Stephanie Leroux, PhD

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

38-year-old, pacsée, 1 kid
french citizenship
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http://stephanieleroux.github.io/

Professionnal 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.

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).

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).

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, Quaterly 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.

Languages

French Native.

English Advanced skills in writing/reading/speaking.

Referees:

⟶ Nick Hall (PhD advisor 2006-2009) Professor at Université Paul Sabatier, LEGOS, Toulouse. Email: `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`.

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., QJRMS (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., Tulisch 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 comprÃ©hension du systÃšme 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. QJRMS, **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., Messager C., **Leroux** S., van Ypersele J.-P., Climate Dyn., **30**, 191-202. *Internal variability in a regional climate model over West Africa.*