LOPS-IFREMER: Aurélien Ponte, Zoé Caspar-Cohen, Margot Demol INRIA: Noé Lahaye; SYSU: Xiaolong Yu



combining SWOT and surface drifters high frequency / small-scale motion characterization

Internal tide mapping

Inertial frequency

High res. model validation

Surface dynamics current prediction



(a) KE_a/KE

(b) KE_{a,low}/KE_{low}











Global Drifter Program Fraction of hourly GPS data increasing Elipot et al. 2016

10 data points 10⁶ 10⁴ $^{\circ}$ 10³ Numper of 010² Numper 10² 10

Surface drifters

30°E



What could we potentially do with regards to internal tides ?

uncertainty / difficulty

- amplitudes
- incoherent/coherent fraction
 - incoherent timescales
 - coherent phases
 - modal decomposition (spatial scales)

complex amplitudes modal decomposition

statistically averaged metrics

instantaneous information



amplitudes / énergies

num. model.



drifters (true)





See Lascace 2008 for review (Middleton 1985, Davis 1983, 1985, Lumpking et al. 2002)





temporal autocorrelations

Caspar-Cohen et al. 2022





Caspar-Cohen et al. 2022





Caspar-Cohen et al. 2022

0.0



agrangian / Eulerian





(incoherence) timescale





Caspar-Cohen et al. in prep

boils down: uncertainty / difficulty - to data density / resolution trade-off - Eulerian / Lagrangian biases



What could we potentially do with regards to internal tides ?

incoherent/coherent fraction incoherent timescales

modal decomposition (spatial scales) modal decomposition

Upcoming activities: linking sea level, currents and winds

Margot Demol: M2 internship, PhD starting from October

Lagrangian / Eulerian biases

realistic num. model. (HR tide resolving)

Lagrangian / Eulerian biases

- Eulerian / Lagrangian biases

- to data density / resolution trade-off

Globally averaged spectra

Yu et al. in prep.

Zonally averaged spectra

Yu et al. in prep.

in collab. with on going work @INRIA with Noé + PhD Vertical mode projection of eNATL60

itide surface kinetic energy fractions

mode 1

linking sea level and surface current variability

mode 2

