Odilon J. HOUNDEGNONTO

Ph.D. - Physical Oceanography and Environment

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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 : 1**st 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:** 8^{th})

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 2022 - **PostDoc Researcher**, *CNRS/LOPS, Brest, France (ESA 4DAtlantic-OHC project)*

• **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 1^{st} to 12^{th} July, 2019

- **Training in Data Sciences for Geosciences: initiation to machine Learning and Deep Learning with Python**, *Plouzané - France*, from 14^{th} to 18^{th} 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 (submitted)*

[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 Océanogrphie 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 sollicitations

- **Reviewer for IOP Science, Environmental Research Letters, Environmental Research Communications**

- **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 22^{nd}, 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 19^{th}, 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 29^{nd}, 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 19^{th} (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 22^{th}-23^{th}, 2022, Magelium company site, Toulouse, **Framce** (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 6^{th}-9^{th}, 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 1^{st}-3^{th}, 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. 27^{th}-30^{th}, 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. 23^{th} -27^{th}, 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, 1^{st} - 12^{th}, 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 Simposium 2019** (**LPS19**), May, 13^{th} - 17^{th}, 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. 7^{th} - 12^{th}, 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. 6^{th}-9^{th}, 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)