

METPAG (2019-2020) Suspended Particle Characteristics from Glider Observations in Region of Freshwater Influence

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Sentinel 2 MSI, February 2014

UPVD





Why study Coastal Dynamics ?

- Coastal area = critical zone
 - Concentration of population, coastal-ocean use
 - High sensitivity to climate change
 / anthropogenic activities



Nature, 451, 2008

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 - Extreme events such as flashfloods and storms
- Need to investigate more in realtime, at various spatio-temporal scales of the coastal area



Nature, 451 , 2008



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Distance from the coast (km)



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- Deployment during energetic events such as floods and storms
- Augment observations, more detailed measurements to highlight fine-scale structures



Specific Scientific Payloads



Gentil et al., 2020, 2022 Use of optical and acoustic sensors to investigate Suspended Sediment Fluxes in ROFI





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VIA

Different signals from acoustics vs optics ?



VIA DOMITIA



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Probably different particle size populations !

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Use of Particle Size Analyser on board gliders !

- Miniaturisation of sensor conducted as part a US-NSF projetct
- Integration phase conducted in collaboration with DT INSU
- Both mechanical/wiring and software adaptation

LISST-200X, Sequoia Inc. 1,25-500µm



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Use of Particle Size Analyser on board gliders !



- Field campaign for test and calibration in front of the Rhône River
- Match-up between in-situ mesurements and remote measurements (both satellite and glider)
- Derivation of SSC and effective density from glider optical sensor (attenuation and backscattering coefficients)









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PSD in Nepheloid Layers



Salinity [PSU]

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PSD in Nepheloid Layers



VIA DOMITIA

PSD in Nepheloid Layers



- \rightarrow Towards estimation of Ws (mm/s) vs size classes
- \rightarrow Inputs for hydro-sedimentary modelling
- $\rightarrow\,$ Better predictions for sediment behaviour



Take home messages

- Gliders are usefull tools to study particle dynamics and characteristics during energetic events when you can't go at sea (also during COVID conditions)
- A wide range of payloads can be used (ADCP, LISST) for high frequency measurements at various spatio-temporal scales
- Perspectives : integration of turbulence sensor





Main outcomes of the METPAG project (2019-2020)

- « Tremplin » to DeltaRhone
- Last instrumentation project conducted by DT INSU
- Certification of the PING

- 2 publications (Gentil et al., 2020 ; Miles et al., 2021)
- 3 communications (EGU, OCEANS, EGO)
- 1 thèse (Gentil, 2021)

VIA DOMITIA

Labellisation CSOA/INSU 2025-26

- Parc pluri-localisé
- Mise en place d'un AO GMMC « demande de soutien glider » pour les labos non-experts

Parc d'Instruments Nationaux Gliders



CEFREM Perpignan

PING - utilisateurs internes et externes

