I CONVEGNO ISTITUTO DI SCIENZE POLARI

10 years of oceanic observation in the kongsfjorden

Giglio F., L. Langone, T. Tesi, P. Giordano, L. Patrolecco, F. De Rovere, F. Filiciotto, S. Aliani, J. Chiggiato, G. Ingrosso, G. Suaria, S. Miserocchi

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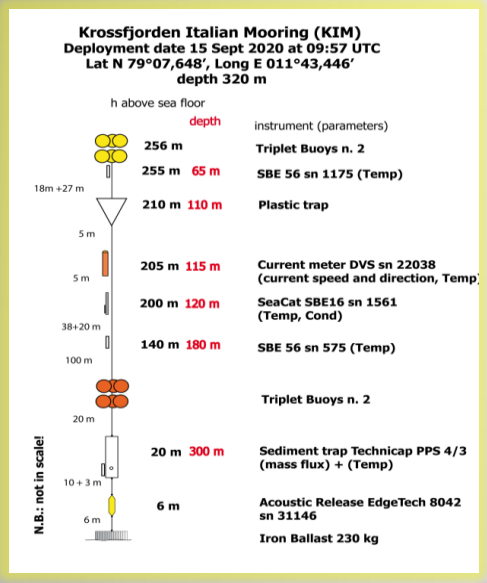
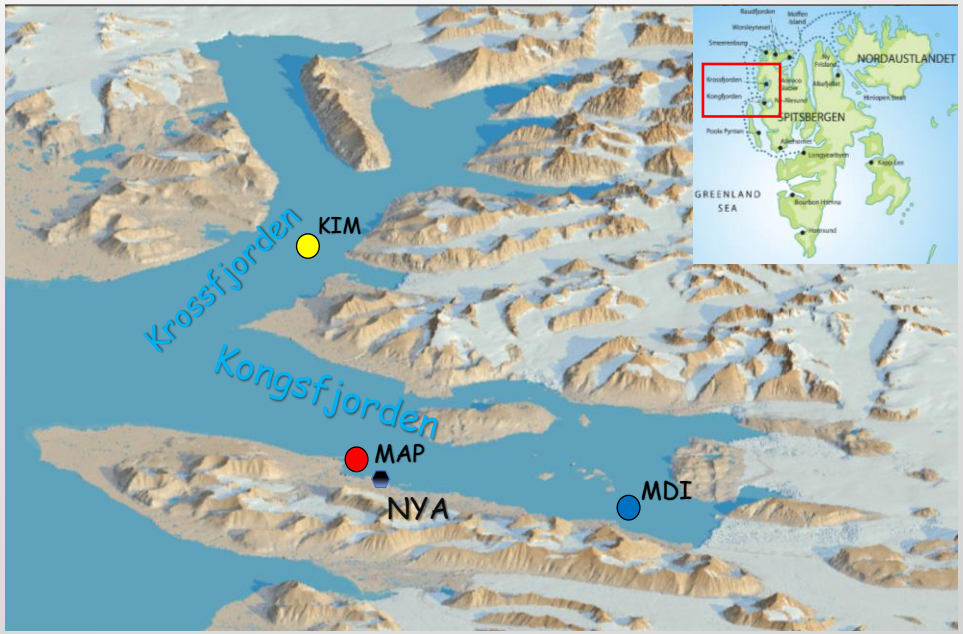
Roma, 22 – 24 settembre 2021

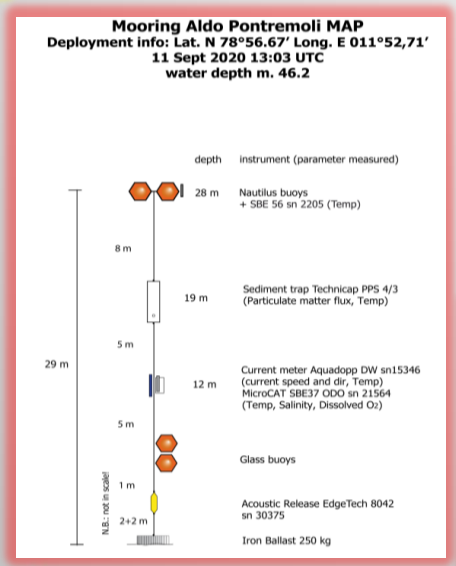
Long time series from marine system



since Sept. 2020

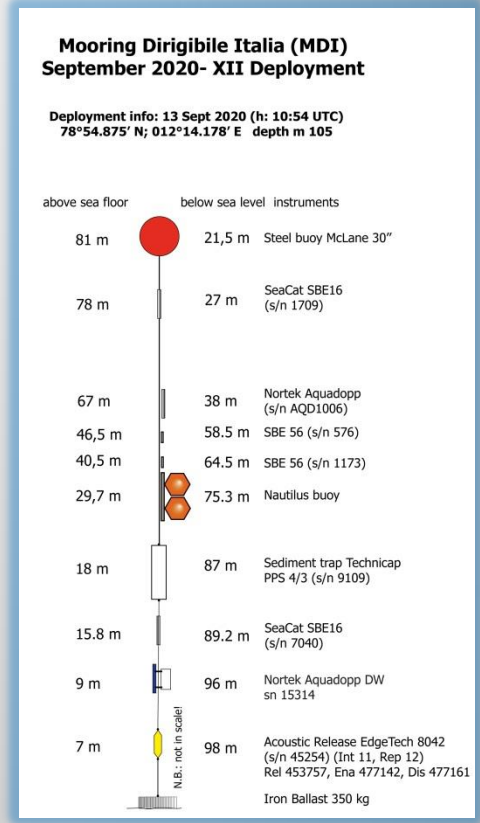
AW contribution of particles, pollutants and microplastics (vs. expected less glacier particle supply)





since Sept. 2020

Bayelva river contribution by surface permafrost erosion (vs. subglacial supply)



since Sept. 2010
Permanent

Interactions between fjord waters and tidal glaciers (marine vs. subglacial particle supply)

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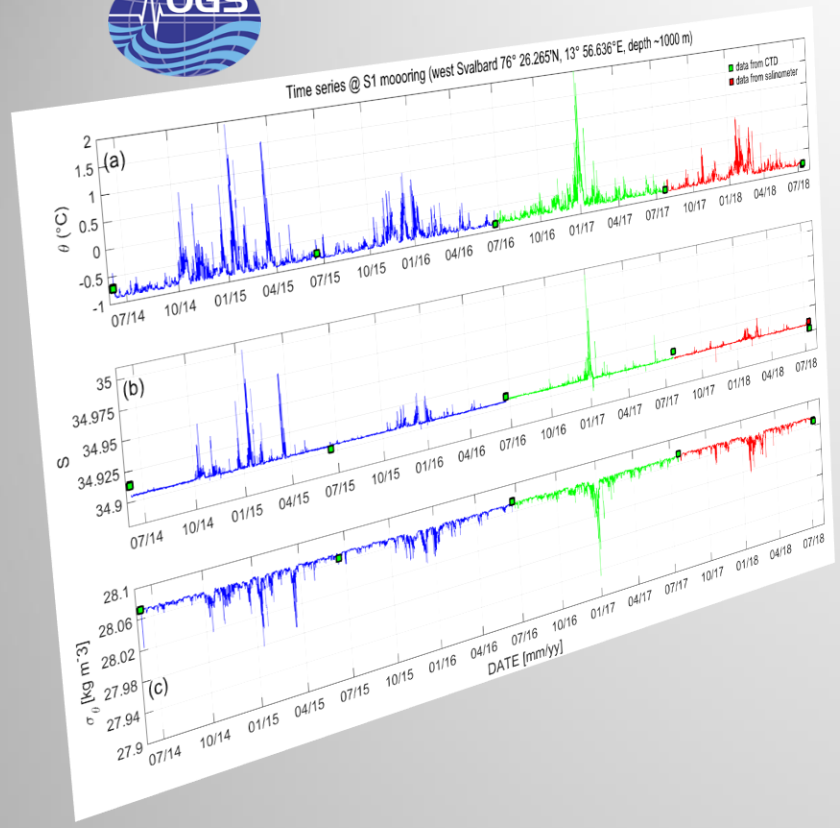
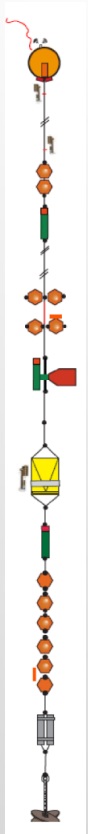
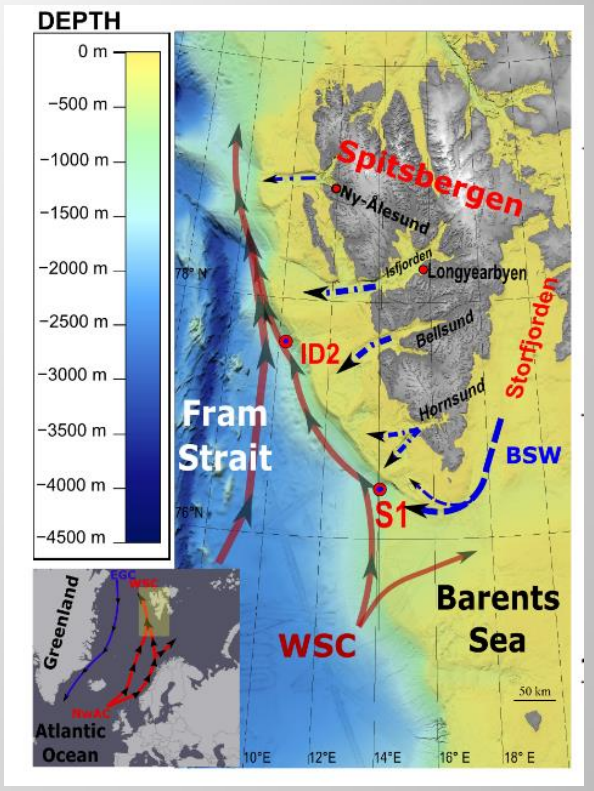




Main Parameters

1. Pressure
2. Temperature
3. Salinity
4. *Dissolved oxygen*
5. *Currents (u,v,w)*
6. *Turbidity*
7. *Sediment traps*



Bensi, M., et al (2019). Water 2019, 11, 683; doi:10.3390/w11040683.

2014 *G.O. SARS*

2015 *Helmer Hanssen*

2016 *POLASTERN*

2017 *ALLIANCE*

2018 *ALLIANCE*

2019 *ALLIANCE*

2021 *L. BASSI*

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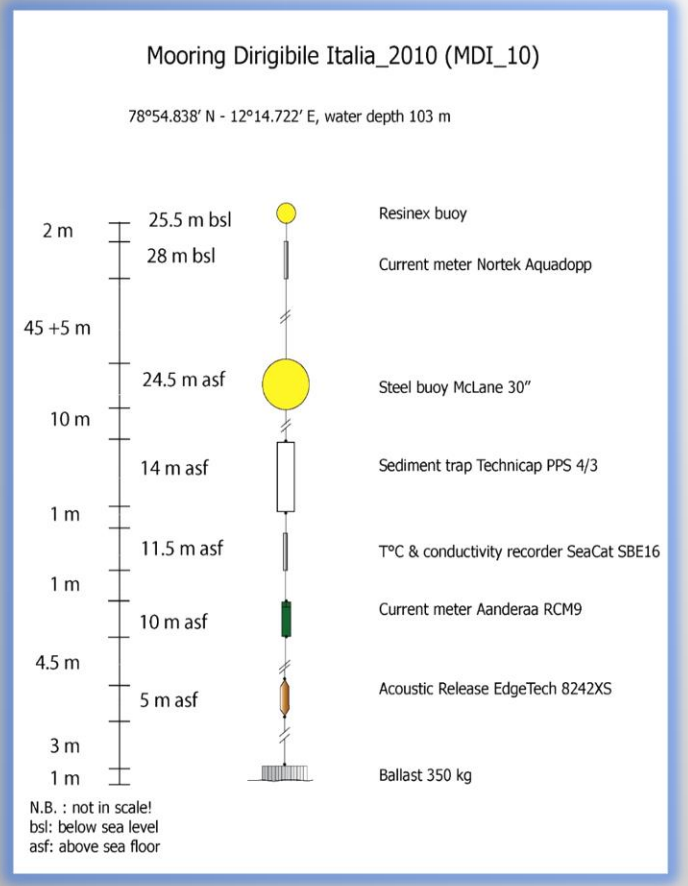
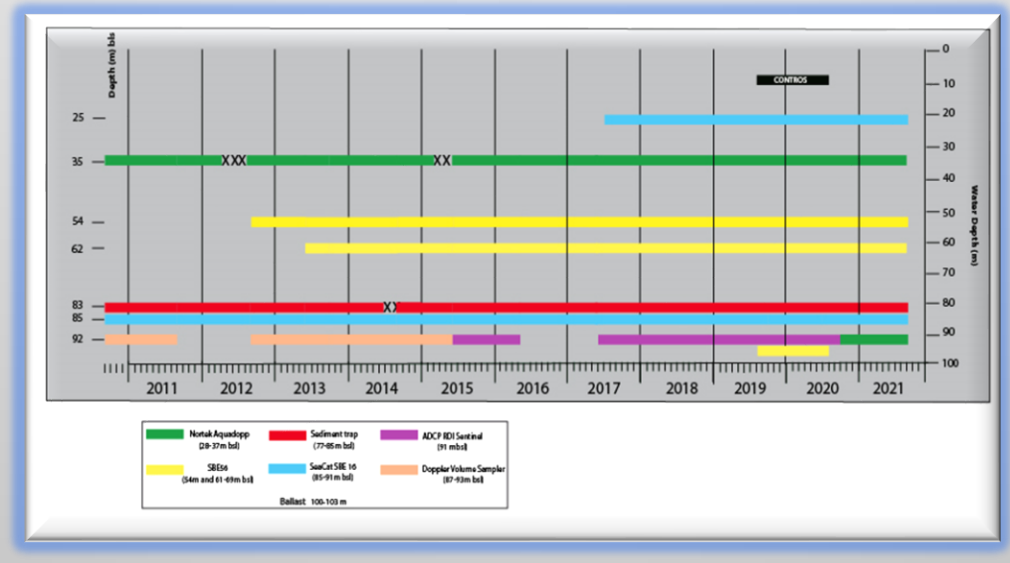
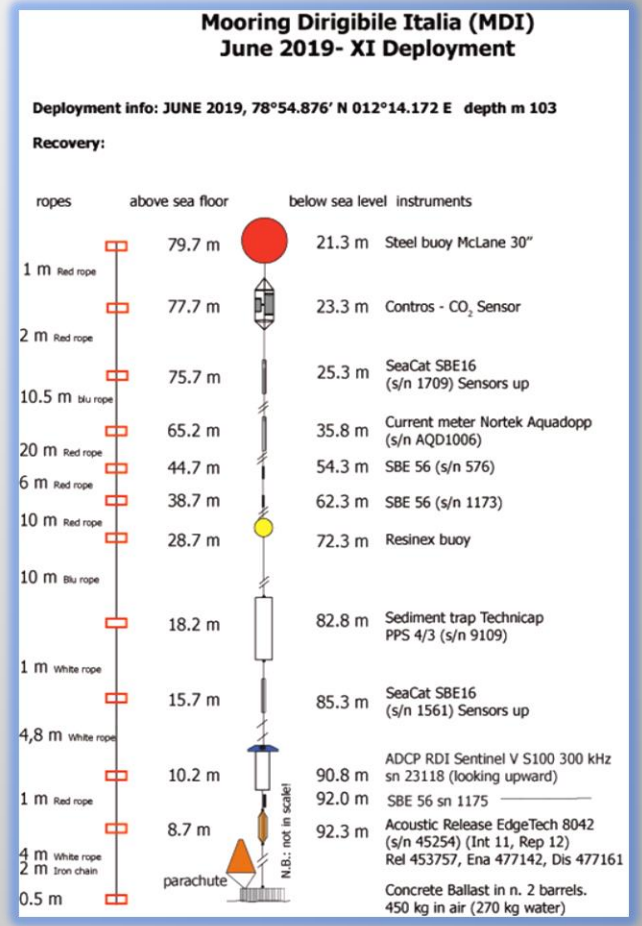
Mooring MDI
time configuration evolution







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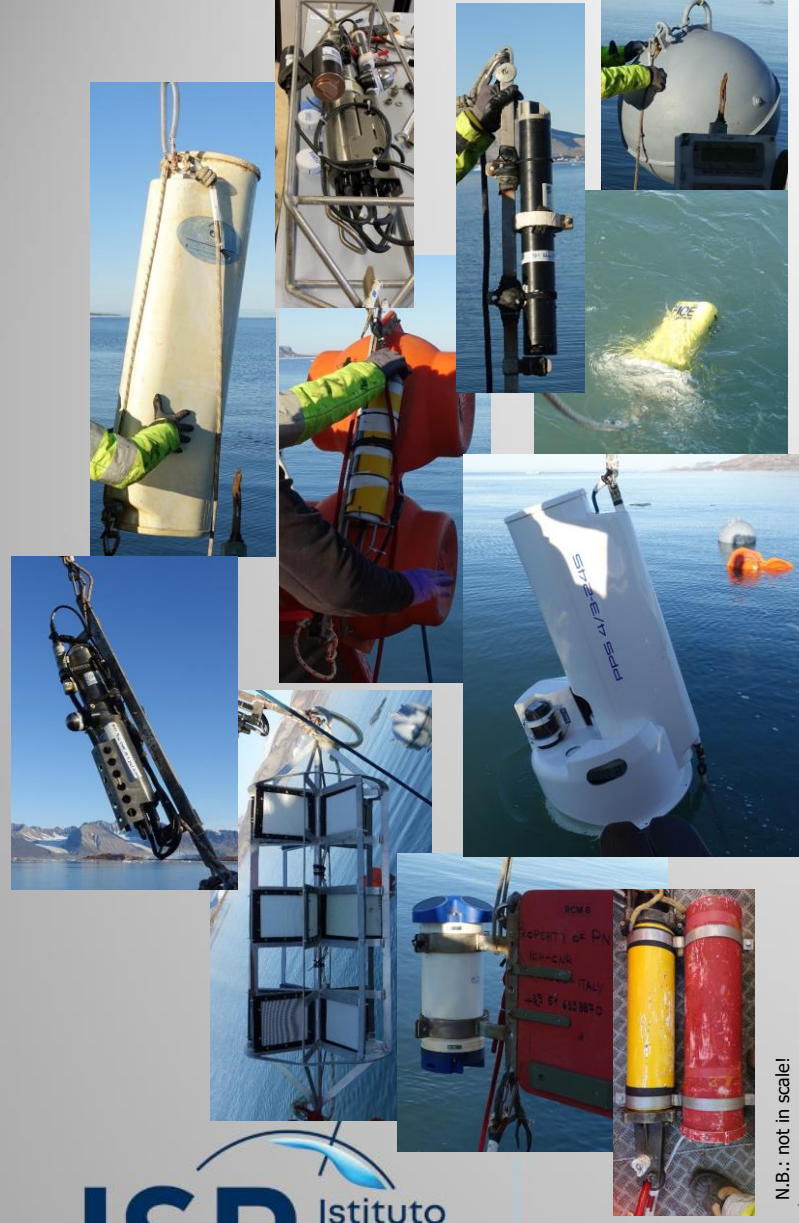
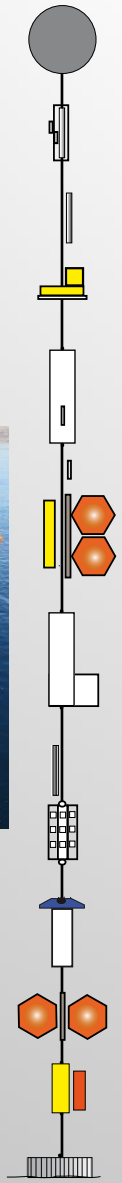
Mooring MDI 2021 configuration





depth (m)	instruments	
27 m	SeaCat SBE16 *PARS +FLUNTUS **(temp, sal, DO, PAR, fluo, turb)**	ISP Bologna
39 m	Nortek Aquadopp **(current speed and dir)**	ISP Bologna
50 m	THOE DGT **(dissolved contaminants)**	ISP Roma/Venezia
59 m	SBE 56 **(temp)**	ISP Bologna
60 m	Sediment trap PLASTIC **(plastic debris flux)**	ISMAR La Spezia
69 m	SBE 56 **(temp)**	ISP Bologna
76 m	Acoustic recorder Silence LP **(underwater noise)**	ISP Messina
87 m	Sediment trap **(particulate matter fluxes)**	ISP Bologna
90 m	SeaCat SBE16 **(temp, sal, DO, turb)**	ISP Bologna
91 m	Plastic degradation Cage **(plastic degradation)**	ISMAR La Spezia
96 m	ADCP RDI Sentinel V S100 300 kHz **(current speed and dir profile)**	ISP Bologna
98 m	Acoustic Release + Rope canister	
	Iron Ballast 350 kg	

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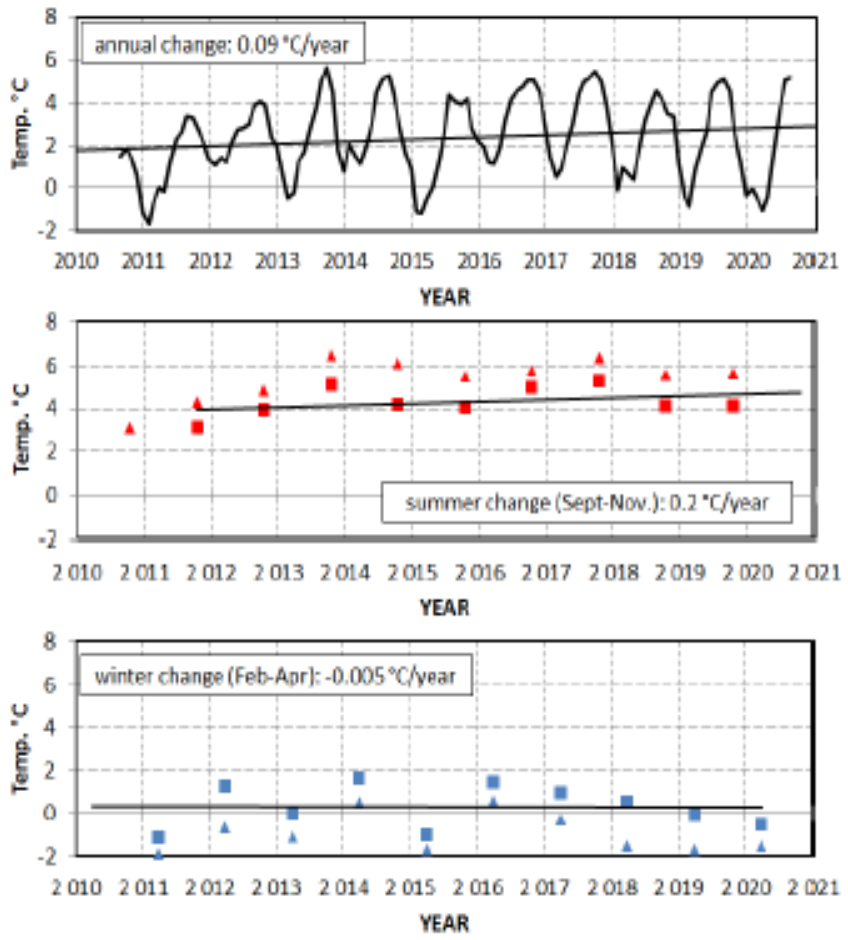


• Water temperature

Seasonal variability, with increasing trend (0.09 °C/year), but T°C growth rate is higher in the warmest months (0.2 °C/y during the last decade), and almost constant during winter

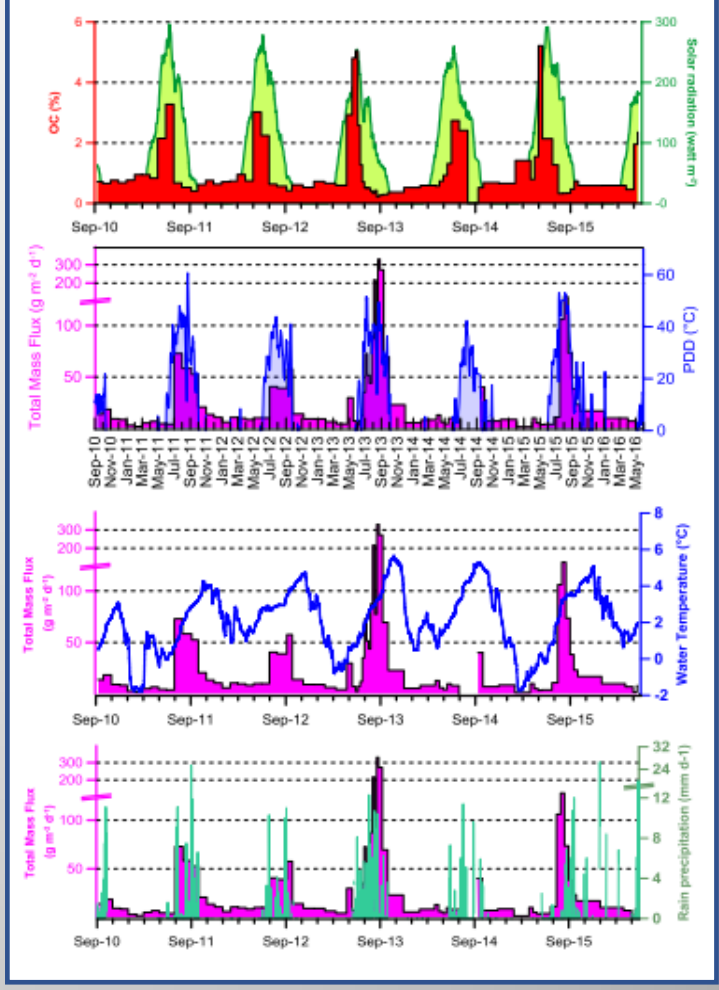
• Particle flux & source

Huge seasonal variability (>300 g m^{-2} d^{-1})

a) Autochthonous ⟶ vertical flux of marine organic matter, peak in late May-June

b) Allochthonous ⟶ lateral advection of terrestrial particles (Jul-Aug)

- ✓ **Meltwater run-off/englacial and subglacial drainage (most important)**
- ✓ **Submarine melting and calving**
- ✓ **Surface run-off (rivers, etc.)**



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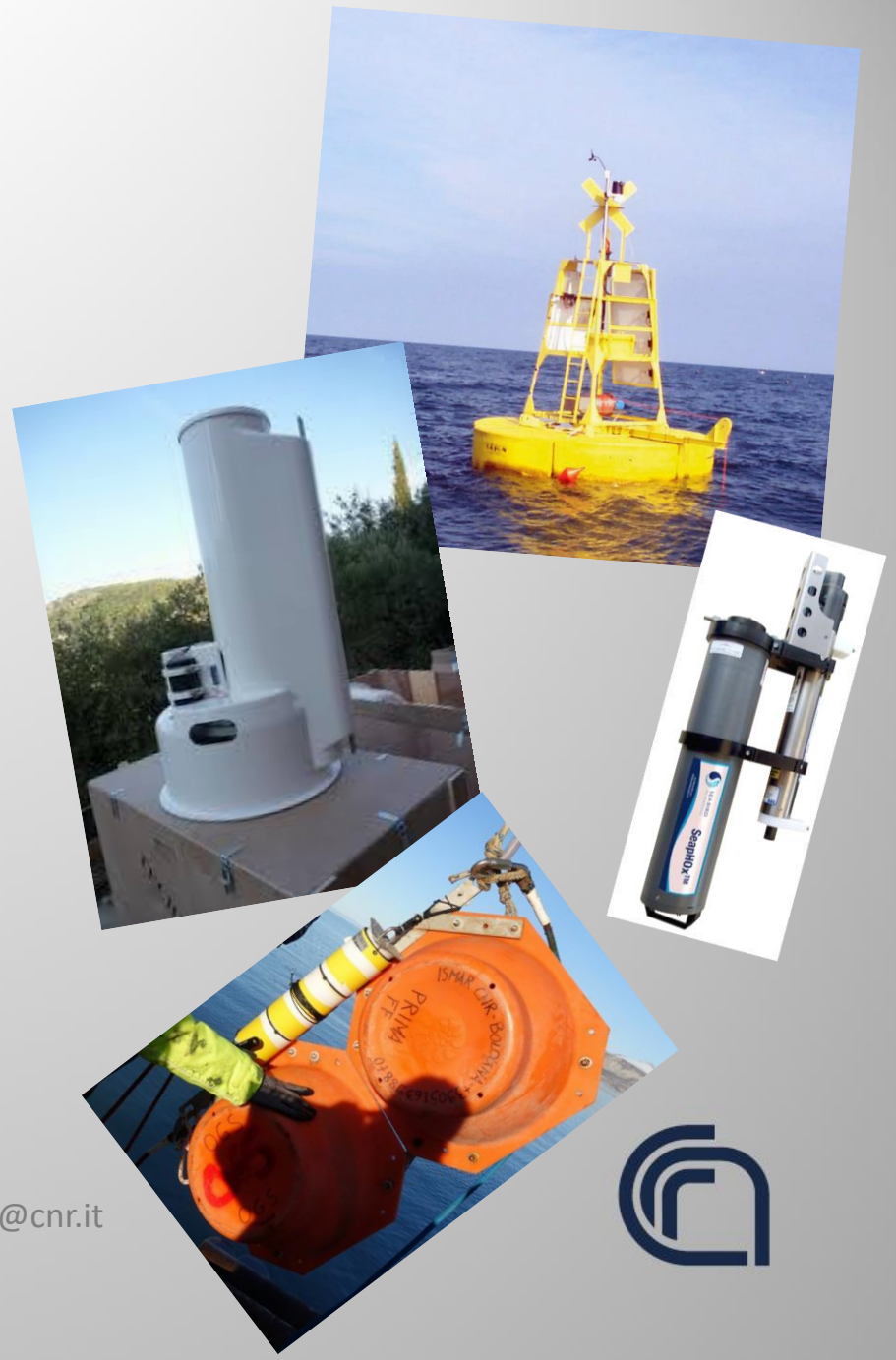
Outlook, future perspectives

Recently approved funds for instrumentation upgrading (to be completed in 2022):

a) Add the sea surface level
(T, S, DO, pH, fluo, turbidity, PAR, nitrate, currents, waves)

b) On the surface buoy, a weather station
(T°C, pressure, relative humidity, winds)

c) Additional instruments
(Microplastics collection, acoustic recorder, camera and video recorder, 24-bottle sediment trap)



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What you hope to get out of a Svalbard marine infrastructure network

- Improve quality and intercomparability of measurements between different stations (define minimum requirements, actions to fill gaps, verify available essential variables, use high-quality instrumentation, define the optimal frequency of data acquisition, use comparable QA/QC procedures...)

- Interact with marine SIOS core data (SCD)

- Improve our data management and data sharing (increase man power with dedicated people; IADC, Italian Arctic Data Center, to be updated)

- Improve cooperation in mooring servicing Optimizing logistics, sharing ship-time and instrumentations, promoting the setting-up of common teams, able to work on all moorings in the Kongsfjorden, in order to avoid time-series interuptions and save money. Year 2020 example in which, due to COVID 19, some mooring service dropped

- Develop future collaborations in joint review papers and research projects

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Grazie della vostra attenzione

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