

Paolo Ruggieri

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Date of birth: 18.02.1988 Nationality: Italian

Work experience

- **Junior Assistant Professor** (February 2020 – Now)
Department of Physics and Astronomy, University of Bologna, Italy
- **Post-Doc Researcher** (September 2017 - February 2020)
Climate Simulation and Prediction division, CMCC, Bologna, Italy

Education

- **PhD** in Physical and Chemical Sciences (cum laude)
Università degli Studi dell'Aquila
Supervisors: R. Buizza (Ecmwf), F. Kucharski (ICTP), G. Visconti
Thesis: Stratospheric and tropospheric linkages between Arctic and midlatitudes
- **MSc** in Physics of the Atmosphere (cum laude)
Università degli Studi dell'Aquila
Thesis: Impact of Barents-Kara sea ice variability on the Euro-Atlantic sector
- **BSc** in Physics

Postgraduate training:

- **ECMWF Training Course on NWP (Numerical Weather Prediction)**: *European Centre for Medium-Range Weather Forecasts, Reading, UK*. March 2014 *Data Assimilation*, April 2014 *Parameterizations of diabatic and sub-grid processes*, May 2014 *Predictability, diagnostics and extended-range forecasting*, June 2015 *Advanced numerical methods in earth-system modelling*
- **Training course on Numerical Modelling**: *Abdus Salam-International Centre for Theoretical Physics, Trieste*
- **ISSAOS Summer School**: *Advanced Programming Techniques for the Earth System Science*, Gran Sasso Science Institute, L'Aquila
- **Training course** on 'Probability and Uncertainty: two concepts to be expanded in Meteorology', *ARPAE, Bologna*

Teaching experience

- **Supervisor** of 10+ MSc and BSc theses, co-supervisor of 4 PhD theses
- Ongoing:
- Formal responsibility for the course '**Climatology**' in the Master degree in *Physics of the Earth System*, University of Bologna (28h, from 2021).
 - Formal responsibility for the course '**Numerical Laboratory of the Atmosphere and Ocean**' in the Master degree in *Science of Climate*, University of Bologna (32h, from 2021)
 - Formal responsibility for a module of the course '**Modern Climate Change**' in the Master degree in *Science of Climate*, University of Bologna (24h, from 2022)
 - Formal responsibility for a module of the course '**Fundamentals of Atmospheric Physics and Meteorology**', *Bachelor in Physics*, University of Bologna (2020, 24h).
 - Formal responsibility for a module of the course '**Dynamic Meteorology**' in the Master degree in *Physics of the Earth System*, University of Bologna (2020, 20h).
 - Formal responsibility for a module of the course '**Geophysical Fluid Dynamics**'
Ph.D course in *Science and Management of Climate Change*, Università Ca' Foscari, Venice, (2019 and 2020, 8h)

Publications (Peer reviewed)

- [1]: Shah A. et al., Quantifying the effects of Nature-based Solutions in reducing risks from hydrometeorological hazards: examples from Europe, Shah et al, submitted to International Journal of Disaster Risk Reduction.
- [2]: Strommen K. et al., Predictable Decadal Forcing of the North Atlantic Jet Stream by Sub-Polar North Atlantic Sea Surface Temperatures, submitted to Weather and Climate Dynamics.
- [3]: Bianco et al. *Influence of Arctic ocean heat content on regional sea ice variability at sub-seasonal time scales* submitted to Frontiers in Marine Science.
- [4]: Palmeiro et al. *On the Influence of ENSO on Sudden Stratospheric Warmings.*, submitted to JGR: Atmospheres
- [27]: Nicoli D., Bellucci A., **Ruggieri P.** et al. *The CMCC Decadal Prediction System*, Geoscientific Model Development (2022).
- [26]: Possega M, Aragao L., **Ruggieri P.**, Santo M., Di Sabatino S., *Observational evidence of urban heat island intensification during heatwaves in European cities.* submitted to Environmental Research Letters (2022).
- [25]: Dobrynin et al. *Hidden potential in predicting wintertime temperature anomalies in the Northern Hemisphere* submitted to Geophysical Research Letters (2022).
- [24]: Bellucci A., Mattei D., **Ruggieri P.**, Famooss Paolini L., *Intermittent behavior in the AMOC-AMV relationship* Geophysical Research Letters (2022).
- [23]: Athanasiadis et al. *Mitigating Climate Biases in the Midlatitude North Atlantic by Increasing Model Resolution: SST Gradients and Their Relation to Blocking and the Jet* Journal of Climate (2022).
- [22]: LF Paolini, PJ Athanasiadis, **P Ruggieri**, A Bellucci, *The atmospheric response to meridional shifts of the Gulf Stream SST front and its dependence on model resolution*, Journal of Climate (2022)
- [21]: Di Carlo E., **Ruggieri P.**, et al. *Dependence of the ENSO teleconnection on the atmospheric mean state in a set of idealised simulations*, Climate Dynamics (2022).
- [20]: Langehaug et al. *Propagation of thermohaline anomalies and their predictive potential in the Northern North Atlantic.* Journal of Climate (2022)
- [19]: **Ruggieri P.** et al. *On the role of Eurasian autumn snow cover in dynamical seasonal predictions*, Climate Dynamics (2022)
- [18]: Gallotti G. et al., On the management of nature-based solutions in open-air laboratories: New insights and future perspectives (2021).
- [17]: Seidenglanz, A. Athanasiadis P., **Ruggieri P.**, et al. *Pacific circulation response to eastern Arctic sea ice loss in seasonal forecast simulations*, Climate Dynamics (2021)
- [16]: A. Portal, P. **Ruggieri**, F. Palmeiro, J. Garcia-Serrano, D. Domeisen, S. Gualdi *Seasonal forecast in the winter stratosphere: sources of predictability and underlying dynamics*, Climate Dynamics (2021)
- [15]: Materia et al. *Summer temperature response to extreme soil water conditions in the Mediterranean transitional climate regime.* Climate Dynamics (2021)
- [14]: Benassi, M, G. Conti, S. Gualdi, **P. Ruggieri**, S. Materia, J. García-Serrano, F. M. Palmeiro, L. Batté, C. Ardilouze, *ENSO teleconnection to the Euro-Mediterranean late-winter: the role of extratropical Pacific modulation*, Climate Dynamics (2021)
- [13]: Polkova I. et al., *Predictors and prediction skill for marine cold air outbreaks over the Barents Sea*, Quarterly Journal of the Royal Meteorological Society (2021)
- [12]: A. Bellucci, Athanasiadis P., **Ruggieri, P.** et al. *Air-sea interaction over the Gulf-stream in an ensemble of HighResMIP simulations*, Climate Dynamics (2021). <https://doi.org/10.1007/s00382-020-05573-z>
- [11]: **Ruggieri, P.**, A. Bellucci, D. Nicoli, P. Athanasiadis, F. Castruccio, C. Cassou, G. Danabasoglu, P. Davini, G. Gastineau, J. Grieger, D. Hodson, S. Qasmi, Y. Ruprich-Robert, C. O'Reilly, B. Rodriguez de Fonseca, E. Sanchez-Gomez, D. Smith, R. Sutton, S. Wild (2020) *Atlantic Multidecadal Variability and North Atlantic storm track.*, Journal of Climate, 34(1), 347-360
- [10]: Smith, Doug M., et al., (2020), *North Atlantic climate far more predictable than models imply.* Nature 583.7818, 796-800.
- [9]: Afargan-Gerstman, H., Polkova, I., Papritz, L., **Ruggieri, P.**, King, M. P., Athanasiadis, P. J., ..., Domeisen, D. I., (2020), *Stratospheric influence on North Atlantic marine cold air outbreaks following sudden stratospheric warming events.* 2/7 Weather and Climate Dynamics, 1(2), 541-553.
- [8]: D. Nicoli, A. Bellucci, Iovino D., **Ruggieri, P.**, Gualdi S., (2020) *Decadal predictability of Siberian summer precipitation: the role of the Atlantic Multidecadal Variability*, Scientific Reports, 10(1), 1-11.
- [7]: **Ruggieri, P.**, Alvarez-Castro, Bellucci, A., Athanasiadis P., Materia S., Gualdi, S. (2020), *North*

Atlantic winter weather regimes and meridional heat transport by transient atmospheric eddies, Journal of Climate, 33.11 4769-4785.

[6]: M. A. Ehsan, D. Nicoli, F. Kucharski, M. Almazroui, M. K. Tippett, A. Bellucci, **P. Ruggieri**, (2020), *Atlantic Ocean forcing of Arabian Peninsula summer surface air temperature: An Ocean-Desert mechanism*, Climate and Atmospheric Science, 3.1 : 1-8

[5]: **Ruggieri, P.**, M. Ambaum, J. Nycander, (2020), *Thermodynamic cycles in the stratosphere* Journal of the Atmospheric Sciences, 77 (6), 1897-1912

[4]: **Ruggieri, P.**, F. Kucharski, and L. Novak, 2019: *The Response of the Midlatitude Jet to Regional Polar Heating in a Simple Storm-Track Model*. J. Climate, 32, 2869–2885, doi:10.1175/JCLI-D-18-0257.1

[3]: **Ruggieri, P.**, F. Kucharski, R. Buizza, M.H.P. Ambaum (2017), *The transient atmospheric response to a reduction of sea-ice cover in the Barents and Kara Seas*. Q.J.R. Meteorol. Soc., 143: 1632–1640. doi:10.1002/qj.3034

[2]: Herceg-Bulić, I., Mezzina, B., Kucharski, F., **Ruggieri, P.** and King, M. P. (2017), *Wintertime ENSO influence on late spring European climate: the stratospheric response and the role of North Atlantic SST*. Int. J. Climatol. doi:10.1002/joc.4980

[1]: **Ruggieri, P.**, R. Buizza, and G. Visconti (2016), *On the link between Barents-Kara sea ice variability and European blocking*, J. Geophys. Res. Atmos., 121, doi:10.1002/2015JD024021. (published also as ECMWF Tech memo)

Books

- Visconti G. and **Ruggieri, P.**, *Fluid dynamics Fundamentals and Applications*, Springer

Role in organisation of conferences, workshops and summer schools

- **Convener** of the session *Mid-latitude atmospheric teleconnection dynamics*, EMS General Assembly
- Member of the **Organising committee** of the *Summer School on “Nature-based Solutions for hydro-meteo hazards and climate change adaptation”* organised by the Department of Physics and Astronomy of the University of Bologna and UNESCO (Summer 2022).
- Member of the **Advisory Board** of the Summer School on Physical Sensing and Processing organised by the Department of Physics and Astronomy of the University of Bologna (2021)
- **Organiser** of the online workshop: Pending issues of the ENSO teleconnections (8 speakers, about 30 participants), organised by University of Bologna and University of Barcelona, January 2020
- **Convener** of the session *Explore, predict and project climate variations and extremes* 8th SISC Annual Conference 2020
- **Co-director** of: 4th ECMWF OpenIFS user meeting, ICTP, 06/2017, Trieste, Italy (about 40 people, frontal lectures and laboratory)
- **Organiser** of the workshop: OpenIFS for Teaching and Research, Gran Sasso Science Institute, 10/05/2016, L'Aquila, Italy (about 15 people)

Scientific responsibilities and role in research projects

- LAND4CLIMATE, Horizon Europe, from 2023 onward.
- ECMWF Special Project, BONSAI. I am involved in the implementation of large-ensemble decadal predictions with an intermediate complexity coupled GCM, from 2023 onward.
- TRIGGER, Horizon Europe: responsibility in a Work Package on Climate modelling and specific tasks on S2D predictions and development of forecast products, from 2023 onward.
- OPERANDUM, H2020, Co-leader the Open-Air Laboratory - Italy, a pilot research infrastructure for co-design, co-development and co-deployment of Nature Based Solutions in Italy, from 2020 to 2022 Lead author and contributing author of project deliverables.
- Decadal Climate Prediction Project, I have led a study based on idealized simulations (DCPP-C, [11]), 2019-2020.
- EUCP, H2020: I implemented the initialisation and the ensemble generation of a decadal prediction system, 2019-2020.
- Blue-Action, H2020: lead author and contributing author of deliverables, 2018-2020.

- MEDSCOPE, ERA4CS: invited contributor, contributing author of deliverables 2019-2020.
- Principal Investigator, ISCRA class B (HP10B4I2KH) SeaReFor - CINECA, 2018-2020.
- Principal Investigator, ISCRA class C (HP10CBIXJ1) S2D-ARC - CINECA, 2018-2020.
- Referee of the Atmospheric Physics group for the departmental High-Performance Computing resources.

Selected talks and seminars

- 50+ **conference abstracts**, 13+ orals as presenting author
- **Panelist** at the Roundtable: *Nature-based solutions for strengthening climate and disaster resilience: toward comprehensive risk management*, UNESCO Pavillon, COP27, 2023.
- **Invited talk** at the workshop: Elements for the production of Objective Seasonal Forecasts *I gave a 40 min. talk entitled: Predictability from Siberian snow cover and sea ice*, 2022. Organised by the World Meteorological Organisation (WMO) and by the Spanish meteorological agency (AEMET)
- **Moderator** at the Open-Air Laboratory Italy Policy Roundtable, *Roundtable with researchers of the OAL-Italy and decision-makers*, 2022.
- **Panelist** at the Roundtable Reconnecting water management with nature: Upscaling Nature-Based Solutions, *World Water Week conference in Stockholm*, 2022.
- **Invited seminar** at University of Hamburg and Max Planck Institute *Title: Atlantic Multidecadal Variability and North Atlantic Storm Track*, 2019.
- **Invited seminar** Thermodynamic cycles in the stratosphere, *University of Barcelona, Department of Applied Physics*
- **Invited seminar**: The atmospheric response to an impulsive sea-ice forcing, *Joint Seminar, University of Helsinki-Finnish Met. Institute, Helsinki - Finland*, 2017
- **Invited seminar** A stratospheric link between Barents-Kara Sea-Ice and European Weather (invited) *University of Cambridge (UK), Department of Applied Math. and Theoretical Physics*, 2016.

Reviews

- *Reviewer* for the US National Science Foundation, Climate and Large-Scale Dynamics program
- *Reviewer* for: Journal of Climate, Climate Dynamics, Climate and Atmospheric Science, International Journal of Climatology, Geophysical Research Letters, Scientific Reports, Bulletin of the Atmospheric Science and Technology
- *Reviewer* for IPCC-AR6

Visiting periods

- Department of Meteorology, University of Barcelona, Spain, 2019
- Department of Meteorology, University of Reading, UK, 2017
- International Centre for Theoretical Physics, Trieste, Italy, 2016
- University of Helsinki, Finland, 2016

Awards, Grants

- Young Scientist Travel Award, European Meteorological Society, 2016
- Travel award (bando di mobilità), Università degli Studi dell'Aquila, 2016
- Scholarship: Percorso di Eccellenza Laurea Magistrale, Dipartimento di Scienze Fisiche e Chimiche, Università degli Studi dell'Aquila, 2014