Valerio Lembo

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SUMMARY

My scientific career is mainly devoted at bridging the gap between weather/climate modelling and innovative mathematical/statistical analyses. Nowadays this commitment is particularly relevant, since expertise required to develop and maintain model codes is sometimes detached from scientific understanding of crucial yet poorly resolved processes, e.g. turbulence. Thermodynamics and radiative feedbacks are among those fields in which model's development and process understanding share common questions. Along these lines, "Perspectives on Climate Sciences" webinar series, organized during pandemic years, fostered cross-boundaries networking, encouraging renowned scientists to interact with early career researchers on how their peculiar career paths shaped their outstanding scientific results.

QUALIFICATIONS

Ph. D. in Climate Sciences July 2016
University of Salento *Lecce, Italy*

· Doctoral thesis "Evolution of the Energy Budget in the 20^{th} Century and its Role in the Inter-Hemispheric Temperature Contrast"
· Academic Guest (Jan 2015 - Apr 2015) at "Climate and Water Cycle" group of the Institute for Atmospheric and Climate Sciences of the Swiss Federal Institute of Technology, Zürich, Switzerland

M. Sc. in Physics of the Atmosphere and Meteorology October 2012
University of Bologna *Bologna, Italy*

· M. Sc. thesis "Surface Temperature as a Climate Index: Relations with Mid-latitude Tropospheric Baroclinicity"

B. Sc. in Physics and Astrophysics December 2009
University of Rome La Sapienza *Rome, Italy*

· B. Sc. thesis on "Influence of Atmospheric Gravity Waves on ground-based Solar Irradiance Measures"

CURRENT EMPLOYMENT

ISAC-CNR October 2020 - Present
Permanent Researcher *Bologna, Italy*

· Member of the "Global Change" unit of the Earth system science and environmental technologies Department at CNR, within the Institute for Atmospheric Sciences and Climate (ISAC).

EMPLOYMENT HISTORY

CEN, University of Hamburg November 2016 - August 2020
Postdoctoral Researcher *Hamburg, Germany*

· Project "Energy Transfers in the Atmosphere and Ocean".
· Research on diagnostics and metrics for the assessment of climate models.
· Participation to ESMValTool community diagnostics for the analysis of IPCC model ensembles.

CINFAI March 2016 - September 2016
Research Associate *Lecce, Italy*

· Research on the seasonal cycle of atmospheric baroclinic activity in mid-latitudes

ISAC-CNR June 2012 - October 2012
Internship *Bologna, Italy*

· Research activity related to the M. Sc. thesis at the University of Bologna

SKILLS

Computer Languages	C++, Fortran, HTML, MATLAB, NCL, Python, UNIX-Bash
Protocols	FTP, SSH
Databases	GRIB, NetCDF
Tools	CDO, GitHub, LaTeX, NCO

MISCELLANEOUS

Projects	PNRR CN-HPC Spoke 4 "Earth and Climate" (MUR, 2022-)
	MedHEX (PRIN, 2023-)
	DROMEDAR (PRIN-PNRR, 2023-)
	FutureMED (COST Action, 2023-)
	OptimESM (Horizon Europe, 2023-)
	CN-HPC, Spoke 4 "Earth and Climate" (PNRR-MUR, 2023-)
	Destination Earth (EU-ESA-ECMWF, 2022-)
	Roadmap (JPI, 2021-)
	TRR181 (DFG, 2016-2020)
Roles	CMIP7 Model Benchmarking Task Team (WCRP, 2022-)
	CNR-ISAC Commission on Communication (CNR, 2021-)
Editor	Nonlinear Processes in Geophysics
	Frontiers in Climate
	Oxford Open Climate Change
	PLOS Climate
Reviewer	Earth System Dynamics,
	Geophysical Research Letters,
	Meteorology and Atmospheric Physics
	Journal of Climate
	Weather and Climate Dynamics
	Climate Dynamics
	Physical Review E
	International Journal of Climatology
Memberships	European Geosciences Union (2013-)
	Associazione Italiana per le Scienze dell'Atmosfera e Meteorologia (2016-2018)
	Centro Euro-Mediterraneo per i Cambiamenti Climatici (2013-2016)

PUBLICATION LIST

- Faranda, D. Messori, G., Alberti, T., Alvarez-Castro, C., Caby, T., Cavicchia, L., Coppola, E., Donner, R. V., Dubrulle, B., Galfi, V. M., Holmberg, E., Lembo, V., Noyelle, R., Yiou, P., Spagnolo, B., Valenti, D., Vaienti, S. and Wormell, C. 2024, Statistical physics and dynamical systems perspectives on geophysical extreme events, Phys. Rev. E, 110, 4, 041001
- Liu, Z., C. L. E. Franzke, L. Novak, R. Tailleux, and V. Lembo, 2024: A Systematic Local View of the Long-Term Changes of the Atmospheric Energy Cycle., J. Climate, in press
- Galfi, V. M., Alberti, T., De Cruz, L., Franzke, C. L. E., and **Lembo, V.**, 2023, Review article: Interdisciplinary Perspectives on Climate Sciences – Highlighting Past and Current Scientific Achievements, Nonlin. Processes Geophys. Discuss. [preprint], https://doi.org/10.5194/npg-2023-19, in review
- Fabiano, F., Davini, P., Meccia, V., Zappa, G., Bellucci, A., **Lembo, V.**, Bellomo, K., and Corti, S., 2023, Multi-centennial evolution of the climate response and deep ocean heat uptake in a set of abrupt stabilization scenarios with EC-Earth3, Earth Syst. Dynam., 15, 527–546
- **Lembo, V.**, Fabiano, F., Galfi, V.M., Graversen, R., Lucarini, V., and G. Messori, 2022, Meridional energy transport extremes and the general circulation of NH mid-latitudes: dominant weather regimes and preferred zonal wavenumbers, Weather Clim. Dyn., 3(3), 1037-1062
- Franzke, Christian LE, Franzke, C. L., Blender, R., O'Kane, T. J., and **V. Lembo**, 2022, Stochastic Methods and Complexity Science in Climate Research and Modeling, Frontiers in Physics, 521
- Ragone, C., **Lembo, V.**, Lucarini, V., Vérard, C., Kasparian, J., and M. Brunetti, 2022, Robustness of competing climatic states, J Atm Sciences, 35(9), 2769-2784
- Faranda, D., Alberti, T., Arutkin, M., **Lembo, V.**, and V. Lucarini, 2021, Interrupting vaccination policies can greatly spread SARS-CoV-2 and enhance mortality from COVID-19 disease: The AstraZeneca case for France and Italy, Chaos, 31(4), 041105
- Qiyun, M., **Lembo, V.**, and C.L.E. Franzke, 2021, The Lorenz energy cycle: trends and the impact of modes of climate variability, Tellus A: Dyn Met and Oc, 73:1, 1-15
- Vissio, G., **Lembo, V.**, Lucarini V., and M. Ghil, 2020, Evaluating the Performance of Climate Models Based on Wasserstein Distance, Geophys. Res. Lett., 47, e2020GL089385.
- **Lembo, V.**, Ragone F., and V. Lucarini, 2020, Beyond Forcing Scenarios: Predicting Climate Change through Response Operators in a Coupled General Circulation Model, Sci Rep 10, 8668.
- Eyring, V. et al., 2020, Earth System Model Evaluation Tool (ESMValTool) v2.0 – an extended set of large-scale diagnostics for quasi-operational and comprehensive evaluation of Earth system models in CMIP, Geosci. Model Dev., 13, 3383–3438.
- **Lembo V.**, Lunkeit F., and V. Lucarini, 2019, TheDiaTo (v1.0) – A new diagnostic tool for diagnosing water, energy and entropy budgets in climate models, Geosci. Model Dev., 12, 3805–3834
- **Lembo V.**, Messori G., Graversen R., and V. Lucarini, 2019, Spectral decomposition and extremes of atmospheric meridional energy transport in the Northern Hemisphere midlatitudes, Geophys. Res. Lett., 46, 7602-7613
- **Lembo V.**, Folini D., Wild M., and P. Lionello, 2019, Inter-hemispheric differences in energy budgets and cross-equatorial transport anomalies during the 20th Century, Clim. Dyn., 53: 115
- Faranda D., **Lembo V.**, Kuzzay D., Daviaud F. and B. Dubrulle, 2017, Computation and characterization of local energy transfers in atmospheric flows, J. Atm. Sciences, 75, 2175–2186
- **Lembo V.**, Bordi I., and A. Speranza, 2017, Annual and semiannual cycles of midlatitude surface temperature and baroclinicity: reanalysis data and AOGCMs simulations, Earth Sys. Dyn., 8, 295-312
- **Lembo V.**, Folini D., Wild M. and P. Lionello, 2016, Energy budgets and transports: global evolution and spatial patterns during the 20th Century in two AMIP-like experiments, Clim. Dyn., 48, 1793-1812