

# César Sauvage

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## Education





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- Ph.D. at the National Center for Meteorological Research (CNRM)** Oct. 2016 – Dec. 2019  
*Paul Sabatier University, Toulouse, France*
- Ocean-atmosphere coupling for prediction of Mediterranean heavy precipitation events : better modeling and impacts of river runoff and sea state.
- Engineering degree - Hydrology major** Sept. 2012 – Jan. 2015  
*Polytech Nice-Sophia Antipolis, France*
- 3 year master program.
  - Semester in South Korea in 2014 at Incheon National University.

## Positions Held

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- Oceanographic Researcher** Honolulu, HI, USA  
*University of Hawai'i at Mānoa*  
 Nov. 2024 – present
- Advisor: Hyodae Seo
  - Guest Investigator at Woods Hole Oceanographic Institution (WHOI)
- Research Associate III** Woods Hole, MA, USA  
*Woods Hole Oceanographic Institution (WHOI)*  
 Jun. 2023 – Nov. 2024
- Advisors: Hyodae Seo and Carol Anne Calyson
- Postdoctoral Investigator** Woods Hole, MA, USA  
*Woods Hole Oceanographic Institution (WHOI)*  
 Feb. 2020 – Jun. 2023
- Advisor: Hyodae Seo and Carol Anne Calyson
- Ph.D. student** Toulouse, France  
*National Center for Meteorological Research (CNRM)*  
 Oct. 2016 – Dec. 2019
- Advisors: Cindy Lebeaupin Brossier, Marie-Noëlle Bouin and Véronique Ducrocq
- Guest student** Toulon, France  
*Mediterranean Institute of Oceanography (MIO)*  
 Apr. 2024 – Sept. 2015
- Advisors: Anne Molcard and Yann Ourmières

## Publications

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- [9] - **Sauvage, C.**, Seo, H., Zippel, S., Clayson, C-A., Edson, J., *Fetch-dependent Surface Wave Responses To Off-shore Wind Farms in the Northeast U.S. Coast*. Journal of Geophysical Research : Oceans, 130, [e2024JC021162](#), 2025.
- [8] - Seo, H., **Sauvage, C.**, Renkl, C., Lundquist, J., Kirincich, A., *Sea Surface Warming and Ocean-to-Atmosphere Feedback Driven by Large-Scale Offshore Wind Farms under Seasonally Stratified Conditions*. Science Advances, Vol 11, Issue 45, [10.1126/sciadv.adw7603](#), 2025.
- [7] - Nuijens, L., and coauthors including **Sauvage, C.**, *The Air-Sea Interaction (ASI) submesoscale: physics and impact*. [10.5065/78ac-qd31](#), 2024.
- [6] - **Sauvage, C.**, Seo, H., Barr, B., Edson, J.B. and Clayson, C.A., *Misaligned Wind-Waves Behind Atmospheric Cold Fronts*. Journal of Geophysical Research : Oceans, 129, [e2024JC021162](#), 2024.
- [5] - Bouin M-N, C. Lebeaupin Brossier, S. Malardel, A. Voltaire, **Sauvage, C.**, *The wave-age-dependent stress parameterisation (WASP) for momentum and heat turbulent fluxes at sea in SURFEX v8.1*, Geosci. Model Dev., 17, 117–141, [gmd-17-117-2024](#), 2024.

- [4] - **Sauvage, C.**, Seo, H., Clayson, C.A. and Edson, J.B., *Improving wave-based air-sea momentum flux parameterization in mixed seas*. Journal of Geophysical Research : Oceans, 128, e2022JC019277, [10.1029/2022JC019277](https://doi.org/10.1029/2022JC019277) , 2023.
- [3] - **Sauvage, C.**, Lebeaupin Brossier, C., Bouin, M-N., *Towards kilometer-scale ocean-atmosphere-wave coupled forecast on a Mediterranean heavy precipitation event*. Atmos. Chem. Phys., 21, 11857–11887, [10.5194/acp-21-11857-2021](https://doi.org/10.5194/acp-21-11857-2021) , 2021.
- [2] - **Sauvage, C.**, C.Lebeaupin Brossier, C., Bouin, M-N., and Ducrocq, V., *Characterization of the air-sea exchanges during a Mediterranean heavy precipitation event using realistic sea state modelling*. Atmos. Chem. Phys., 20, 1675–1699, [10.5194/acp-20-1675-2020](https://doi.org/10.5194/acp-20-1675-2020) , 2020.
- [1] - **Sauvage, C.**, Lebeaupin Brossier, C., Ducrocq, V., Bouin, M-N., Vincendon, B., Verdecchia, M., Taupier-Letage, I. and Orain, F., *Impact of the representation of the freshwater river input in the Western Mediterranean Sea*. Ocean Modelling, 131, 115-131, [10.1016/j.ocemod.2018.09.005](https://doi.org/10.1016/j.ocemod.2018.09.005) , 2018.
- ONR SAFARI (Study of Air-Sea Fluxes and Atmospheric River Intensity DRI. Marine Meteorology and Space Weather at ONR. (2025-2028): sole PI

## Projects

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|---|---------|
| <b>ONR SAFARI (2025-2028)</b>   | Current |
| <ul style="list-style-type: none"> <li>◦ <i>Study of Air-Sea Fluxes and Atmospheric River Intensity DRI. Marine Meteorology and Space Weather at ONR.</i> PI: Seo H.</li> </ul>   |         |
| <b>NSF PO (2022-2026)</b>   | Current |
| <ul style="list-style-type: none"> <li>◦ <i>Improving understanding of coupled impacts of oceans and waves on air-sea fluxes in the US Northeast Coast.</i> PIs: Seo H., Sauvage C., and Clayson C.A.</li> </ul>  |         |
| <b>NASA MAP (2021-2026)</b>   | Current |
| <ul style="list-style-type: none"> <li>◦ <i>Improving coupled atmosphere-ocean processes in NU-WRF for the simulation of coast-threatening extratropical cyclones in the northeastern US.</i> PIs: Seo H., Clayson C.A., Braun S.A. and Shi R.</li> </ul> |         |
| <b>DOE WFIP3 (2021-2026)</b>  | Past    |
| <ul style="list-style-type: none"> <li>◦ <i>Improving High Resolution Offshore Wind Resource Assessments and Forecasts using Observations in the MA/RI Lease Areas.</i> PIs: Kirincich et al.</li> </ul>  |         |
| <b>NOAA CVP (2019-2024)</b>   | Past    |
| <ul style="list-style-type: none"> <li>◦ <i>Coupled Ocean-atmosphere interaction mediated by ocean mesoscale eddies in the Northwestern Tropical Atlantic Ocean.</i> PIs: Seo H., Clayson C.A.</li> </ul>   |         |
| <b>MISTRALS - HYMEX (2010-2020)</b>   | Past    |
| <ul style="list-style-type: none"> <li>◦ <i>Hydrological Cycle in Mediterranean Experiments.</i> PIs: Drobinski et al.</li> </ul>   |         |

## Honor and Awards

- Travel grant received to attend the **Workshop on Atmosphere-ocean coupling at (sub)mesoscales**, Leiden, the Netherlands, Sept. 2023.
- Travel grant received as early career scientist to attend the **US CLIVAR Mesoscale and Frontal-Scale Air-Sea Interactions Workshop**, Boulder, CO, USA, March 2023.
- Invited to participate to the **Physical Oceanography Dissertation Symposium XI (PODS)**, Kaua'i, Hawai'i. Oct. 2021

## Teaching and Outreach

- **"Ocean-Atmosphere Interactions Impact on Global Climate"**, Guest lecture in Earth and Science class at Glenville State University, Glenville, WV. Apr. 2023 (virtual).
- **"Introduction to ocean surface waves"**, Guest lecture for the MIT/WHOI Joint Program, Woods Hole, MA. Nov. 2021.

## Student Mentoring

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- **Summer 2025**, Co-advising Clint Reyes (University of Hawai'i at Mānoa). Clint is working on wave modeling of the typhoon Khanun passing near the islands of Okinawa during August 2023.
- **Winter 2024**, Co-advised Yoo-Jun Kim (Tokyo University) during November 2023-March 2024; Yoo-Jun is working on coastal and estuary circulation around Japan, looking into LES-scale winds and circulation.
- **Summer 2023**, Co-advised Peisen Tan (University of Miami); Peisen was working on laboratory and numerical modeling of short wind waves and swell interactions.

## Community Activities

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- **Session chair : "Waves in the large-scale air-sea system"** at The 4th workshop on Waves and Wave-Coupled Processes, Uppsala, Sweden, February 2023.
- **Session chair : "Regional / Shelf Scale"** at the Physical Oceanography Dissertation Symposium XI, Kaua'i, Hawai'i, USA, Oct. 2021.
- **Panelist reviewer** for the NOAA Modeling, Analysis, Predictions, and Projections (MAPP) Program.
- **Ad hoc reviewer** for the National Science Foundation (NSF) and for the French National Research Agency (ANR).
- **Reviewer** for Journal of Geophysical Research (JGR): Oceans; JGR: Atmospheres; Atmospheric Chemistry and Physics (ACP); Geoscientific Model Development (GMD); Scientific Reports; Limnology; Asia-Pacific Journal of Atmospheric Sciences (APAS); Journal of Physical Oceanography (JPO); Journal of Atmospheric and Oceanic Technology (JTECH); Geophysical Research Letters (GRL).
- **Co-organizer of the Physical Oceanography Department Seminar** at WHOI (2021- 2022).
- **Member of the Physical Oceanography Website Committee** at WHOI (2022 – 2024).

## Conferences and Seminars

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\*\* indicates invited talks.

### 2025

- **\*\*AGU 2025 Fall meeting, Honolulu, New Orleans, LA, USA, Dec. 2025**  
**Sauvage C.**, H. Seo, B. Barr, J. B. Edson and C-A. Clayson: *Impacts of surface waves on air-sea flux and marine boundary layer processes*. Talk.
- **SA3NDBAR ONR Meeting, Monterey, CA, USA, Dec. 2025**  
**Sauvage C.**, H. Seo, B. Barr, C-A. Clayson and J. B. Edson: *Misaligned Wind-Waves Behind Atmospheric Cold Fronts*. Poster.
- **Mesoscale and Sub-mesoscale Ocean Dynamics and Air-Sea Interaction, Honolulu, HI, USA, Aug. 2025**  
**Sauvage C.**, H. Seo, B. Barr, J. B. Edson and C-A. Clayson: *Impacts of surface waves on air-sea flux and marine boundary layer processes*. Talk.
- **Waves in Sea Environments (WISE) meeting, Seattle, WA, USA, May 2025.**
  - **Sauvage C.**, H. Seo, B. Barr, J. B. Edson and C-A. Clayson: *Misaligned Wind-Waves Behind Atmospheric Cold Fronts*. Talk.
  - **Sauvage C.**, H. Seo, S. Zippel: *Surface wave response to offshore wind farms off the Coast of New England*. Poster.
- **\*\*International Climate AND Ocean sciences meeting (ICANDO), Virtual, Jan. 2025**  
**Sauvage C.**, H. Seo, B. Barr, J. B. Edson and C-A. Clayson: *Ocean surface waves impact on air-sea momentum flux*. Talk.

### 2024

- **NAWEA/WindTech 2024 Conference, New Jersey, NJ, USA, Nov. 2024.**
  - **Sauvage C.**, H. Seo, S. Zippel: *Surface wave response to offshore wind farms off the Coast of New*

England. Talk.

- Seo H., **C. Sauvage**, C. Renkl, J. Lundquist and A. Kirincich: *Anomalous Sea Surface and Ocean Mixed Layer Warming Driven by Large-Scale Offshore Wind Farms*. Talk.
- **The 5th Workshop on Waves and Wave-Coupled Processes, Reading, UK, Apr. 2024.**  
**Sauvage C.**, H. Seo, B. Barr, J. B. Edson and C-A. Clayson: *Misaligned Wind-Waves Behind Atmospheric Cold Fronts*. Talk.
- **Ocean Science Meeting 2024, New Orleans, LA, USA, Feb. 2024.**  
**Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *Air-Sea Flux Impacts Over Misaligned Waves During Atmospheric Cold Fronts*. Talk.

## 2023

- **NAWEA/WindTech 2023 Conference, Denver, CO, USA, Nov. 2023.**  
**Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *On the misaligned wind waves behind the atmospheric cold fronts*. Poster.
- **Workshop on Atmosphere-ocean coupling at (sub)mesoscales, Leiden, the Netherlands, Sept. 2023.**  
**Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *Improving wave-based air-sea momentum flux parameterization in mixed seas*. Poster.
- **\*\*ODYSEA: winds and currents seminar series, Virtual, May 2023.**  
**Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *Improving wave-based air-sea momentum flux parameterization in mixed seas*. Talk.
- **The 29th WISE meeting, New Jersey, NY, USA, May 2023.**  
**Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *Improving wave-based air-sea momentum flux parameterization in mixed seas*. Talk.
- **WHOI Physical Oceanography Seminar, Physical Oceanography Seminar, Woods Hole, MA, USA, Apr. 2023.**  
**Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *Improving wave-based air-sea momentum flux parameterization in mixed seas*. Talk.
- **\*\*Graduate School of Oceanography, Physical Oceanography Seminar, Rhode Island, RI, USA, March, 2023.**  
**Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *Improving wave-based air-sea momentum flux parameterization in mixed seas*. Talk.
- **US CLIVAR Mesoscale and Frontal-Scale Air-Sea Interactions Workshop, Boulder, CO, USA, March, 2023.**
  - **Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *Improving wave-based air-sea momentum flux parameterization in mixed seas*. Poster.
  - Seo H., **C. Sauvage**, C. Renkl, C-A. Clayson and J. B. Edson: *On the misaligned wind waves behind the atmospheric cold fronts*. Poster.
- **The 4th Workshop on Waves and Wave-Coupled Processes, Uppsala, Sweden, Feb. 2023.**  
**Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *Improvements of parametrized air-sea momentum flux using coupled wave modeling in the Northwest Tropical Atlantic Ocean*. Talk.
- **AMS 103rd Annual Meeting, Denver, CO, USA, Jan. 2023.**
  - **Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *Impacts of Surface Waves on Air-Sea Flux and Marine Boundary Layer Processes in the North Atlantic Oceans*. Talk. 14th Conference on Weather, Climate, and the New Energy Economy.
  - Edson J.B., D. C. Vandemark, H. Seo, M. Emond, **C. Sauvage**, and C-A. Clayson: *Oceanic Data for Atmospheric Research: Improvements to the COARE Bulk Flux Algorithm using OOI Surface Flux Data*. 23rd Conference on Air-Sea Interaction, co-author.

## 2022

- **AGU Fall Meeting, Virtual, Dec 2022.**
  - **Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *Impacts of Waves and Sea States on Air-Sea Momentum Flux in the Northwest Tropical Atlantic Ocean : Parameterization and Wave Coupled Climate*

*Modeling*. Talk.

- Edson J.B., D. C. Vandemark, H. Seo, M. Emond, **C. Sauvage**, and C-A. Clayson: *Improvements to the COARE Bulk Flux Algorithm using OOI Surface Flux Data*. (Poster, co-author).
- DeSilva A.M., K. L. Daly, G. Voulgaris, J. B. Edson, A. J. Plueddemann, **C. Sauvage**, A. Nath, K. G. Bemis, E. Biondi, A. S. Bower, M. Denolle, J. Fang and A. Z. Wang: *Ocean Observatories Initiative Facility Board (OOIFB) Town Hall*. (Lightening talk, co-author).

- **Whither the Gulf Stream Workshop: Present Understanding and Future Opportunities for Elucidating the Role of the Gulf Stream in Weather and Climate, Woods Hole, MA, USA, June 2022.**

**Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *Impacts of surface waves on air-sea flux and marine boundary layer processes in the North Atlantic Oceans*. Poster.

- **US CLIVAR Air-Sea Interaction Working Group, Virtual, Mar. 2022.**

**Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *Impacts of surface waves on air-sea flux and marine boundary layer processes in the extratropical and tropical North Atlantic Oceans*. Talk.

- **Ocean Science Meeting, Virtual, Feb. 2022.**

**Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *Impacts of waves and sea states on air-sea flux in the Northwest Tropical Atlantic Ocean : parameterization and wave coupled climate modeling*. Talk.

## 2021

- **Coastal Ocean Fluid Dynamics Laboratory (COFDL) Seminar, Virtual, Dec. 2021.**

**Sauvage C.**, H. Seo, C-A. Clayson and J. B. Edson: *Impacts of sea states on momentum flux in the Northwest Tropical Atlantic Ocean*. Talk.

- **The International Workshop for Mid-Latitude Air-Sea Interaction, Virtual, Jun. 2021.**

**Sauvage C.**, H. Seo and C-A. Clayson: *Effects of sea state and small-scale currents on air-sea fluxes in the Northwest Tropical Atlantic Ocean*. Talk.

- **Pohang University of Science and Technology (POSTECH) seminar, Virtual, Apr. 2021.**

**Sauvage C.**, C. Lebeaupin Brossier, M-N. Bouin, H. Seo and C-A. Clayson: *Modeling of ocean mesoscale variability and coupled ocean atmosphere interaction*. Talk.

- **EGU Annual Meeting, Virtual, Apr. 2021.**

**Sauvage C.**, H. Seo and C-A. Clayson: *Effects of sea state and small-scale currents on air-sea fluxes in the Northwest Tropical Atlantic Ocean*. Talk.

- **AMS 101st Annual Meeting, Virtual Jan. 2021.**

**Sauvage C.**, H. Seo and C-A. Clayson: *Modeling of ocean mesoscale variability and coupled ocean-atmosphere interaction in the Northwest Tropical Atlantic Ocean*. Talk.

## 2020

- **AGU Fall Meeting, Virtual, Dec. 2020.**

**Sauvage C.**, H. Seo and C-A. Clayson: *Modeling of ocean mesoscale variability and coupled ocean-atmosphere interaction in the Northwest Tropical Atlantic Ocean*. Talk.

- **Physical Oceanography Seminar, Woods Hole, MA, USA, Sept. 2020.**

**Sauvage C.**, C. Lebeaupin Brossier, V. Ducrocq and M-N. Bouin: *Ocean-atmosphere coupling for prediction of Mediterranean heavy precipitation events: better modeling and impacts of river runoff and sea state*. Talk.

## 2019

- **12th HyMeX workshop, Split, Croatia, May 2019.**

**Sauvage C.**, C. Lebeaupin Brossier, V. Ducrocq and M-N. Bouin: *Characterization of the air-sea exchange during a Mediterranean heavy precipitation event using realistic sea state modelling*. Talk.

## 2018

- **AMS 21st Conference on Air-Sea Interaction, Oklahoma City, OK, USA, June 2018.**

**Sauvage C.**, C. Lebeaupin Brossier, V. Ducrocq and M-N. Bouin: *Role of the sea state on the air-sea exchanges during a Mediterranean heavy precipitation event in a kilometer-scale forecast system*. Talk.

- **11th HyMeX workshop, Lecce, Italy, June 2018.**

**Sauvage C.**, C. Lebeaupin Brossier, V. Ducrocq and M-N. Bouin: *Role of the sea state on the air-sea exchanges during a Mediterranean heavy precipitation event in a kilometer-scale forecast system*. Talk.

**2017**

- **10th HyMeX workshop, Barcelona, Spain, July 2017.**

**Sauvage C.**, C. Lebeaupin Brossier, V. Ducrocq and M-N. Bouin: *Ocean-atmosphere coupling for Mediterranean heavy precipitation forecast: better river runoff and sea state modelling*. Poster.