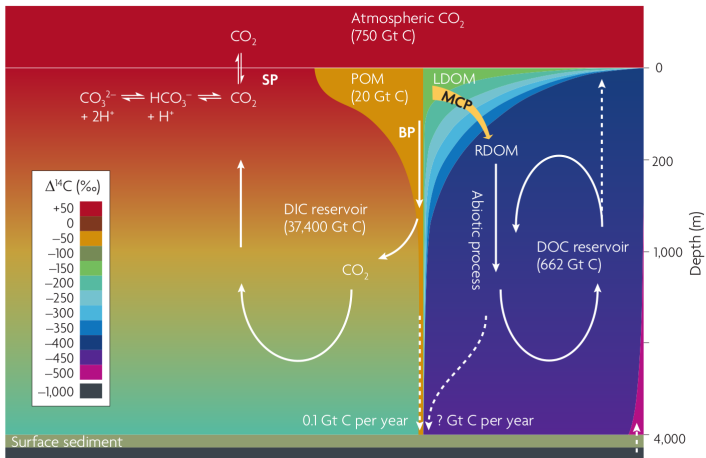


Dissolved organic matter dynamics in the NW Mediterranean from a new glider optical sensor

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Mediterranean Institute of Oceanography (MIO-AMU)

7th EGO conference - NOC (Southampton)
Sept. 29th, 2016

Why Dissolved Organic Matter (DOM)?



Jiao et al. (2010), Nature Reviews

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- ~95% of total organic carbon in the ocean (Hedges, 2002);
- Role on carbon export uncertain (~20% ?);
- ~75% of molecules unknown !

Minifluo-UV (Tedetti et al., 2013)



Now glider-compatible (SeaExplorer)

2 DOM families targeted here

Amino-acids (i.e., Tryptophan)

- Mostly of natural origin
- From degradation of particulate OM
- By-product of biology (microbial activities, etc.)

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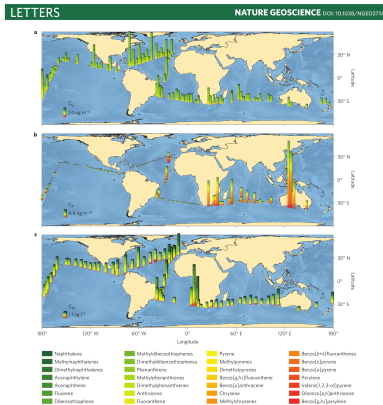
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→ Monthly equivalent of 6 Deep Water Horizon spills
(Gonzalez-Gaya et al., 2016)

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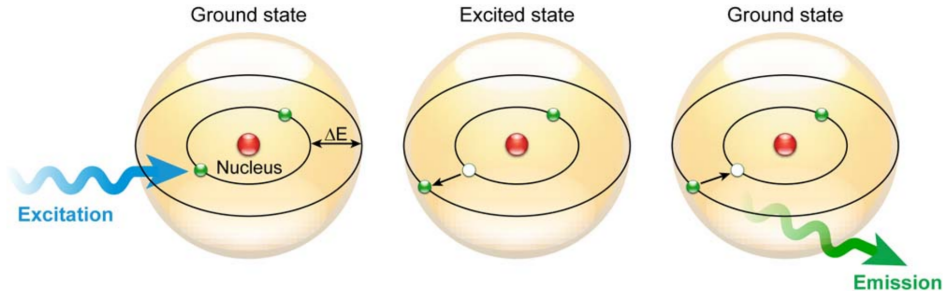
Gonzalez-Gaya et al. (2016)

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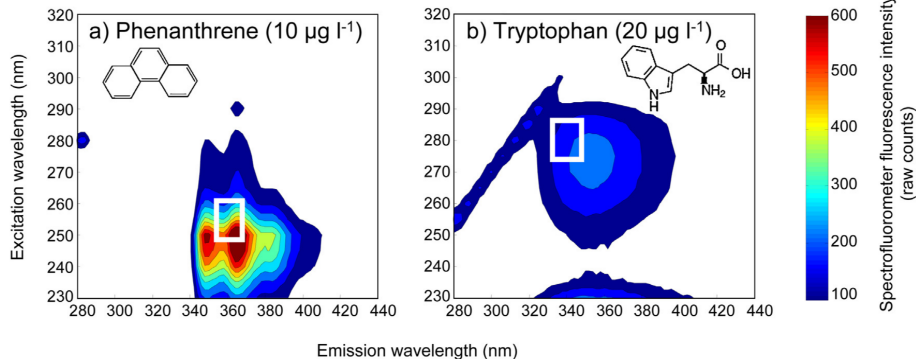
Now glider-compatible (SeaExplorer)

Fluorescence Principle



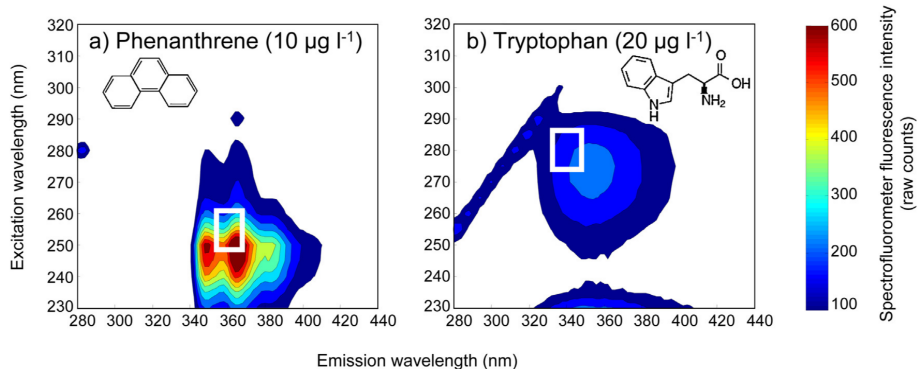
Ishikawa-Ankerhold et al. (2012)

Excitation-Emission Matrix (EEM)



Tedetti et al. (2013)

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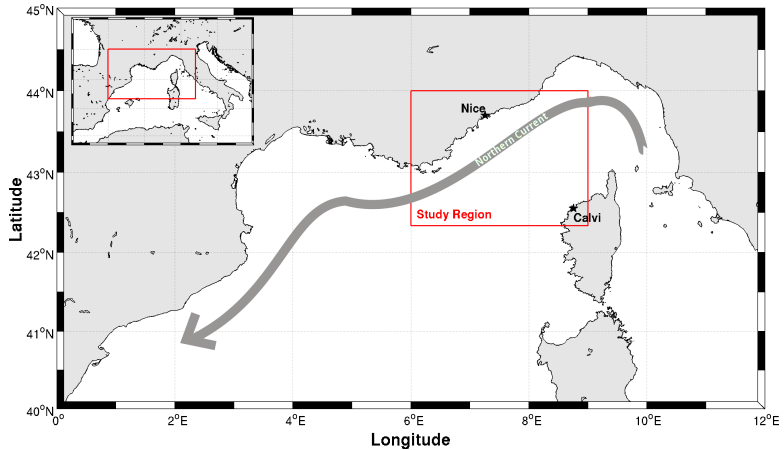
Tedetti et al. (2013)

$\rightarrow \lambda_{\text{Ex/Em}} = 255/360 \text{ nm (PHE)} \text{ and } 280/340 \text{ nm (TRY)}$

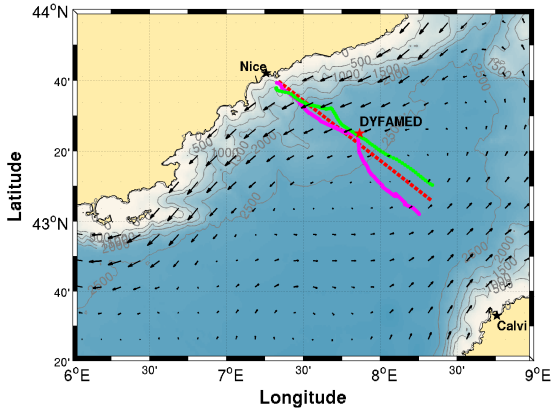
SeaExplorer glider & Minifluo-UV

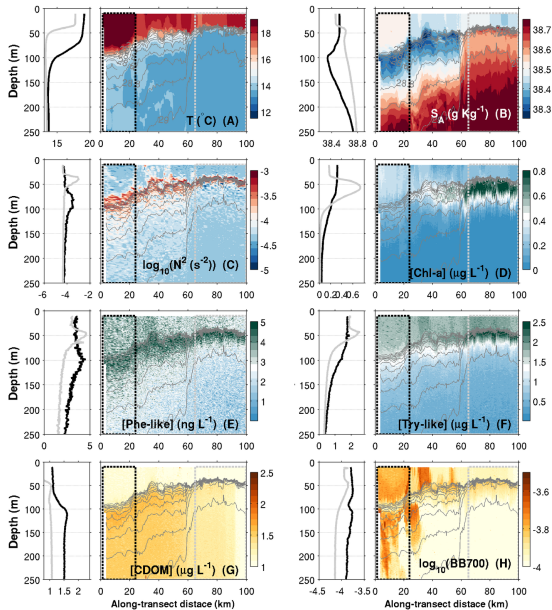


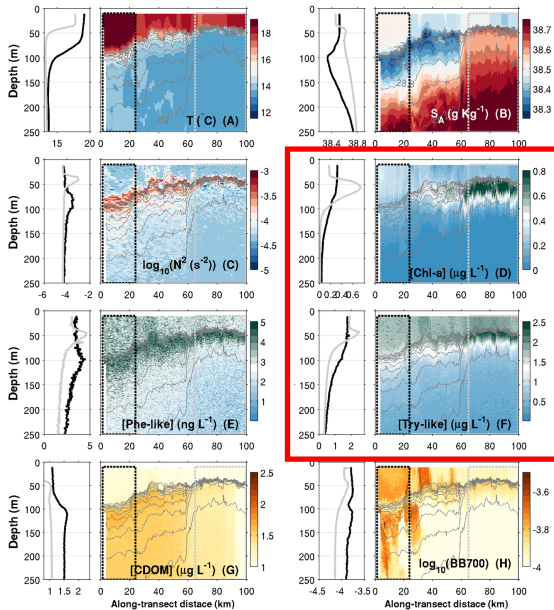
NW Mediterranean

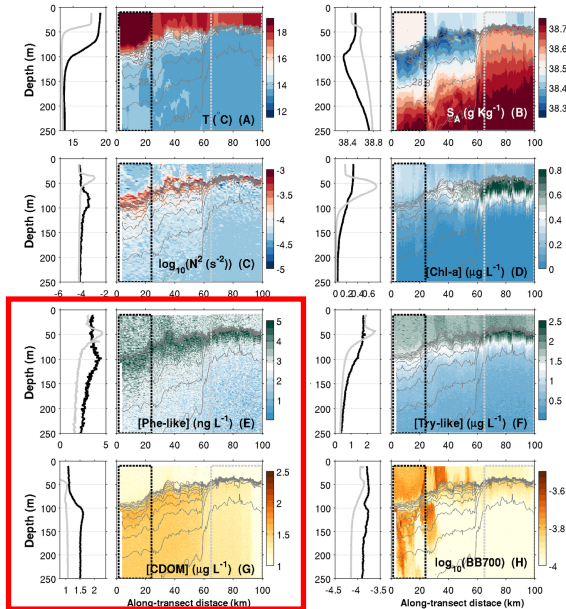


3 Deployments (Spring, Summer, Fall)

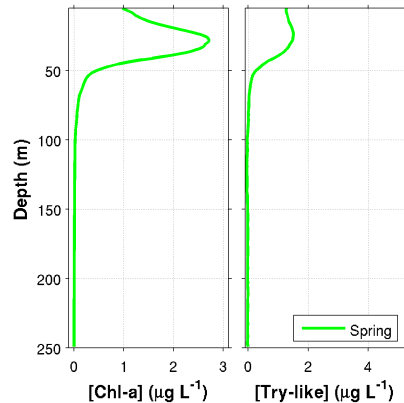




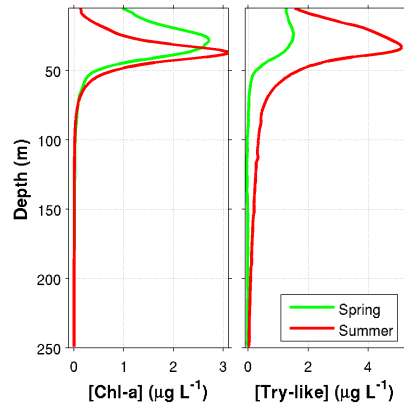




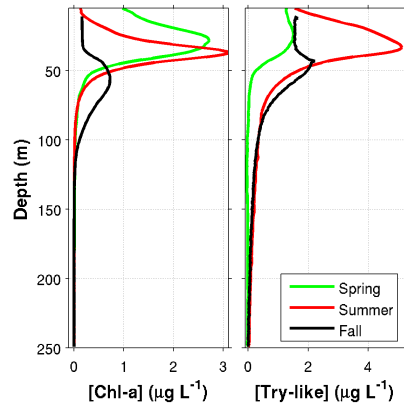
Tryptophan (amino-acid)



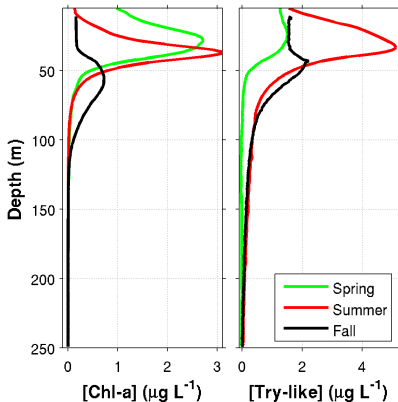
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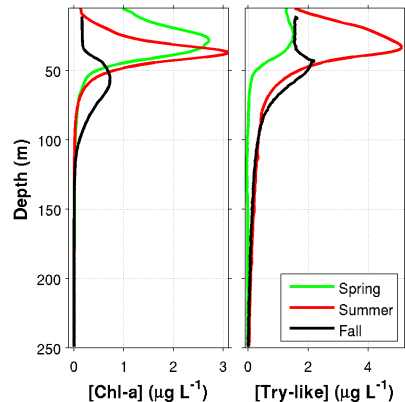


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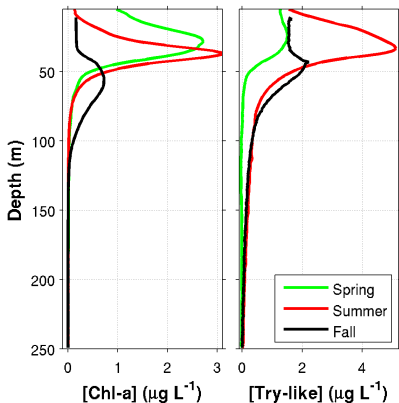
- TRY peaks during the summer (autotrophic to heterotrophic system)

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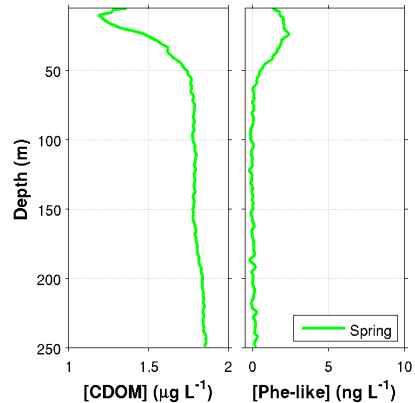
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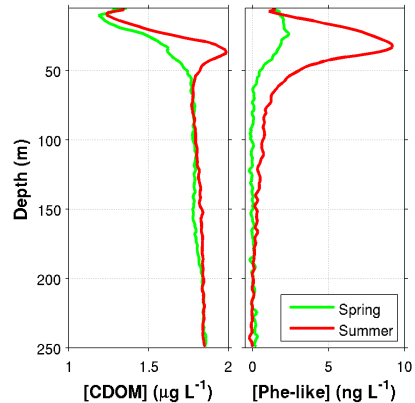


- TRY peaks during the summer (autotrophic to heterotrophic system)
- TRY peaks shallower than Chl-a
- This sensor refines usual glider biogeochemical observations (e.g., shifts in microbial communities)

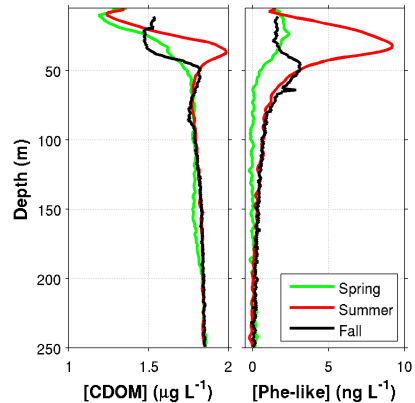
Phenanthrene (PAH)



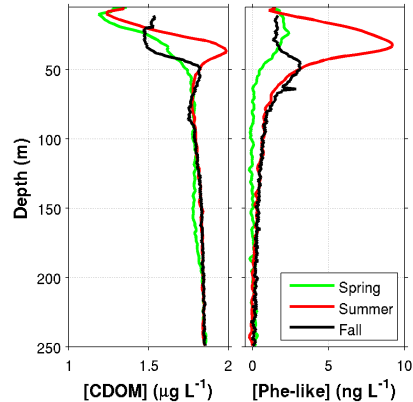
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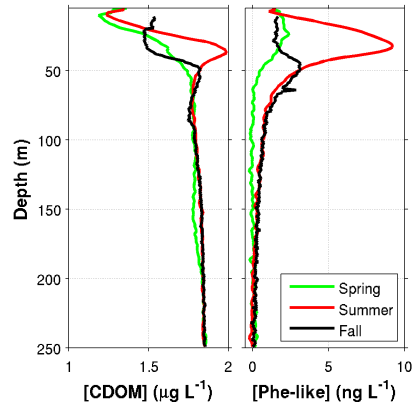


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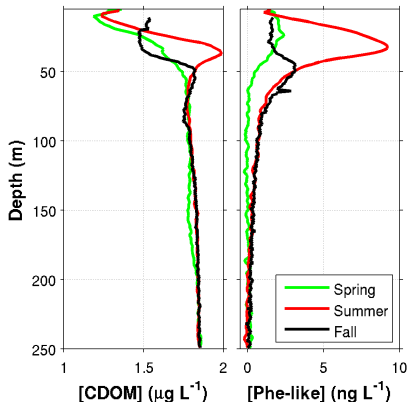
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- PHE accumulation just below pycnocline (throughout the front)
- Work in progress for interpretation

Minifluo-UV : a new sensor for OM dynamics

Oceanographic applications

- MFL gives a richer portrait of DOM dynamics in relationship with microbial communities
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Industrial applications

- Possible use of this sensor for tracking oil spills, oil seeps, waste-waters, etc.

Thanks for listening !

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Next generation Low-Cost Multifunctional Web Enabled Ocean Sensor Systems Empowering Marine, Maritime and Fisheries Management

Special thanks to :

L. Beguery, M. Mery, F. Besson & SeaExplorer team

MIO's SAM service (N. Bhairy, D. Guillemain, C. Grenz)

G. de Liege (LOV)

...

→ SeaExplorer now compatible with the [SOCIB glider toolbox](#)