

Zoé Caspar-Cohen

Ph.D. in Physical oceanography



About me

I am currently a postdoc in the Multi-scale Ocean Dynamics group at Scripps Institution of Oceanography. I study near inertial waves in the Iceland Basin and mesoscale and stratification impact their kinetic energy distribution. I obtained a Ph.D. in Physical oceanography on the characterization of internal tides and its incoherence in Eulerian and Lagrangian observations. I have been studying physical oceanography since my Masters in Brest and it is a subject that I am very passionate about. I explored a broad range of aspects of physical oceanography during my studies and it is a domain in which I plan to pursue a career in research. I am particularly enthusiastic about the study of internal waves and mesoscale interactions in multi-observational datasets.

Learn more about me on my website

Contact

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 Zoé Caspar-Cohen
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Languages

French - Native
 English - Fluent
 German - Basic

Professional skills

Data analysis: Signal processing, Statistical analysis

Theoretical marine physics: Internal waves, Fluid mechanics, Geophysical fluid dynamics

Numerical model analysis: MITgcm (LLC4320), CROCO, HYCOM

Programming languages: Python (preferred), Matlab, Fortran

WORK EXPERIENCE

July
2023-July
2025

Postdoc

📍 La Jolla, CA, USA

Scripps Institution of Oceanography, UCSD

Near-Inertial Waves - Mesoscale interactions from moored observations in the Iceland Basin, PI: Amy Waterhouse and Gunnar Voet

Study the impact of near-inertial waves and mesoscale interactions on the near-inertial waves energy distribution by analyzing 18-months long moored observations.

- Extract the near-inertial signal and energy
- Estimate the vorticity and stratification from the moorings data
- Link near-inertial kinetic energy vertical distribution and seasonal variability to background properties, i.e. stratification and mesoscale vorticity
- Estimate near-inertial waves - mesoscale energy transfers

December
2022-
February
2023

Fixed term position

📍 Rennes, France

INRIA, Campus Beaulieu

Extension of my thesis work to correct biases found in surface drifters data (GDP drifters) and compare the resulting kinetic energy to the ones from high resolution global simulations and altimeter measurements.

October
2019-
December
2022

PhD Student

📍 Plouzané, France

LOPS, IFREMER

Characterization of internal tide: Eulerian versus Lagrangian perspectives
- *Numerical simulation analysis*

Advisors: Aurélien PONTE, Noé LAHAYE and Xavier CARTON

- Contribute to the effort around SWOT to disentangle internal tides and balanced flow by providing a better characterization of internal tides using of drifters data
- Estimate internal tides properties (energy levels, decorrelation timescales) from numerical simulation outputs and simulated drifters trajectories and compare the results in both perspectives
- Develop a predictive theoretical model describing biases one may observe in Lagrangian observations and their link to low frequency motion properties

2019
(5 months)

Internship

📍 Plouzané, France

LOPS, IFREMER

Layering in the Canada basin and impact of mesoscale eddies

- *In situ data analysis*, Advisors: Claire MENESGUEN and Camille LIQUE

Study the evolution of the stratification in Canada basin over 10 years by developing criteria to characterize this evolution in various observational datasets (CTD + ADCP): moorings, IceTethered Profilers and ship surveys.

2018
(2 months)

Internship

📍 Plouzané, France

LOPS, IFREMER

Stratification around mesoscale eddies in the Arctic ocean

- *In situ data analysis*

Advisors: Claire MENESGUEN

Study mesoscale mid-depth and deep eddies in the Canada Basin and their impact on the background stratification using moored observations as well as data from ITPs and ship surveys.

2017
(3 months)

Internship

📍 Paris, France

LOCEAN, UPMC

Internal waves generation and observation in a stratified fluid

- *Experimental internal wave*

Advisors: Guillaume GASTINEAU and Pascale BOURUET-AUBERTOT

Experimental study of internal waves generation and propagation in a stratified fluid and impact of the forcing frequency and the wave speed. An experimental set up was developed for this purpose.

EDUCATION

2019-2022	Doctoral Degree, Physical oceanography <i>LOPS, IFREMER, Université de Bretagne Occidentale</i>	📍 Brest, France
2017-2019	Master Degree, Marine physics <i>Université de Bretagne Occidentale</i>	📍 Brest, France
2014-2017	Bachelor Degree, Physics <i>Université Pierre and Marie Curie, Sorbonne Université</i>	📍 Paris, France

PUBLICATIONS

In prep. 2025	Impact of mesoscale eddies on near-inertial wave vertical propagation in Iceland Basin, Z.Caspar-Cohen, G.Voet and A.Waterhouse, ,
Scientific Reports 2025	Combining surface drifters and high resolution global simulations enables the mapping of internal tide energy, Z.Caspar-Cohen, A.Ponte , N.Lahaye, X.Yu, E.Zaron, B.Arbic, S.Le Gentil, D.Menemenlis, <i>Sci Rep</i> 15, 10.1038/s41598-025-92662-w
JGR: Oceans 2024	Lagrangian Versus Eulerian Spectral Estimates of Surface Kinetic Energy Over the Global Ocean, Xinwen Zhang, Xiaolong Yu, Aurélien L. Ponte, Zoé Caspar-Cohen, Sylvie Le Gentil, Lu Wang, Wenping Gong, <i>Journal of Geophysical Research : Oceans</i> , 10.1029/2024JC021057
JGR: Oceans 2022	Density Staircases Are Disappearing in the Canada Basin of the Arctic Ocean, C.Menesguen, C.Lique, Z.Caspar-Cohen, <i>Journal of Geophysical Research : Oceans</i> , 10.1029/2022JC018877
JPO 2022	Characterization of Internal Tide Incoherence: Eulerian versus Lagrangian Perspectives, Z.Caspar-Cohen, A.Ponte , N.Lahaye, X.Carton, X.Yu, S.Le Gentil, <i>Journal of Physical Oceanography</i> , 10.1175/JPO-D-21-0088.1
JGR: Oceans 2021	Geostrophy Assessment and Momentum Balance of the Global Oceans in a Tide- and Eddy-Resolving Model, X.Yu, A. L. Ponte, N.Lahaye, Z.Caspar-Cohen, D.Menemenlis, <i>Journal of Geophysical Research : Oceans</i> , 10.1029/2021JC017422

OTHER EXPERIENCES/FORMATIONS

2024	MOTIVE Expedition <i>PI: Caitlin Whalen and Gunnar Voet</i> Observation of Tropical Instability Waves around 140°W in equatorial Pacific.	📍 R/V Sikuliaq
2024	A step beyond: after school outreach program <i>Gunnar Voet</i> Guide students and parents through the visit of the R/V Sally Ride.	📍 R/V Sally Ride
2024	NOPP Expedition <i>PI: Drew Lucas and Magdalena Andres</i> Retrieval and deployment of one mooring in SWOT CalVal California area as part of the NOPP.	📍 R/V Sally Ride
2020	Data sciences for Geosciences <i>ENSEEHIT</i> Formation on data analysis tools used in Geosciences.	📍 Toulouse, France
2019	Formation for CROCO users <i>IFREMER</i> Formation on the various features of the numerical model ROMS (CROCO).	📍 Plouzané, France

SCIENTIFIC COMMUNICATION (2024-2025)

2025	NOPP 2025 <i>Z.Caspar-Cohen, A.Waterhouse and G.Voet</i> Oral presentation - Impact of mesoscale activity on near-inertial wave vertical propagation in Iceland Basin	📍 Tallahassee, FL, USA
2024	Seminar JPL <i>Z.Caspar-Cohen, A.Waterhouse and G.Voet</i> Impact of mesoscale activity on near-inertial wave vertical propagation in Iceland Basin	📍 JPL, Pasadena, CA, USA
2024	SWOT workshop <i>Z.Caspar-Cohen, A.Ponte , N.Lahaye, X.Yu, E.Zaron, B.Arbic, S.Elipot, S.Le Gentil</i> Oral presentation - Combining surface drifters and high resolution global simulations enables the mapping of internal tide energy	📍 SIO, San Diego, CA, USA
2024	GRC: Ocean Mixing <i>Z.Caspar-Cohen, A.Waterhouse and G.Voet</i> Poster presentation - Impact of mesoscale activity on near-inertial wave vertical propagation in Iceland Basin	📍 South Hadley, MA, USA
2024	Ocean Sciences Meeting <i>Z.Caspar-Cohen, A.Waterhouse and G.Voet</i> Poster presentation - Impact of mesoscale activity on near-inertial wave vertical propagation in Iceland Basin	📍 New Orleans, LA, USA
2024	Seminar WHOI <i>Z.Caspar-Cohen, A.Ponte , N.Lahaye, X.Carton, X.Yu, S.Le Gentil</i> Characterization of internal tides in Eulerian and Lagrangian perspectives	📍 Remote