

Dr. Franz Philip Tuchen

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NOAA / Atlantic Oceanographic and Meteorological Laboratory (AOML)
Physical Oceanography Division (PhOD), Miami, FL, USA

Research Interest

I am an observational physical oceanographer with an interest in **tropical and equatorial ocean dynamics** on a wide range of temporal and spatial scales and its role in climate variability. In previous projects, I investigated subtropical/tropical circulation variability and oxygen ventilation, equatorial wave dynamics, deep intraseasonal variability and equatorial deep jets in the Atlantic Ocean. My current research is funded by an NRC Postdoctoral Research Associateship Award and focuses on the long-term variability of **Tropical Instability Waves** and their impact on climate variability. Through regular participation in multi-disciplinary research cruises to the tropical oceans I am trained to acquire, process and analyze a variety of oceanographic data.

Professional Experience

Jan 2022 –	Postdoctoral Research Associate (NRC Fellowship) NOAA/AOML (Miami, USA) Advisers: Renellys Perez, Gregory Foltz
Nov 2020 – Dec 2021	Postdoctoral Researcher GEOMAR (Kiel, Germany) Advisers: Peter Brandt, Joke Lübbecke
Apr 2017 – Oct 2020	Doctoral Researcher GEOMAR (Kiel, Germany) Adviser: Joke Lübbecke
Jan 2017 – Mar 2017	Researcher GEOMAR (Kiel, Germany) Adviser: Peter Brandt

Education

Apr 2017 – Oct 2020	Dr. rer. nat. in Physical Oceanography (Kiel University) Thesis: <i>“The Atlantic Subtropical Cells – Mean State and Variability from an Observational perspective”</i> Advisers: Joke Lübbecke, Sunke Schmidtke, Claus Böning
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Oct 2013 – Dec 2016

M.Sc. in Climate Physics (Kiel University)

Thesis: “*Intraseasonal Variability of the Equatorial Atlantic Ocean*”

Advisers: Peter Brandt, Martin Claus

Oct 2010 – Sep 2013

B.Sc. in Physics of the Earth System (Kiel University)

Thesis: “*The Impact of Wind Stress on the Atlantic Meridional Overturning Circulation*”




Advisers: Thomas Martin, Mojib Latif

Publications (in progress)

Tuchen, F. P., Perez, R. C., Foltz, G. R., Brandt, P., Subramaniam, A., Lee, S.-K., Lumpkin, R., & Hummels, R. (in preparation): Modulation of Equatorial Currents and Tropical Instability Waves during the 2021 Atlantic Niño. *Journal of Geophysical Research: Oceans*

Lee, S.-K., Lopez, H., Tuchen, F. P., Kim, D., Foltz, G. R., & Wittenberg, A. T. (in revision): On the Genesis of the 2021 Atlantic Niño. *Geophysical Research Letters*

Publications (peer-reviewed journal articles)

 (127 citations, h-index = 6)  (115 citations, h-index = 6)  (92 citations, h-index = 6)

- [11] **Tuchen, F. P., Perez, R. C., Foltz, G. R., Brandt, P., & Lumpkin, R.** (2022): Multidecadal Intensification of Atlantic Tropical Instability Waves. *Geophysical Research Letters*, 49(22), e2022GL0101073, doi: [10.1029/2022GL101073](https://doi.org/10.1029/2022GL101073)
- [10] Körner, M., Claus, M., Brandt, P., & **Tuchen, F. P.** (2022): Sources and Pathways of Intraseasonal Meridional Kinetic Energy in the Equatorial Atlantic Ocean. *Journal of Physical Oceanography*, 52(10), pp. 2445-2462, doi: [10.1175/JPO-D-21-0315.1](https://doi.org/10.1175/JPO-D-21-0315.1)
- [9] Heukamp, F., Brandt, P., Dengler, M., **Tuchen, F. P.**, McPhaden, M. J., & Moum, J. N. (2022): Tropical Instability Waves and Wind-Forced Cross-Equatorial Flow in the Central Atlantic Ocean. *Geophysical Research Letters*, 49(19), e2022GL099325, doi: [10.1029/2022GL099325](https://doi.org/10.1029/2022GL099325)
- [8] **Tuchen, F. P.**, Brandt, P., Hahn, J., Hummels, R., Krahnemann, G., Bourlès, B., Provost, C., McPhaden, M. J., & Toole, J. M. (2022): Two Decades of Full-Depth Current Velocity Observations from a Moored Observatory in the Central Equatorial Atlantic at 0°N, 23°W. *Frontiers in Marine Science*, 9:910979, doi: [10.3389/fmars.2022.910979](https://doi.org/10.3389/fmars.2022.910979)
- [7] Fu, Y., Brandt, P., **Tuchen, F. P.**, Lübbecke, J. F., & Wang, C. (2022): Representation of the Mean Atlantic Subtropical Cells in CMIP6 Models. *Journal of Geophysical Research: Oceans*, 127(3), e2021JC018191, doi: [10.1029/2021JC018191](https://doi.org/10.1029/2021JC018191)
- [6] **Tuchen, F. P.**, Brandt, P., Lübbecke, J. F., & Hummels, R. (2022): Transports and Pathways of the Tropical AMOC Return Flow from Argo Data and Shipboard Velocity

Measurements. *Journal of Geophysical Research: Oceans*, 127(2), e2021JC018115, doi: [10.1029/2021JC018115](https://doi.org/10.1029/2021JC018115)

- [5] Brandt, P., Hahn, J., Schmidtke, S., **Tuchen, F. P.**, Kopte, R., Kiko, R., Bourlès, B., Czeschel, R., & Dengler, M. (2021): Atlantic Equatorial Undercurrent intensification counteracts warming-induced deoxygenation. *Nature Geoscience*, 14, pp. 278-282, doi: [10.1038/s41561-021-00716-1](https://doi.org/10.1038/s41561-021-00716-1)
- [4] **Tuchen, F. P.**, Lübbecke, J. F., Brandt, P., & Fu, Y. (2020): Observed Transport Variability of the Atlantic Subtropical Cells and Their Connection to Tropical Sea Surface Temperature Variability. *Journal of Geophysical Research: Oceans*, 125(12), e2020JC016592, doi: [10.1029/2020JC016592](https://doi.org/10.1029/2020JC016592)
- [3] **Tuchen, F. P.**, Lübbecke, J. F., Schmidtke, S., Hummels, R., & Böning, C. W. (2019): The Atlantic Subtropical Cells Inferred from Observations. *Journal of Geophysical Research: Oceans*, 124(11), pp. 7591-7605, doi: [10.1029/2019JC015396](https://doi.org/10.1029/2019JC015396)
- [2] **Tuchen, F. P.**, Brandt, P., Claus, M., & Hummels, R. (2018): Deep Intraseasonal Variability in the Central Equatorial Atlantic. *Journal of Physical Oceanography*, 48(12), pp. 2851-2865, doi: [10.1175/JPO-D-18-0059.1](https://doi.org/10.1175/JPO-D-18-0059.1)
- [1] Greatbatch, R. J., Claus, M., Brandt, P., Matthießen, J.-D., **Tuchen, F. P.**, Ascani, F., Dengler, M., Toole, J. M., Roth, C., & Farrar, J. T. (2018): Evidence for the Maintenance of Slowly Varying Equatorial Currents by Intraseasonal Variability. *Geophysical Research Letters*, 45(4), pp. 1923-1929, doi: [10.1002/2017GL076662](https://doi.org/10.1002/2017GL076662)

Conference and workshop contributions (first-authored)

- [15] **Tuchen, F. P.**, Perez, R. C., Foltz, G. R., Brandt, P., Subramaniam, A., Lee, S.-K., & Lumpkin, R. (2023): Modulation of Tropical Instability Waves and chlorophyll concentration by equatorial waves during the 2021 Atlantic Niño. EGU General Assembly, 23.04.-28.04.2023, Vienna, Austria [TALK]
- [14] **Tuchen, F. P.**, Perez, R. C., Foltz, G. R., Brandt, P., & Lumpkin, R. (2023): Investigating long-term variability and trends of Atlantic Tropical Instability Waves with multidecadal satellite observations and mooring data. US CLIVAR Mesoscale and Frontal-Scale Air-Sea Interactions Workshop, 06.03.-08.03.2023, Boulder, USA [VIRTUAL POSTER]
- [13] **Tuchen, F. P.**, Perez, R. C., Foltz, G. R., Brandt, P., Lumpkin, R., Hahn, J., Hummels, R., Krahnemann, G., Bourlès, B., Provost, C., McPhaden, M. J., & Toole, J. M. (2022): Investigating long-term changes of equatorial ocean dynamics with 20 years of current velocity observations from a moored observatory at 0°N, 23°W. AGU Fall Meeting, 12.12.-16.12.2022, Chicago, USA [VIRTUAL TALK]
- [12] **Tuchen, F. P.**, Perez, R. C., Foltz, G. R., Brandt, P., & Lumpkin, R. (2022): Multidecadal Intensification of Atlantic Tropical Instability Waves. TRIATLAS 3rd General Assembly and Conference / PIRATA-25 Meeting, 03.10.-05.10.2022, Porto de Galinhas, Brazil [TALK]

- [11] **Tuchen, F. P.**, Brandt, P., Lübbecke, J. F., & Hummels, R. (2022): Transports and Pathways of the Tropical AMOC Return Flow from Argo Data and Shipboard Velocity Measurements. US AMOC Science Team Meeting, 25.04.-28.04.2022, Woods Hole, USA [TALK]
- [10] **Tuchen, F. P.**, Perez, R. C., Foltz, G. R., & Brandt, P. (2022): Interannual to Decadal Variability of Atlantic Tropical Instability Waves and its Connection to Regional Climate Variability. Ocean Sciences Meeting, 27.02.-04.03.2022 [VIRTUAL TALK]
- [9] **Tuchen, F. P.**, Brandt, P., Lübbecke, J. F., & Hummels, R. (2021): Mean Characteristics of the Tropical AMOC Return Flow from Argo and Shipboard Velocity Observations. TRIATLAS Web 2nd General Assembly, 27.09.-01.10.2021 [VIRTUAL POSTER]
- [8] **Tuchen, F. P.**, Brandt, P., Lübbecke, J. F., & Hummels, R. (2021): Tropical Pathways and Water Mass Transformation of the Atlantic Ocean Upper Circulation. PIRATA-24/TAV Meeting, 10.05.-14.05.2021 [VIRTUAL TALK]
- [7] **Tuchen, F. P.**, Lübbecke, J. F., Brandt, P., & Fu, Y. (2021): Observed Transport Variability of the Atlantic Subtropical Cells and Their Connection to Tropical Sea Surface Temperature Variability. EGU General Assembly: vEGU21, 19.04.-30.04.2021 [vPICO]
- [6] **Tuchen, F. P.**, Lübbecke, J. F., Brandt, P., & Fu, Y. (2020): Observed Transport Variability of the Atlantic Subtropical Cells and Their Impact on Tropical Sea Surface Temperature Variability. TRIATLAS Web 1st General Assembly, 12.05.-14.05.2020 [VIRTUAL POSTER]
- [5] **Tuchen, F. P.**, Lübbecke, J. F., Schmidtko, S., Hummels, R., Böning, C. W., & Brandt, P. (2020): Mean State and Seasonal to Interannual Variability of the Atlantic Subtropical Cells Inferred from Recent Observations. Ocean Sciences Meeting, 16.02.-21.02.2020, San Diego, USA [TALK]
- [4] **Tuchen, F. P.**, Lübbecke, J. F., Schmidtko, S., Hummels, R., & Böning, C. W. (2019): Characteristics of the Atlantic Subtropical Cells Inferred from Observations. EGU General Assembly, 07.04.-12.04.2019, Vienna, Austria [PICO]
- [3] **Tuchen, F. P.**, Lübbecke, J. F., & Schmidtko, S. (2018): Characteristics of the Atlantic Subtropical Cells Inferred from ARGO Data. PIRATA-23/TAOS Meeting, 22.10.-26.10.2018, Marseille, France [TALK]
- [2] **Tuchen, F. P.**, Brandt, P., Claus, M., & Hummels, R. (2018): Deep Intraseasonal Variability in the Central Equatorial Atlantic. PREFACE International Conference & Final Assembly, 17.04.-20.04.2018, Arrecife/Lanzarote, Spain [TALK]
- [1] **Tuchen, F. P.**, Brandt, P., & Claus, M. (2017): Intraseasonal Variability of the Equatorial Atlantic Ocean. PIRATA-22/TAV Meeting, 05.11.-10.11.2017, Fortaleza, Brazil [POSTER]

Seminars

- May 2023 Seminar at the *VIII Seminar of the Bilateral Cooperation DOCEAN-GEOMAR* on “Transports and Pathways of the Upper-Layer Circulation in the Tropical Atlantic Ocean” at UFPE, Recife, Brazil
- Mar 2023 [NOAA/AOML seminar on “Multidecadal Intensification of Atlantic Tropical Instability Waves”](#)
- Jul 2022 [INVITED] *WHOI Physical Oceanography seminar* on “Multidecadal Intensification of Atlantic Tropical Instability Waves”
- Jul 2022 [INVITED] *GEOMAR Physical Oceanography seminar* on “Multidecadal Intensification of Atlantic Tropical Instability Waves”
- Mar 2022 [INVITED] *NOAA/AOML seminar* on “Two Decades of Full-Depth Current Velocity Observations from a Moored Observatory in the Central Equatorial Atlantic at 0°N, 23°W”
- Feb 2022 [NOAA/AOML seminar on “Transports and Pathways of the Tropical AMOC Return Flow from Argo Data and Shipboard Velocity Measurements”](#)
- Feb 2021 Seminar at the *German Argo User Meeting* on “The Atlantic Subtropical Cells – Mean State and Variability Inferred from Argo Float Data”
- Oct 2019 Seminar at the *VII Seminar of the Bilateral Cooperation DOCEAN-GEOMAR* on “The Atlantic Subtropical Cells Inferred from Observations” at UFPE, Recife, Brazil

Convening

- 2022 Co-chair at the TRIATLAS 3rd General Assembly and Conference / PIRATA-25 Meeting (03.10.-05.10.2022)
- 2021 Co-chair for the “Earth system mechanisms” session at the PIRATA-24/TAV Virtual Meeting (10.05.-14.05.2021)
- 2020 Member of the Scientific Organizing Committee and session chair at the TRIATLAS 1st Web General Assembly (12.05.-14.05.2020)

Research cruises (362 days of sea-going physical oceanography)

2023 R/V **Maria S. Merian MSM117**

Recife, Brazil – Ponta Delgada, Portugal; Tropical Atlantic; 10.05-15.06.2023

Responsibilities: CTD watch, LADCP and vmADCP measurements, SVP drifters, MMP, mooring recovery and deployment

- 2023 **R/V F.G. Walton Smith (FLOTSUM2023)**
Miami, USA – Miami, USA; Florida Strait; 24.02.2023
Responsibilities: Training of undergraduate students (CTD casts, ADCP and meteorological measurements)
- 2023 **R/V Endeavor EN697 (AB2302)**
Ft. Lauderdale, USA – Ft. Lauderdale, USA; Subtropical North Atlantic; 05.02.-21.02.2023
Responsibilities: CTD watch, mooring recovery and deployment
- 2022 **R/V Ronald H. Brown PNE22**
Bridgetown, Barbados – Newport, USA; Tropical Atlantic; 01.11.-09.12.2022
Responsibilities: Co-Chief Scientist, CTD watch, salinity calibration, Argo float deployments
- 2022 **R/V F.G. Walton Smith (FLOTSUM2022)**
Miami, USA – Miami, USA; Florida Strait; 26.03.-27.03. + 02.04.2022
Responsibilities: Training of undergraduate students (CTD casts, ADCP and meteorological measurements)
- 2021 **R/V Alkor AL564**
Kiel, Germany – Kiel, Germany; Baltic Sea; 14.09.-17.09.2021
Responsibilities: Training of Bachelor students (CTD measurements, salinity calibration, ADCP and meteorological measurements)
- 2021 **R/V Sonne SO284**
Emden, Germany – Emden, Germany; Tropical Atlantic; 27.06.-16.08.2021
Responsibilities: CTD watch leader, LADCP and UVP measurements, MMP, mooring recovery and deployment
- 2020 **R/V Alkor AL541**
Kiel, Germany – Kiel, Germany; Baltic Sea; 07.08.-10.08.2020
Responsibilities: Training of Bachelor students (CTD measurements, salinity calibration, ADCP and meteorological measurements)
- 2019 **R/V Meteor M158**
Walvis Bay, Namibia – Recife, Brazil; Tropical Atlantic; 19.09.-26.10.2019
Responsibilities: CTD/MSS watch leader, MMP, mooring recovery and deployment
- 2018 **R/V Meteor M145**
Mindelo, Cape Verde – Recife, Brazil; Tropical Atlantic; 13.02.-14.03.2018
Responsibilities: CTD/MSS watch leader, salinity calibration, MMP, mooring recovery and deployment
- 2017 **R/V Meteor M138**
Callao, Peru – Bahia Las Minas, Panama; Eastern Tropical Pacific; 01.06.-05.07.2017
Responsibilities: CTD/MSS/uCTD watch leader, salinity calibration
- 2015 **R/V Meteor M119**
Mindelo, Cape Verde – Recife, Brazil; Tropical Atlantic; 08.09.-13.10.2015
Responsibilities: CTD/MSS watch leader, MMP, mooring recovery and deployment
- 2014 **R/V Polarstern PS88.2**
Las Palmas, Spain – Cape Town, South Africa; Tropical Atlantic; 02.11.-29.11.2014

Responsibilities: CTD/MSS watch, UVP measurements, mooring recovery and deployment

2014 **R/V Meteor M106**

Mindelo, Cape Verde – Fortaleza, Brazil; Tropical Atlantic; 19.04.-26.05.2014

Responsibilities: CTD/MSS watch, salinity calibration, MMP, mooring recovery and deployment

2012 **R/V Alkor AL03/12**

Kiel, Germany – Kiel, Germany; Baltic Sea; 23.09.-24.09.2012

Student training: CTD measurements, salinity calibration, ADCP and meteorological measurements

Summer Schools & Workshops

- 2023 US CLIVAR Mesoscale and Frontal-Scale Air-Sea Interactions Workshop (06.03.-08.03.2023, Boulder, USA & online)
- 2022 TRIATLAS-TAPIOCA-CANEMS-UFPE Summer School and Workshop on the functioning of Tropical and South Atlantic marine ecosystems (25.09.-01.10.2022, Tamandaré, Brazil)
- 2020 Nansen Tutu TRIATLAS Summer School on Ocean, Climate and Marine Ecosystems (14.01.-21.01.2020, Cape Town, South Africa)
- 2014 Nansen Tutu Summer School on Ocean, Climate and Marine Ecosystems: A focus on the Agulhas Current, the Benguela upwelling system and the Tropical Atlantic (01.12.-08.12.2014, Cape Town, South Africa)

Grants & Awards

- 2021 & 2022 United States National Research Council (NRC) Postdoctoral Research Associateship Award of about 75k\$ per year (granted for 12 months, renewed for 12 months after positive evaluation)
- 2020 German Academic Exchange Service (DAAD) travel scholarship (Ocean Sciences Meeting 2020, 16.02.-21.02.2020, San Diego, USA) of about 2k€
- 2020 Best PhD student presentation at the Nansen Tutu TRIATLAS Summer School (14.01.-21.01.2020, Cape Town, South Africa)
- 2018 Integrated School of Ocean Sciences (ISOS) travel grant (PIRATA-23/TAOS Meeting, 22.10.-26.10.2018, Marseille, France) of about 400€
- 2017 Integrated School of Ocean Sciences (ISOS) travel grant (PIRATA-22/TAV Meeting, 05.11.-10.11.2017, Fortaleza, Brazil) of about 1k€

Teaching & Mentoring

2023	Co-mentoring a Barnard College Pathways summer intern working on “Multidecadal Variability of Pacific Tropical Instability Waves” at NOAA/AOML
2022	Co-organizing and co-leading a group exercise on “downloading and working with observational oceanographic data sets” as part of the TRIATLAS-TAPIOCA-CANEMS-UFPE Summer School and Workshop
2022 – 2023	Training of undergraduate students in oceanographic and meteorological measurements during student research cruises aboard the R/V F.G. Walton Smith in the Florida Strait in March and April 2022, and in February 2023
2022	Participation in the OSM 2022 Mentor/Mentee Program (mentees: Daan Reijnders, Alice Ren, Kayo Takahashi)
2021	Leading “Regional Oceanography” exercises (Bachelor level, winter term 2021/2022) as part of the B.Sc. program at GEOMAR Helmholtz Centre for Ocean Research Kiel
2021	Participation in the vEGU21 Mentoring Program (mentee: Yadi Badarvada)
2020 – 2021	Training of Bachelor students in oceanographic and meteorological measurements during two student research cruises aboard the R/V Alkor in the Baltic Sea in August 2020 and September 2021 as part of the B.Sc. program at GEOMAR Helmholtz Centre for Ocean Research Kiel
2020	Organizing and leading a group exercise on “the role of intraseasonal variability on the equatorial ecosystem” as part of the Nansen Tutu TRIATLAS Summer School
2019	Introducing local high-school students to physical oceanography instrumentation aboard the R/V Meteor in the ports of Walvis Bay (Namibia) and Recife (Brazil) before and after the R/V Meteor M158 research cruise
2018 – 2021	Supervision of Bachelor and Master students during seminars as part of the B.Sc./M.Sc. programs at GEOMAR Helmholtz Centre for Ocean Research Kiel

Media coverage

2023	NOAA/AOML seminar on “Multidecadal Intensification of Atlantic Tropical Instability Waves”
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2022	Summary video of the TRIATLAS-TAPIOCA-CANEMS-UFPE Summer School and Workshop in Tamandaré, Brazil (filmed and edited by Siri Halvorsen)
2022	GEOMAR press release about the publication of the article “Two Decades of Full-Depth Current Velocity Observations from a Moored Observatory in the Central Equatorial Atlantic at 0°N, 23°W”
2022	NOAA/AOML seminar on “Transports and Pathways of the Tropical AMOC Return Flow from Argo Data and Shipboard Velocity Measurements”
2021	Information video about the equatorial mooring at 23°W aboard the R/V SONNE (filmed and edited by David Menzel)

Peer-Reviewing

Journals	<ul style="list-style-type: none"> Deep-Sea Research Part I: Oceanographic Papers (1) Frontiers in Marine Science (1) Geophysical Research Letters (2) Journal of Geophysical Research: Oceans (4) Journal of Oceanology and Limnology (1) Journal of Operational Oceanography (1) Journal of Physical Oceanography (2) Ocean Dynamics (1) Ocean Modelling (1) Ocean Science (1)
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