

Josué Martínez Moreno

Climate & Fluid Physics

ARC Centre of Excellence for Climate Extremes,
Research School of Earth Sciences

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Interests

Geophysical fluid dynamics, physical oceanography, climate dynamics, mesoscale and submesoscale energetics, oceanic tracer dynamics.

Education

2017 – 2021 Ph.D. Geophysical Fluid Dynamics

Research School of Earth Science at Australian National University.

Supervisor: Andy Hogg.

Thesis: “Global changes in mesoscale currents and coherent eddies from satellite altimetry”

2012 – 2017 B.Sc. Earth Sciences w/ Honors

Aquatic Science major, Science School at National Autonomous University of Mexico.

Supervisor: Angel Ruiz-Angulo.

Thesis: “Pollution scenarios in the Gulf of Mexico by the river plume of the Coatzacoalcos river”.

Experience

2021 – 2022 Ph.D. Geophysical Fluid Dynamics

Research School of Earth Science at Australian National University.

Supervisor: Andy Hogg.

2021 – Postdoctoral Researcher

L’Institut Français de Recherche pour l’Exploitation de la Mer.
with Camille Lique.

Grants & Awards

2022 Uwe Radok Award: award for the best PhD thesis for the previous year in the fields of meteorology, oceanography, glaciology or climatology in Australia

2021 ECMWF – ESoWC: grant to develop BlenderNC a 3D software for scientific visualization.

2021 Best paper among Honours, Masters or, PhD student within ARC Centre of Excellence for Climate Extremes

Publications

In Press / Published

Martínez-Moreno, J., Hogg, A. M., & England, M. H. (2022). Climatology, seasonality, and trends of spatially coherent ocean eddies. *Journal of Geophysical Research: Oceans*.

Hogg, A. M., Penduff, T., Close, S. E., Dewar, W. K., Constantinou, N. C., & **Martínez-Moreno, J.** (2022). Circumpolar variations in the chaotic nature of Southern Ocean eddy dynamics. *Journal of Geophysical Research: Oceans*.

Martínez-Moreno, J., Hogg, A. M., England, M. H., Kiss, A. E., Constantinou, N. C., & Morrison, A. K. (2021). Mesoscale kinetic energy trends in changing oceans. *Nature Climate Change*.

Martínez-Moreno, J., Hogg, A. M., Kiss, A. E., Constantinou, N. C., & Morrison, A. K. (2019). Kinetic energy of eddy-like features from sea surface altimetry. *Journal of Advances in Modeling Earth Systems*.

Conference Proceedings (refereed)

Méndez-Fragoso, R., Villavicencio-Torres, M., & **Martínez-Moreno, J.** (2017): Design and use online platforms to learn mathematics and the use of them in simulations of problems in applied sciences, *IJTME*, 24 Issue 2, 89-94.

Software

Core developer for “xarrayMannKendall”: A Python library to compute linear trends over 2D and 3D arrays; [xarrayMannKendall – GitHub](#).

Developer for “TrackEddy”: A Python library to track and reconstruct the coherent eddy field from sea surface height; [TrackEddy – ReadTheDocs](#).

Developer of “Blendernc”: A python – blender add-on to visualise netCDF data [blendernc – ReadTheDocs](#).

Conferences

Have surface ocean currents change in the last 3 decades? *Physical Oceanography Dissertation Symposium*, Kona, Hawai’i, USA, 16–20 October. 2022. (poster)

Asymmetry of mesoscale eddies in marginal ice zones. *GRC: Ocean Mixing*, Holyoke, Ms., USA, 5–10 June. 2022. (poster)

Kinetic energy of coherent eddy features from sea surface altimetry: A trend perspective. *Ocean Sciences Meeting 2020*, San Diego, CA, USA, 16–21 Feb. 2020. (poster)

Tracing the dispersion of the Coatzacoalcos river plume in the Gulf of Mexico: a numerical experiment. *Ocean Sciences Meeting 2020*, San Diego, CA, USA, 16–21 Feb. 2020. (poster)

Sustainability in ocean observations. *Ocean Obs 2019*, Honolulu, Hawaii, USA, 15-20 Sept. 2019. (poster)

Climate Change Signal in Oceanic Eddies. *Sources and Sinks of Ocean Mesoscale Eddy Energy*, Tallahassee, Florida, USA, 12–14 March. 2019. (talk)

Kinetic Energy in Mesoscale Eddies. *ARC Centre of Excellence for Climate Extremes Annual Workshop 2018*, Wollongong, NSW, Australia, 18–21 Nov. 2018. (poster)

Southern Ocean Eddies and their interactions with Climate Change. *Ocean Sciences Meeting 2018*, Portland, Oregon, USA, 11–16 Feb. 2018. (poster)

Seasonal variation of Eddy Kinetic Energy *ARC Centre of Excellence for Climate System Science Annual Workshop 2017*, Canberra, ACT, Australia, Oct 19th – Nov 1st. 2017. (poster)

Seminars

Response of oceanic eddies to climate change, Pint for science, CSIRO Discovery Centre, Canberra, Australia, May 22nd 2019.

What are we forgetting about Climate Change?, There's more to sea in the ACT at CSIRO Discovery Centre, Canberra, Australia, organized by Australian Marine Science Association (AMSA), Aug 15th 2018.

One work day in cruise UNAM's R/V Justo Sierra I, Tour with Science, UNAM, Mexico City, Mexico, organized by General Direction of Popularization of Science, 2015.

Workshops

- 2022 **Mentor M1 Project: Variability of the ocean and sea ice conditions in the Arctic Marginal Ice Zone**
May - July 2022, Brest, France
- 2020 **Dynamical Systems and Bifurcation Theory**
20 – 28 January 2020, Canberra, ACT, Australia
- 2019 **Advanced Ocean Modelling School**
April 28th – May 3rd, Lake Pedder, Tasmania, Australia
- 2019 **Advanced Scientific Python Programming**
20 – 27 January 2019, Canberra, ACT, Australia
- 2018 **Climate Extremes and High Impact Weather**
25 – 29 June 2018, Canberra, ACT, Australia
- 2016 **Introduction to the dynamics of semienclosed bodies of water**
Academic Unit, Puerto Morelos of the Institute of Marine Sciences and Limnology, UNAM, Puerto Morelos, Quintana Roo, Mexico.

Teaching Experience

- 2020 Tutor of Fundamentals of Climate System Science
Research School of Earth Science, ANU, Canberra, Australia
- 2019 Tutor of Classical Mechanics
Physics, ANU, Canberra, Australia
- 2018 Lab Demonstrator of Physics of Fluid Flows
Physics, ANU, Canberra, Australia
- 2017 Tutor of Python
Center of Atmospheric Sciences, UNAM, Mexico City, Mexico
- 2016 Tutor of \LaTeX and Python
School of Science, UNAM, Mexico City, Mexico
- 2016 Tutor of Geophysical Fluid Dynamics (Undergraduate)
School of Science, UNAM, Mexico City, Mexico

Research cruises

RV Investigator, October 16th, 2018 – November 16th, 2018

Chief Scientist: Helen Phillips & Nathan Bindoff from Institute of Marine Sciences, UTAS

Activities: Assistant at CTD and VMP profiling.

RV Justo Sierra, August 1st, 2014 – August 4th, 2014

Chief Scientist: Elva Escobar Briones from Instituto de Ciencias del Mar y Limnología, UNAM

Activities: Assistant of seismic profiling, PDF and CTD profiling, and sediment samples collect. Responsible of water sampling.

Other Scientific Activities

- Committees:
 - GRC – Ocean Mixing conference organization committee.
 - AGU Meetings Committee: working on behalf of the AGU Board and Council to advance the Union's scientific direction and strategy by providing strategic guidance for all of the Society's external meetings.
 - AGU Sustainability Advisory Group on Virtual Engagement and Sustainable Meetings
 - Early Career Researchers Committee within ARC Centre of Excellence for Climate Extremes
 - ANU Below Zero travel working group to develop recommendations around how we can reduce greenhouse gas emissions from international and air travel
- Reviewer: AAAS Science Advances and Geophysical Research Letters

Programming Languages

Proficient at Python, Matlab, HTML, CSS, PHP, JavaScript and \LaTeX , intermediate at Julia and Fortran.

References

Andy McC. Hogg

(Ph.D. Advisor)

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Adele K. Morrison

(Ph.D. Advisor)

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Angel Ruiz-Angulo

(Undergraduate Advisor)

Icelandic Meteorological Office

Reykjavík, Iceland

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