

# Stephanie Leroux, PhD

Research engineer in modelling, data processing and statistical analysis in oceanography and climate sciences.

40-year-old, pacsée, 1 kid  
french citizenship

✉ [leroux.ste@gmail.com](mailto:leroux.ste@gmail.com)

📄 <http://stephanieleroux.github.io/>

## Professional experience

- Apr 2022– Present **Chercheuse ingénieure, Datlas, Grenoble.**  
Probabilistic approaches in ocean & sea ice numerical modelling. An example of project i am involved in: (<https://sasip-climate.github.io/>)
- Sep. 2021– Apr. 2021 **Chercheuse CDD CNRS, MEOM/IGE, Grenoble.**  
Ocean sea level and heat content response to variations in freshwater river runoffs and Greenland iceshelf melting (OSTST-IMHOTEP).
- July 2017– June 2021 **Chercheuse ingénieure, Ocean Next, Grenoble.**  
In charge of R&D activities related to ensemble/probabilistic approaches in ocean numerical modelling and statistical data analysis. An example of recent realisation: an ensemble of regional ocean simulations at kilometric-scale resolution with the model NEMO+XIOS2 (<https://github.com/ocean-next/MEDWEST60>)
- March 2015– Feb. 2017 **Chercheuse CDD CNRS, MEOM/IGE, Grenoble.**  
Intrinsic ocean variability in eddy-permitting ocean models: a probabilistic/ensemble-simulation approach with a North Atlantic regional NEMO configuration (ANR OCCIPUT).
- 2013–2014 **Chercheuse CDD CNRS, CNRM/Météo-France, Toulouse.**  
Tropical intraseasonal variability simulated by global atmospheric circulation models in aquaplanet configuration (European project FP7-EMBRACE).
- 2012 **Postdoctoral research associate, SUNY, Albany, New York.**  
Influence of the mid-latitudes on intraseasonal variability in the west african monsoon from reanalyses and satellite-derived precipitation & convection datasets and from an idealized atmospheric global circulation model.
- 2010–2011 **Resident research associate, NOAA, Boulder, Colorado.**  
Analysis of the multi-scale nature of the Madden-Julian Oscillation (MJO) based on reanalyses and satellite-derived precipitation/convection datasets.
- 2006–2009 **PhD student, LTHE/Université Joseph Fourier, Grenoble.**  
Dynamics of the African Easterly Waves: origin, propagation and interaction with the environnement. (International project AMMA on the west african monsoon)  
→ 2009 thesis prize from Université J. Fourier.

## Technical and computing skills

- **OS:** Mac, Linux/Unix.
- **Programming Languages:** Python (with Pangeo/xarray/dask environnement), Fortran, bash scripts.
- **HPC experience:** Active user on several of the french HPC: JeanZay@IDRIS, Irene@CEA, Dahu@Gricad.
- **Ocean and Climate science modelling:**
  - User and developper of Ocean Circulation Models: high-resolution regional ensemble simulations and global ensemble simulations with NEMO (<http://www.nemo-ocean.eu/>) and XIOS server,
  - User and developper of Atmospheric Global Circulation Models: ARPEGE-CNRM (Météo-France) and DREAM (<http://dream-gcm.github.io/>).

- **General workflow** also includes: git, github, jupyter notebooks.
- **Specific tools for Ocean/Climate sciences:** cdftools, NCO, CDO, ncview, Ocean Parcels, Sesam,
- **Editing languages:**  $\LaTeX$ , vi, Markdown, LibreOffice, GoogleDocs, Overleaf, Reathedocs
- **Web:** Basic knowledge in html, jekyll, hugo githubpages.

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## Education

- 2006–2009 **PhD in atmospheric sciences**, *LTHE, Université J. Fourier, Grenoble*, [awarded 'Best thesis' prize 2009 from Université J. Fourier, Grenoble].
- 2006 **Master in Atmosphere-Ocean-Hydrology**, *Université J. Fourier, Grenoble*.
- 2005 **"Agrégation SVT"**, (*diploma to teach biology and Earth sciences in French high schools*).
- 2002–2004 **Undergraduate at Ecole Normale Supérieure de Lyon**, *Dpt of Earth Sciences*.
- 2000–2002 **"Classe préparatoire aux grandes écoles BCPST"**, *Lycée Malherbe, Caen*, (competitive class in maths, physics, chemistry, biology and Earth sciences).

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## Teaching experience and communication to the public

- 2017-Present **4 presentations on oceanography and climate sciences**, (high school level).
- 2016 **Co-advisor for two master's research projects**, *MEOM, IGE, UJF, Grenoble*.
- 2006–2009 **Teaching assistant**, *UJF, Grenoble* ("monitorat").  
~200 hours taught to undergraduate students in Earth sciences and numerical computing.
- 2007–2009 **Co-advisor for undergraduate research projects**, *LTHE, UJF, Grenoble*.
- 2008 & 2009 **Tribulations Savantes**, *OSUG, Grenoble*.  
Local science festival explaining to the public the research activities of the PhD students in the Earth Sciences Dpt with live experiments, photo exhibitions, films, panel discussions...
- 2005 **Agrégation SVT**, *ENS, Lyon*.  
1-year training for the national competitive examination to be entitled to teach biology and Earth sciences in French high schools (diploma obtained in June 2005).

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## Service

- 2019–2020 Co-organisation of the weekly meetings and several internal science seminars at Ocean Next,
- 2007–Present Reviewer for: *J. of the Atmospheric Sciences, J. of Climate, Quarterly Journal of the Royal Meteorological Society, Geophysical Research Letters, Theoretical and Applied Climatology*,
- 2014–2015 Associate Editor at *Monthly Weather Review*.
- 2008–2009 In charge of the monthly ASP group seminar at *LTHE, Grenoble*.

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## Languages

- French Native.
- English Advanced skills in writing/reading/speaking.

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## Referees:

- Nick Hall (PhD advisor 2006–2009) Professor at Université Paul Sabatier, LEGOS, Toulouse. Email: [Nick.Hall@legos.obs-mip.fr](mailto:Nick.Hall@legos.obs-mip.fr).
- Jean-Michel Brankart (main collaborator on project MEDWEST60/H2020-IMMERSE 2020–2021). Ingénieur de Recherche CNRS, IGE, Grenoble, France. Email: [jean-michel.brankart@univ-grenoble-alpes.fr](mailto:jean-michel.brankart@univ-grenoble-alpes.fr).

## Publications (peer-reviewed)

- 2022 *In rev. (2022)* S. Leroux, JM Brankart, A. Albert, JM Molines, L. Brodeau, T. Penduff, J. Le Sommer, P. Brasseur, *Ensemble quantification of short-term predictability of the ocean fine-scale dynamics: A western mediterranean test-case at kilometric-scale resolution.*
- 2020 Zhen Y., P. Tandéo, S. Leroux, S. Métref, T. Penduff, J. LeSommer, *Journal of Atmospheric and Oceanic Technology*, **37**, 1697-1711. [doi: 10.1175/JTECH-D-20-0001.1], *An Adaptive Optimal Interpolation Based on Analog Forecasting: Application to SSH in the Gulf of Mexico.*
- 2020 N. Hall, H. Le, and S. Leroux, *Climate Dynamics*, **55**, 813-829. [doi: 10.1007/s00382-020-05299-y], *The extratropical response to a developing MJO: forecast and climate simulations with the DREAM model.*
- 2019 Penduff, T., W. Llovel, S. Close, I. Garcia-Gomez, and S. Leroux, *Surveys in Geophysics*, [doi: 10.1007/s10712-019-09571-7], *Trends of Coastal Sea Level Between 1993 and 2015: Imprints of Atmospheric Forcing and Oceanic Chaos.*
- 2019 Hall, N., Leroux, S., Ambrizzi, *Climate Dynamics*, **52**:6719. [doi: 10.1007/s00382-018-4539-y], *Transient contributions to the forcing of the atmospheric annual cycle: A diagnostic study with the DREAM model.*
- 2018 Zanna, L., J.M. Brankart, M. Huber, Leroux, T. Penduff, P.D. Williams, S., *QJRM*s (Accepted Author Manuscript), [doi:10.1002/qj.3397] *Model Uncertainty Quantification in Ocean Ensembles: From Seasonal Forecasts to Multi-Decadal Predictions.*
- 2018 Penduff, T., G. Sérazin, S. Leroux, S. Close, J.-M. Molines, B. Barnier, L. Bessières, L. Terray, and G. Maze. *Oceanography* 31(2), [doi:10.5670/oceanog.2018.210], *Chaotic variability of ocean heat content: Climate-relevant features and observational implications.*
- 2018 Leroux S., Penduff T., Bessières L., Molines J.-M. , Brankart J.-M., Barnier B., Serazin G., Terray L., *J. of Climate*. [doi:10.1175/JCLI-D-17-0168.1] *Intrinsic and atmospherically-forced variability of the AMOC : insights from a large ensemble ocean hindcast.*
- 2017 Sérazin G., Jaymond A., Leroux S., Penduff T., Bessières L., Brankart J.-M., Molines J.-M. , Terray L., Barnier B., Serazin G., *Geophys. Res. Lett.*, **44**(11):5580-5589, [doi:10.1002/2017GL073026], *A probabilistic study of low-frequency ocean heat content variability: atmospheric influence versus oceanic chaos.*
- 2017 Bessières L., Leroux S., Brankart J.-M., Molines J.-M., Bouttier P.-A., Penduff T., Terray L., Barnier B., Serazin G., *Geosci. Model Dev. Discuss.*, [doi:10.5194/gmd-10-1091-2017], *Development of a probabilistic ocean modelling system based on NEMO 3.5: application at eddying resolution.*
- 2016 Leroux S., Bellon G., Roehrig R., Caian M., Klingaman N., Musat I., Rio C., Tyteca S., *J. Adv. Model. Earth Syst.*, **8**, [doi:10.1002/2016MS000683], *Inter-model comparison of sub-seasonal tropical variability in aquaplanet experiments: effect of a warm pool.*
- 2013 Dias J., Leroux S., Kiladis G., Tulusch S., *GRL*, **40**:1420-1425. *How systematic is organized tropical convection within the MJO?*
- 2012 Lafore, J-P, N. Asencio, D. Bouniol, F. Couvreux, C. Flammant, F. Guichard, N. Hall, S. Janicot, C. Kocha, C. Lavaysse, S. Leroux, E. Poan, P. Peyrille, R. Roca, R. Roehrig, F. Roux, F. Said. *La Météorologie (édition spéciale AMMA)* **8**, 11-16. *Evolution de notre compréhension du système de mousson ouest-africain.*
- 2012 Liebmann, Bladé, Kiladis, Carvalho, Senay, Allured, Leroux, Funk, *J. Climate*, **25**:4304–4322. *Seasonality of African Precipitation from 1996–2009.*
- 2011 Leroux S., Hall N. and Kiladis G., *J. Climate*, **24**: 5378-5396. *Intermittent African Easterly Wave activity in a dry atmospheric model: influence of the extratropics.*
- 2011 Janicot S., Caniaux G., Chauvin F., de Cötlogon G., Fontaine B., Hall N., Kiladis G., Lafore J. P., Lavaysse C., Lavender S. L., Leroux S. , Marteau R., Mounier F., Philippon N., Roehrig R., Sultan B., Taylor C. M. *Atmosph. Sci. Lett.*, **12**: 58-66. *Intraseasonal variability of the West African monsoon.*
- 2010 Leroux S., Hall N. and Kiladis G. *QJRM*s, **136**, 397-410. *A climatological study of transient-mean flow interactions over West Africa.*
- 2009 Leroux S. and Hall N., *J. Atmos. Sci.*, **66**, 2303-2316. *On the relationship between African easterly waves and the African easterly jet.*
- 2009 Janicot S., Mounier F., Hall N., Leroux S., Sultan B., Kiladis G., *J. Climate*, **22**, 1541-1565. *The dynamics of the West African monsoon. Part IV: Analysis of 25-90-day variability of convection and the role of the Indian monsoon.*
- 2008 Vanvyve E., Hall N., Messenger C., Leroux S., van Ypersele J.-P., *Climate Dyn.*, **30**, 191-202. *Internal variability in a regional climate model over West Africa.*