

Odilon J. HOUNDEGNONTO

Ph.D. - Physical Oceanography and Environment

NASA Jet Propulsion Laboratory/Caltech,
M/S 300-323, 4800 Oak Grove Drive,
Pasadena, CA 91109, United States
✉ odilon.joel.houndegnonto@jpl.nasa.gov

— • [ResearchGate](#) • [GitHub](#) • [ORCID](#) • [LinkedIn](#) • —
<https://ojhoundegnonto.github.io/>

My background is physics, including ocean physics and climate dynamics, underpinned by a strong mathematics skillset with extensive experience using Python and Matlab for analysis. I extensively use Python Jupyter notebooks for my analyses of satellite data (e.g., sea surface salinity, sea surface temperature, sea surface height) and numerical model output (MITgcm, ECCO & NEMO) on both local and cloud compute environments. My research interests expand from understanding the ocean responses to the climate change via air-sea interaction to the global freshwater cycle (Rivers, Sea Ice & Precipitation). I am very flexible and eager to discover and learn new things to strengthen my career.

Education

- 2018-2021 - **Ph.D.**, *Physical Oceanography and Environment*, Topic: Analysis of freshwater plumes thermohaline variations from intra-seasonal to seasonal scales in the Gulf of Guinea, at Laboratory for Ocean Physics and Satellite remote sensing, **LOPS** - IRD/UBO/Ifremer/IUEM - Brest, France, with Dr. Christophe Maes and Dr. Nicolas Kolodziejczyk, with Honors
- 2016-2017 - **Research Master of science in Physical Oceanography and Applications /Sciences de l'océan, de l'atmosphère et du climat**, jointly accredited by Paul Sabatier University of Toulouse (UPS, France) and International Chair in Mathematical Physics and Applications (ICMPA UNESCO- Chair) of University of Abomey Calavi (UAC, Benin), Rank : 1st with Honors.
- 2014-2015 - **Maîtrise ès-sciences Physiques, specialization: Physics**, Faculty of Sciences and Technologies - FAST/UAC, Benin
- 2013-2014 - **Licence ès-sciences Physiques, specialization: Physics**, Faculty of Sciences and Technologies - FAST/UAC, Benin

Awards

- July 2018 - **Laureate of Make Our Planet Great Again - MOPGA**, of French Republic for my PhD project and co-funded by Institut de Recherche pour le Développement - IRD, France, (Rank: 8th)

Professional Experiences and Research Training

- 2025 - **PostDoc Researcher (01/2025-present)**, at **NASA-JPL/Caltech**. Python Routines/Packages development to support PO.DAAC activities for ECCO data under the supervision of **Dr. Ian G. Fenty**
- 2024 - **PostDoc Researcher (01/2023-01/2025)**, NASA Jet Propulsion Laboratory/Caltech - Salinity and Stratification at Sea Ice Edge - SASSIE project, supervised by Dr. Severine Fournier and Dr. Ian G. Fenty.
 - Study of the upper pycnocline salinity stratification and ocean heat content preconditioning for sea-ice formation during the fall-winter seasons in the Beaufort Sea using MITgcm modeling approach.
 - Assessment of SMOS and SMAP Sea Surface Salinity against SASSIE In Situ Measurements in the Arctic Ocean
- **ECCO Hack Week 2024**, at **Caltech/Keck Institute for Space Studies**. Deep learning of the ECCO model environment, its built-in Python packages and the EMU tools: Sampling, Adjoint, Convolution and Attribution: Oct. 14-18, 2024
- Mar-Dec - **PostDoc Researcher, CNRS/LOPS, Brest, France (ESA 4DAtlantic-OHC project)**
- 2022 • **Validation of the Ocean Heat Content** derived from satellite products (estimated from Gravimetry and Altimetry) with In situ observations (CTD) along OVIDE transects (Portugal to Greenland) and Argo floats profiles.
 - Temperature and Salinity contributions to regional sea level changes in the north Atlantic subpolar gyre along the OVIDE transects (Portugal to Greenland), supervised by **Dr. William Llovel** and **Dr. Damien Desbruyères**
- 2021 - **Associate researcher**, : Projects and Research collaboration at the CIPMA-UNESCO Chair, UAC, Benin, from Dec. 2021 to present

- **Training in Scientific integrity in the research community** , (*in French: Intégrité scientifique dans les métiers de la recherche*), University of Bordeaux via FUN MOOC, - France, Sep. 2019 to Apr. 2021
- 2019 - **Summer School on Fluid Dynamics of Sustainability and the Environment** at Ecole Polytechnique of Paris, France, from 1st to 12th July, 2019
- **Training in Data Sciences for Geosciences: initiation to machine Learning and Deep Learning with Python**, Plouzané - France, from 14th to 18th January 2019
- 2018 - **Training in sampling techniques and methods, data analysis and interpretation of results**, GEOMAR - Kiel, Germany, July 2018
- **Participant of Oceanographic research cruise**, (M148 cruise) in the tropical Atlantic, R/V Meteor
- from 24th May to 29th June 2018; Position: **CTD, UCTD, ADCP** measurements, Microstructure, Argo and Glider float deployment + Physical analyzes
- 2017 - **Participant of research cruises on the Lake Nokoué in Benin (ADCP, CTD, Turbidity, Ph and, Bathymetry with echo-sounder measurements)** , IRD Benin & IRHOB, Period: 08-09/11/2017 and 31/09 to 01/10/2017

Publications

Peer Reviewed Publication

- [04] **Houndegnonto O. J.**, Fenty G. I., Fournier S., Steele M., Zahn M. J. and Gaube P. (2025), Thermohaline preconditioning for sea-ice formation in the Beaufort Sea. *Journal of Geophysical Research Letter* (under review)
- [03] **Houndegnonto O. J.**, Fournier, S., Fenty, I. G., Steele, M. and Pacini, A. (2025), Comparison between SMOS and SMAP Sea Surface Salinity and SASSIE In-situ Measurements in the Arctic Ocean. *Journal of Atmospheric and Oceanic Technology*. (under review)
- [02] **Rousseau, V.**, Fraudeau, R., Hammond, M., **Houndegnonto, O. J.**, Ablain, M., Blazquez, A., Calafat, F. M., Desbruyères, D., Foti, G., Llovel, W., Marti, F., Meyssignac, B., Restano, M. & Benveniste, J., (2023), Monitoring the regional **Ocean Heat Content** change over the Atlantic Ocean with the space geodetic approach. *Earth Syst. Sci. Data Discuss.* [preprint], <https://doi.org/10.5194/essd-2023-236>
- [01] **Houndegnonto, O. J.**, Kolodziejczyk, N., Maes, C., Bourlès, B., Da-Allada, C. Y., & Reul, N. (2021), Seasonal variability of freshwater plumes in the eastern Gulf of Guinea as inferred from satellite measurements. *Journal of Geophysical Research: Oceans*, 126, e2020JC017041. <https://doi.org/10.1029/2020JC017041>

In Preparation

- [01] **Houndegnonto O. J.**, Kolodziejczyk, N., Maes, C., Bourlès, B., Dobler, D., Grima, N., & Reul, N (2025), Upper Ocean staircases thermohaline stratification of the far field Congo River freshwater plume. *Journal of Geophysical Research: Oceans*. (in pre.)

Dissertations and Reports

- Thesis: - **Ph.D thesis, IRD-UBO/LOPS, Brest, France**, Analysis of freshwater plumes thermohaline variations from intra-seasonal to seasonal scales in the Gulf of Guinea, (<https://hal.archives-ouvertes.fr/tel-03615021>): from Oct. 2018 to Dec. 2021
- **M.Sc thesis, CIPMA-Chaire UNESCO/UAC-Benin and Univ.-Paul Sabatier, Toulouse, France**, Caractérisation des Panaches des Fleuves Niger et Congo dans le Golfe de Guinée., May-Aug. 2017
- Report: - **Co-author of 4DAtlantic OHC data validation report, CNRS-UBO/LOPS, Plouzané-Brest, France**, ESA 4DATLANTIC-OHC project hold by Magellium, Artal group, Toulouse, France., Mar-Dec. 2022
- **Calibration and validation of TSG salinity and temperature measurements, GEOMAR & POGO, Kiel, Germany**, 2018 NF-POGO- GEOMAR Fellowship for Ship-board Training on-board RV Meteor cruise M148, May-Jul. 2018.

Teaching and Mentorship

- 2024 - **Mentor of M. Barnabas Houindo.**, student in Master Océanographie et Applications at CIPMA, Université Abomey-Calavi/, Université Toulouse III. Nov. 2024 to present.

- 2023 - Collaborative mentorship work with Bingham Frederick (UNCW, USA) for John Oklu (intern) on Investigating fresh water pathways in the Arctic Ocean using modeling., Aug. 2023 to Oct. 2024
- 2012-2016 - Tutor:, individual tutoring of secondary school students in Physics, Chemistry and Technics, Abomey-Calavi, Benin

Review activities

- Since 2024 - Reviewer for the Journal of Geophysical Research Letters
- Since 2023 - Reviewer for NASA Solicitation and Proposal Integrated Review and Evaluation System - NSPIRES/FINESST: Physical Oceanography, for 2023 and 2024 solicitations
- Reviewer for IOP Science, Environmental Research Letters, Environmental Research Communications (Certificationn: Trusted Reviewer status of IOP Publishing)
- Reviewer for Marine Pollution Bulletin
- Since 2022 - Reviewer for the Journal of Geophysical Research: Oceans

Languages, Computing and Driving Skills

- Speaking: French – English – Fongbé (Mother tongue)
- OS: Mac, Linux, Docker images and Windows + WSL
- Scripting: Python, Matlab, Git-GitHub, Shell Bash, Fortran^{beg.}, R^{beg.}, JavaScript^{beg.}, SQL^{beg.}
- Editing: LaTeX, Microsoft Office, LibreOffice, Jupyter Notebook and Visual Studio Code
- Remote & Computing: Amazon Elastic Compute Cloud (EC2, NASA-JPL, USA) - IFREMER Datamor-Supercomputer (Ifremer LOPS, France)
- Model: MIT general circulation model - KPP 1D Diffusion-Convection model -, ARIANE - Oceanic langrangian analysis software/Model – SYMPHONIE, Coastal oceanography model
- Driving : Car driving license B — Boat driving license: coastal option

Voluntary Positions and Community Services

- 2024 - Co-organizer of the weekly seminar, for the Ocean Circulation and Air-Sea Interaction group of the Earth Science Division at the Jet Propulsion Laboratory, Pasadena, CA, USA | since Jan. 2024
- Volunteer, Judge-Reviewer of the AGU Student Travel Grant for helping students attend the AGU annual meeting in Washington D.C., USA | 9-13 December 2024
- Volunteer, Judge-Reviewer of the AGU Lloyd V. Berkner Travel Fellowship for supporting Students and Early Career Scientists from around the world to attend the AGU annual meeting in Washington D.C., USA | 9-13 December 2024
- 2023 - Volunteer, Judge of The Doris S. Perpall SURF Speaking Award, California Institute of Technology (Caltech, Pasadena, USA) - Period: 21st October 2023
- Volunteer, Judge of The Vodopia-Hasson Summer Poster Competition, California Institute of Technology (Caltech, Pasadena, USA) - Period: 24th August 2023
- 2020-2021 Spokesperson for non-permanent researchers on the board and scientific college of LOPS, Brest, France
- 2018 - Volunteer, hydrographer on board of Oceanographic research cruises (M148 cruise) in the tropical Atlantic, R/V Meteor - Period: 24th May to 29th June 2018.
- Volunteer researcher, Working with new Master students in Physical Oceanography and Applications, in their training and internship. (CIMPA UNESCO-Chair / UAC, Benin) - Period: October 2017 to May 2018

Conferences

- 2024 - Houndegnonto O. J., Fournier, S., & Fenty, G. I., : Comparison of SMOS and SMAP sea surface salinity against SASSIE in-situ measurements in the Arctic Ocean. Ocean Salinity Conference - May 14th, ESA ESTEC, The Netherlands, (as Poster)

- **Houndegnonto O. J., Fournier, S., & Fenty, G. I.** : Assessment of SMOS and SMAP Sea Surface Salinity against SASSIE In Situ Measurements in the Arctic Ocean. **Ocean Sciences Meeting** - February 22nd, New Orleans, LA, U.S.A. (as speaker)
- **S. Misra, M. Ogut, S. T. Brown, A. Akins, S. Fournier, I. G. Fenty, O. J. Houndegnonto, D. C Vandemark & S. Shellito** : Passive Microwave Remote Sensing Of Cold-Water Sea-Surface Salinity: Future Instrumentation And Techniques . **Ocean Sciences Meeting** - February 19th, New Orleans, LA, U.S.A. (as Poster presenter)
- 2023 - **Houndegnonto O. J., Fournier, S., & Fenty, G. I.** : Assessment of SMOS and SMAP Sea Surface Salinity against SASSIE In Situ Measurements in the Arctic Ocean. **JPL Postdoc Research Poster Day 2023** - November 29nd, Pasadena, CA, U.S.A. (as Poster)
- **Houndegnonto O. J., Kolodziejczyk, N., Maes, C., Bourlès, B., Dobler, D., Grima, N., Da-Allada, C. Y., & Reul, N.** : Upper Ocean staircases thermohaline stratification of far field Congo freshwater plume. **VEPOSSSS** - April 19th (as invited speaker, virtual)
- 2022 - **Houndegnonto O. J., W. Llovel & D. Desbruyères** : 4DAtlantic-OHC v0.4 validation against in situ observations in the Subpolar North Atlantic. **4DAtlantic - OHC project: Mid Term Review** - September 22th-23th, 2022, Magelium company site, Toulouse, **France** (as speaker)
- **Houndegnonto O. J., Kolodziejczyk, N., Maes, C., Bourlès, B., Dobler, D., Grima, N., Da-Allada, C. Y., & Reul, N.** : On the formation of thermohaline stratification off Congo River plume. **2022 Ocean Salinity Conference** - June 6th-9th, 2022, University of Columbia, New York, **USA** (Poster, virtual)
- **Houndegnonto O. J., Llovel, W. & Desbruyères, D.** : Full-depth temperature and salinity contribution to regional sea level changes in the north Atlantic subpolar gyre during 2002-2018 from repeated hydrographic transects. **Sea Level Workshop 2022** - June 1st-3th, 2022, Brest, **France** (as speaker)
- 2021 - **Houndegnonto O. J., Kolodziejczyk, N., Maes, C., Bourlès, B., Dobler, D., Grima, N., Da-Allada, C. Y., & Reul, N.** : On the formation of thermohaline stratification off Congo River plume. **TACCOVAR 2021** - Sep. 27th-30th, 2021, Cotonou, **Benin** (as speaker, virtual)
- 2019 - **Houndegnonto O. J., Kolodziejczyk, N., Maes, C., Bourlès, B., Da-Allada, C. Y., & Reul, N.** : Seasonal variability of Congo and Niger Rivers plumes in the Gulf of Guinea. **TACCOVAR 2019** - Sep. 23th -27th, 2019, Cotonou, **Bénin** (as speaker)
- **Houndegnonto O. J., Kolodziejczyk, N., Maes, C., Bourlès, B., Da-Allada, C. Y., & Reul, N.** : Seasonal variability of Congo and Niger Rivers plumes in the Gulf of Guinea. Summer School at **École Polytechnique de Paris Saclay**, July, 1st - 12th, 2019, Palaiseau, **France** (Poster)
- **Houndegnonto O. J., Kolodziejczyk, N., Maes, C., Bourlès, B., Da-Allada, C. Y., & Reul, N.** : Seasonal variability of Congo and Niger Rivers plumes in the Gulf of Guinea. **Living Planet Symposium 2019 (LPS19)**, May, 13th - 17th, 2019, Milan / **Italie** (as speaker)
- **Houndegnonto O. J., Kolodziejczyk, N., Maes, C., Bourlès, B., Da-Allada, C. Y., & Reul, N.** : Seasonal variability of Congo and Niger Rivers plumes in the Gulf of Guinea. **EGU 2019** (European Geosciences Union) General Assembly, Apr. 7th - 12th, 2019, Vienne/**Autriche** (as speaker)
- 2018 - **Houndegnonto O. J., Kolodziejczyk, N., Maes, C., Bourlès, B., Da-Allada, C. Y., & Reul, N.** : Characterization of Niger and Congo rivers plumes in the Gulf of Guinea. **2018 Ocean Salinity Sciences Conference** - Nov. 6th-9th, 2018, Sorbonne University, Paris/**France** (as speaker)

Referees

- [01] - Dr. Christophe Maes (HDR), **Researcher** at **IRD/LOPS**, France (christophe.maes@ird.fr)
- [02] - Dr. Nicolas Kolodziejczyk (HDR), **Researcher** at **UBO/LOPS**, France, (nicolas.kolodziejczyk@univ-brest.fr)
- [03] - Dr. Ian G. Fenty, **Scientist** at **NASA-JPL**, CA, U.S.A., (ian.fenty@jpl.nasa.gov)
- [04] - Dr. Menemenlis Dimitris, **Scientist** at **NASA-JPL**, CA, U.S.A., (dimitris.menemenlis@jpl.nasa.gov)
- [05] - Dr. William Llovel, **Researcher** at **CNRS/LOPS Brest**, France, (william.llovel@univ-brest.fr)
- [06] - Dr. Vincent Le Fouest, **Professor** at **La Rochelle University**, France, (vincent.le_fouest@univ-lr.fr)
- [07] - Dr. Damien Desbruyères, **Researcher** at **Ifremer/LOPS Brest**, France, (damien.desbruyeres@ifremer.fr)
- [08] - Dr. Severine Fournier, **Scientist** at **NASA-JPL**, CA, U.S.A., (severine.fournier@jpl.nasa.gov)