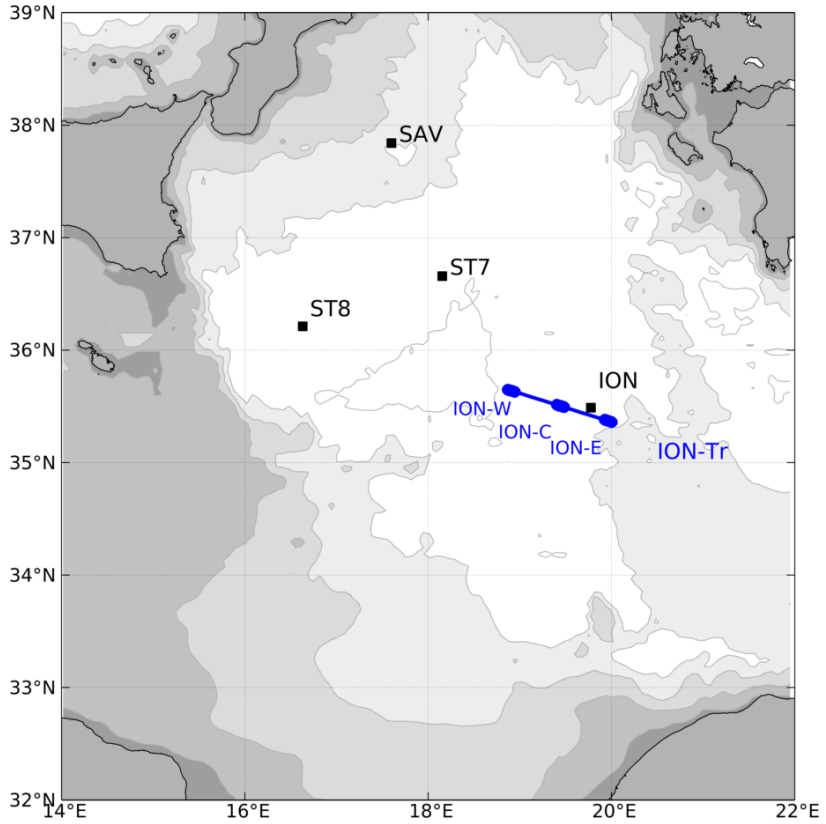
Methods

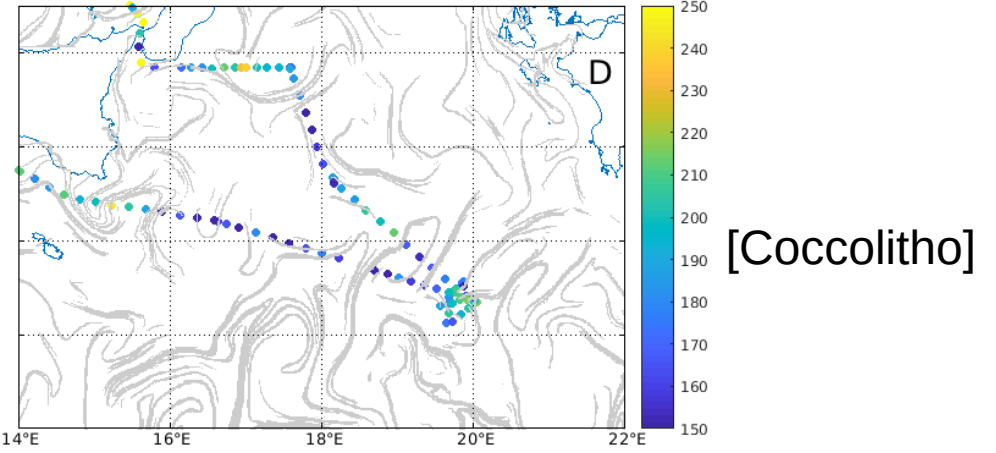
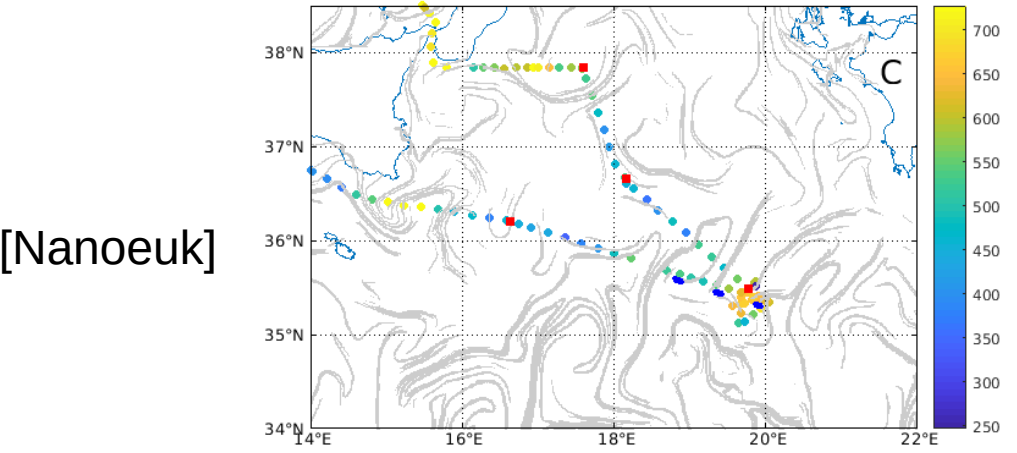
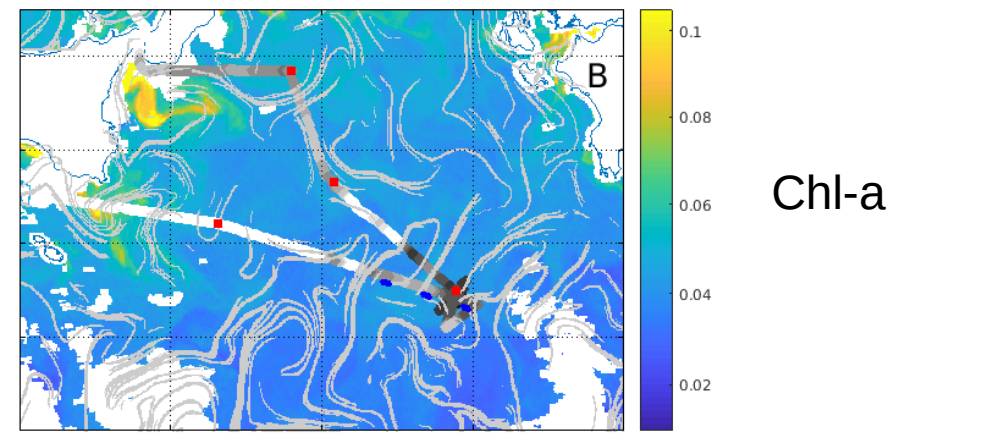
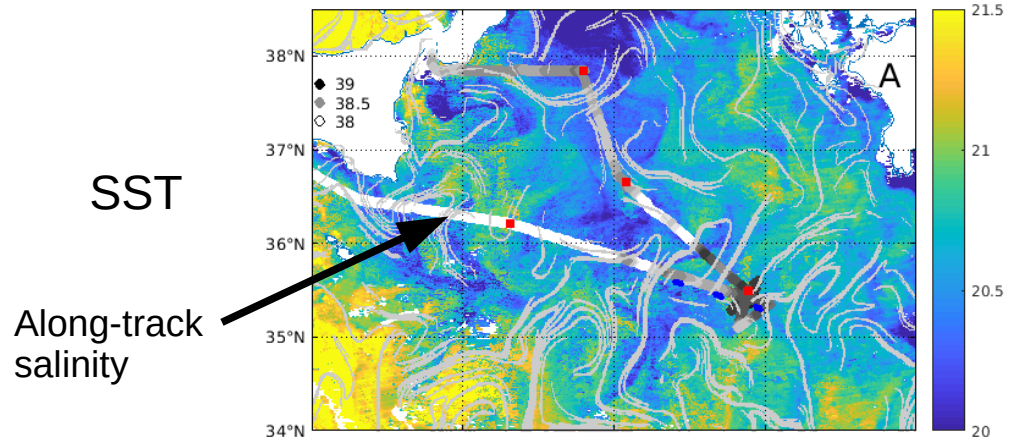
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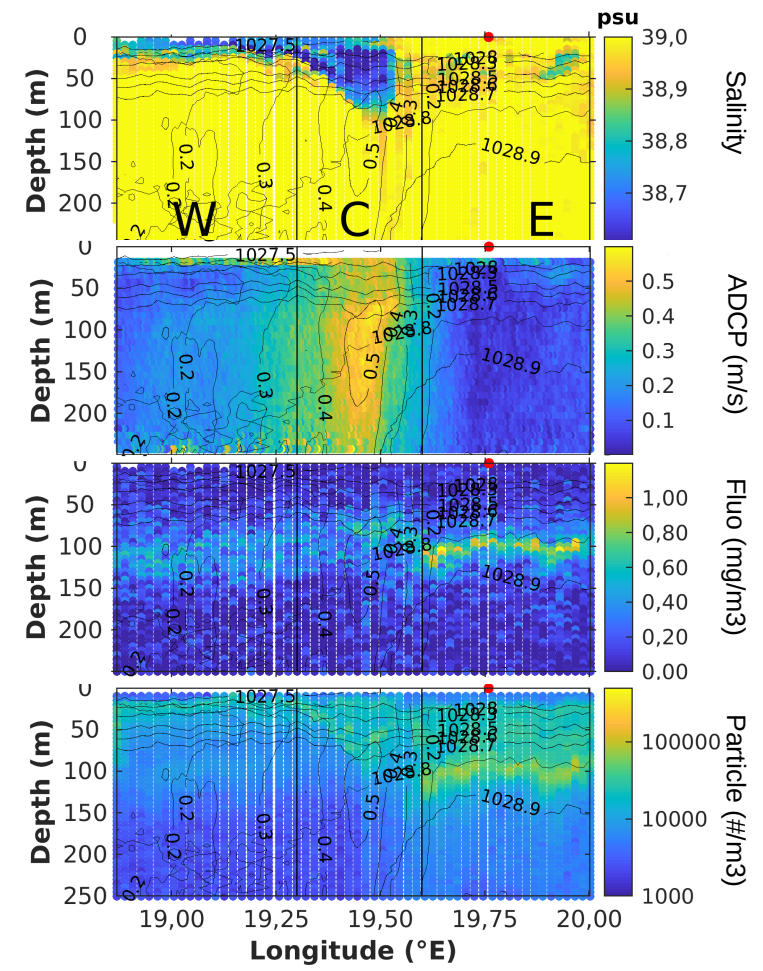
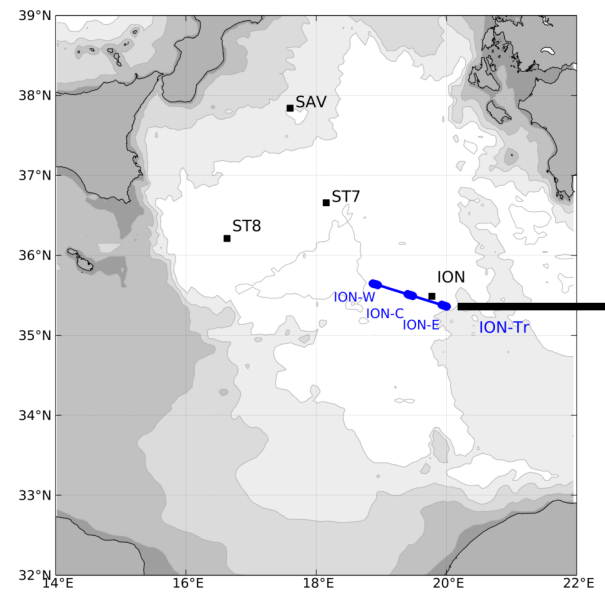
See Special Issue “Atmospheric deposition in the low-nutrient-low-chlorophyll (LNLC) ocean: effects on marine life today and in the future”

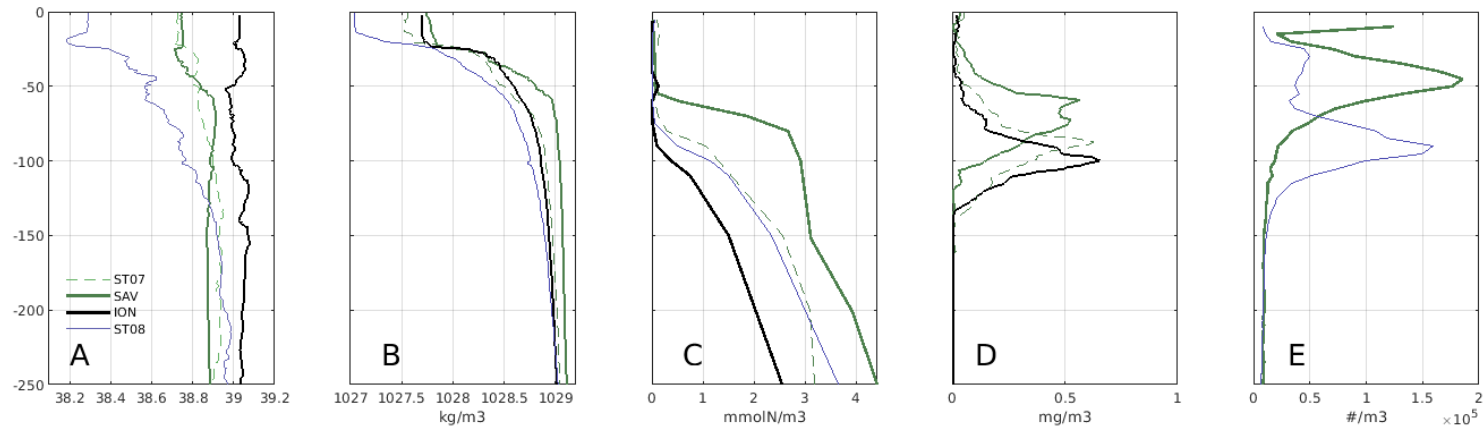
Guieu et al (2020) Biogeosciences, <https://doi.org/10.5194/bg-17-5563-2020>

*See Berline et al (in rev) **Long distance particle transport to the central Ionian Sea**, Biogeosciences <https://doi.org/10.5194/bg-2020-481>*

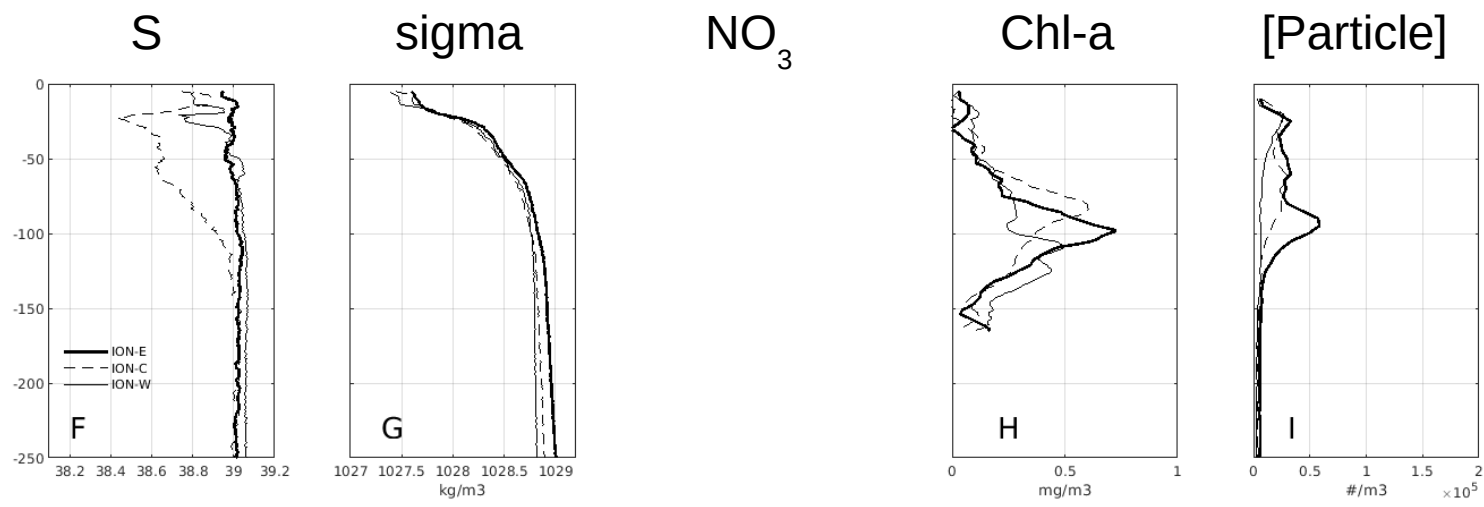




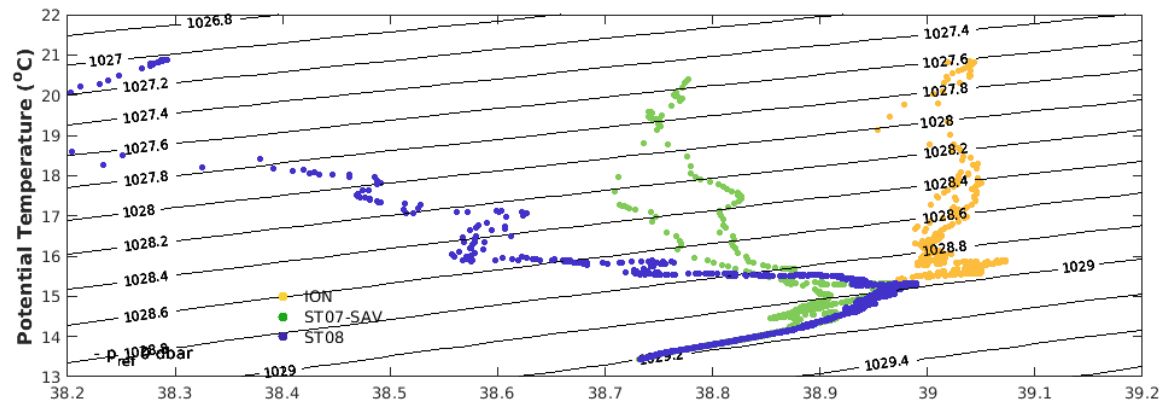
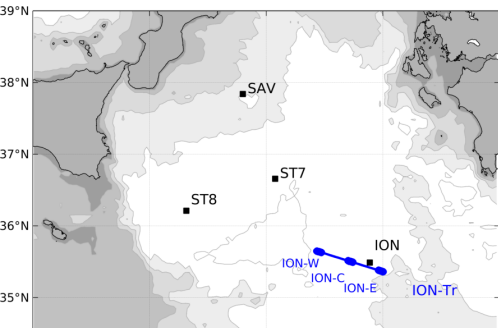




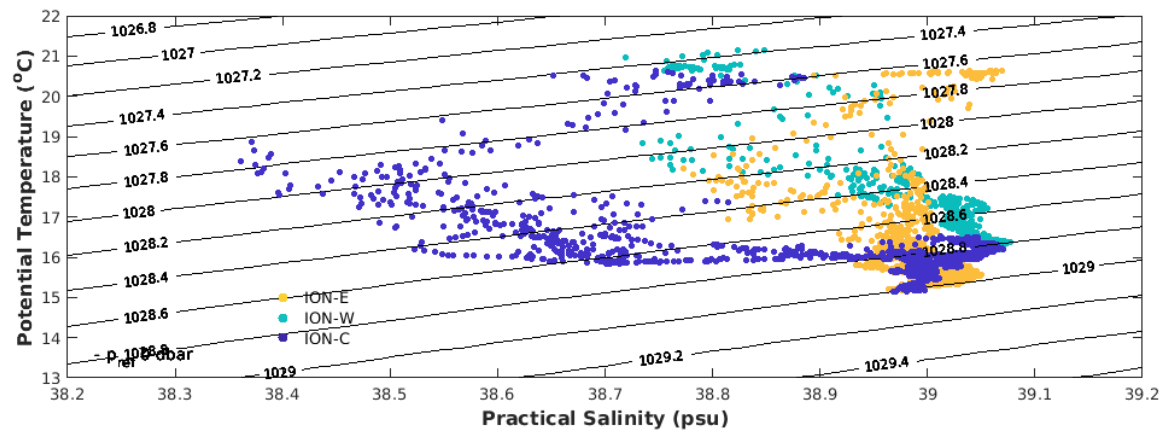
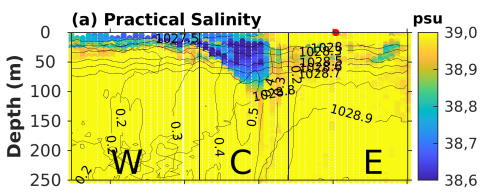
Stations



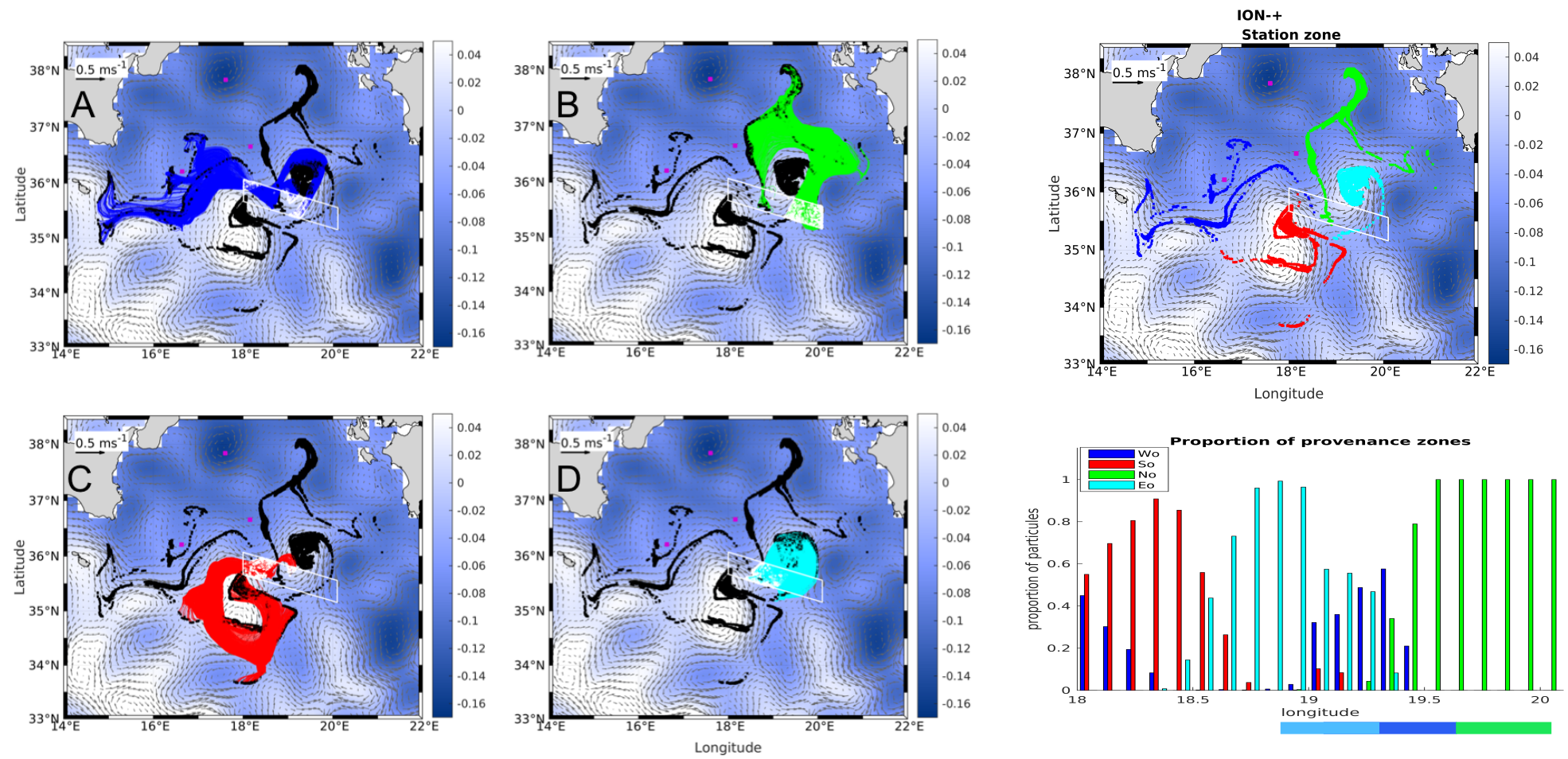
ION Transect



Stations



ION Transect

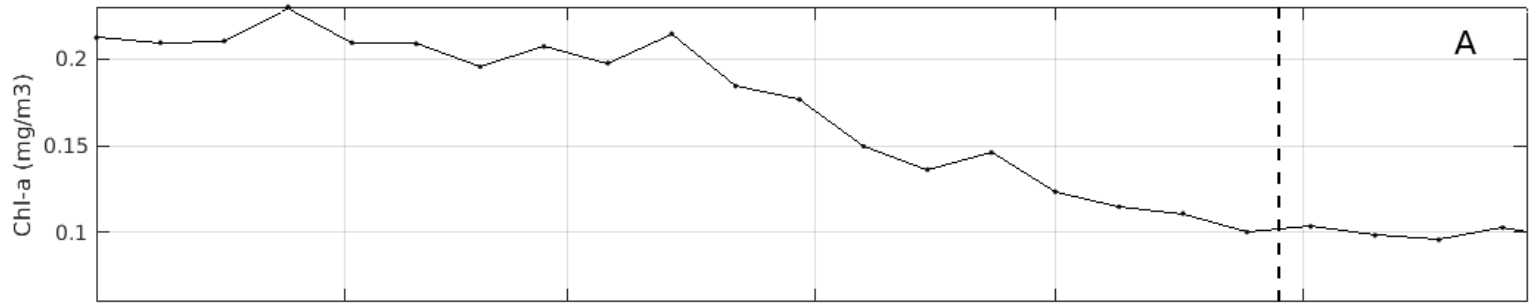


Main findings

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- Long distance suspended particle transport as hypothesis
- 3 regions of origin, with different particle [C]:
 - Western Ionian (Atlantic Water) with moderate particle [C],
 - Northern Ionian with high particle [C],
 - Eddy with low particle [C]
- Particle properties (abundance, size distribution) as a proxy for water mass biological history

See Berline et al (in rev) **Long distance particle transport to the central Ionian Sea**,
Biogeosciences <https://doi.org/10.5194/bg-2020-481>

Chl-a



SST

