

# Dr. Dario Nicoli

## Personal information:

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## Work experiences:

### **Junior scientist at Euro-Mediterranean Center on Climate Change – Climate Simulation and Prediction (CSP) division (2022-present):**

- Research topic: Decadal climate predictability, coupled modelling, with focus on the Euro-Mediterranean sector and North Atlantic Ocean (within WP2 ASPECT project).
- Responsible of the CMCC decadal prediction system within WP1 ASPECT projects (documentation paper published on GMD).
- Idealized experiments targeting the climate response to volcanic forcings within DCP-C framework contributing to multimodel study (2022).

### **Post-doc researcher at Euro-Mediterranean Center on Climate Change – Climate Simulation and Prediction (CSP) division (2020-2022):**

- Research topic: Decadal climate predictability, coupled modelling
- Development of the CMCC decadal prediction system within EUCCP and ASPECT projects (documentation paper published on GMD).
- Co-supervisor of master's degree Chiara Galeotti thesis on "Multi annual predictability of the Atlantic Meridional Overturning Circulation" (2020) CMCC Foundation and University of Bologna, Bologna, Italy

### **Post-doc researcher at Euro-Mediterranean Center on Climate Change – Climate Simulation and Prediction (CSP) division (2018-2020):**

- Research topic: AMV impact on global climate and decadal-scale predictability.
- running idealized AMV-pacemaker experiments within DCP-C framework (2016-2019, started during the Ph.D.).
- Development of the CMCC decadal prediction system within EUCCP project (2018-2020).

### **Visiting at CERFACS, Toulouse, France (2018):**

Internship for Ph.D abroad period (3 months): Study of the AMV impact using CNRM-CM5 DCP-C simulations and comparison to CMCC-CM2 DCP-C simulations for Ph.D. thesis, under the supervision of E. Sanchez-Gomez and C. Cassou. Results have been presented at EGU 2018.

### **Research Fellow at Istituto Nazionale di Geofisica E Vulcanologia (INGV), Bologna, Italy. (2015).**

Technical collaborator (7 months): Collaboration in preparation of the high-resolution bathymetry for numerical modelling

### **Trainee Oceanographer at Istituto Nazionale di Geofisica E Vulcanologia (INGV), Bologna, Italy (2014).**

Internship for post-master training course "Information technologies for maritime safety" (6 months): Improvement of the quality check of pre-processing glider data for Mediterranean Forecasting System.

**Trainee Oceanographer at Woods Hole Oceanographic Institution (WHOI), Woods Hole, MA, U.S. (2012).**

Internship for MSc thesis (4 months): laboratory experiments for a research project investigating the influence of water temperature and wind driven circulation on the submarine melting of Greenland's Glaciers. Analyses of laboratory data and diagnostics development.

## **Education:**

**Ph.D. in Science and Management of Climate Change Ca' Foscari University of Venice, Italy, and CMCC Foundation, Bologna, Italy (03/2019)**

- Ph.D. thesis title: "Global climate impacts of the Atlantic Multidecadal variability: a model-based approach". Advisors: A. Bellucci, D. Iovino

**Master degree of Environmental Engineering "Sapienza" University of Rome, Italy (07/2013)**

- MSc thesis: "Experimental study on Greenland's fjords: influence of temperature and circulation on the glaciers' melting". Advisors: A. Cenedese, C. Cenedese, S. Espa

**Bachelor degree of Environmental Engineering "Sapienza" University of Rome, Italy (11/2009).**

## **Courses and Training:**

- GOTHAM International Summer School "Global Teleconnections in the Earth's Climate System – Processes, Modelling and Advanced Analysis Methods" - Potsdam Institute (PIK), Potsdam, Germany (2017)
- Master of Research in Science and Management of Climate Change Ca' Foscari University of Venice, Italy (2015)
- B2 English Exam Ca' Foscari University of Venice, Italy (2015)
- Graduate Record Examinations (GRE) – General Test (2015)
- Introduction to modern Fortran CINECA, Secrate (MI), Italy (2015)
- Post-master training course "Information technologies for maritime safety" CMCC, Lecce, Italy (2014-2015).

## **Personal skills:**

*Languages:*

Italian (mother tongue), English (B2), Spanish (A2)

*Digital skills:*

Coding: Fortran, Matlab, Python, ncl, NCO (netcdf), CDO (netcdf), Linux-Bash

Modelling: CMCC–CM2 global coupled model, NEMOV3.6 Ocean Model, CAM5 Atmospheric model

## **Publications in peer-reviewed journals:**

Patrizio C., Athanasiadis P.J., Smith D., and **Nicoli D.** Ocean-atmosphere feedbacks key to NAO decadal predictability. *npj Climate and Atmospheric science* (submitted).

**Nicoli D.**, Gualdi S., Athanasiadis P.J.; Decadal predictions outperform projections in forecasting winter precipitation over the Mediterranean region. *Environmental Research Letter* (in review).

Bilbao, R., Ortega, P., Swingedouw, D., Hermanson, L., Athanasiadis, P., Eade, R., Devilliers, M., Doblado-Reyes, F., Dunstone, N., Ho, A.-C., Merryfield, W., Mignot, J., **Nicoli, D.**, Samsó, M., Sospedra-Alfonso, R., Wu, X., and Yeager, S.: Impact of volcanic eruptions on CMIP6 decadal predictions: a multi-model analysis, *Earth Syst. Dynam.*, 15, 501–525, <https://doi.org/10.5194/esd-15-501-2024>, 2024.

Chunxue Yang, Romain Bourdallé-Badie, Marie Drevillon, Dillon Amaya, Lotfi Aouf, Ali Aydogdu, Benjamin Barton, Mike Bell, Tim Boyer, Anouk Blauw, James Carton, Tony Candela, Gianpiero Cossarini, Tomasz Dabrowski, Eric de Boisseson, Lee de Mora, Ronan Fablet, Gaël Forget, Yosuke Fujii, Gilles Garric, Valentina Giunta, Peter Salamon, Hans Hersbach, Mélanie Juza, Julien Le Sommer, Matthew Martin, Ronan McAdam, Melisa Menendez Garcia, Joao Morim, **Dario Nicoli**, Antonio Reppucci, Annette Samuelsen, Raphaëlle Sauzède, Laura Slivinski, Damien Specq, Andrea Storto, Laura Tuomi, Luc Vandenbulcke, Roland Aznar, Jonathan Beuvier, Andrea Cipollone, Emanuela Clementi, Valeria Di Biagio, Romain Escudier, Rianne Giesen, Eric Greiner, Karen Guihou, Vasily Korabel, Julien Lamouroux, Stephane Law Chune, Jean- Michel Lellouche, Bruno Levier, Leonardo Lima, Antoine Mangin, Michael Mayer, Angélique Melet, Pietro Miraglio, Charikleia Oikonomou, Julia Pfeffer, Richard Renshaw, Ida Ringgaard, Sulian Thual, Olivier Titaud, Marina Tonani, Simon van Gennip, Karina von Schuckmann, Yann Drillet, and Pierre-Yves Le Traon (2024). Gathering users and developers to shape together the next-generation ocean reanalyses: Ocean reanalyses workshop of the European Copernicus Marine Service. *Bulletin of the American Meteorological Society*.

Polkova I, Swingedouw D, Hermanson L, Köhl A, Stammer D, Smith D, Kröger J, Bethke I, Yang X, Zhang L, **Nicoli D**, Athanasiadis PJ, Karami MP, Pankatz K, Pohlmann H, Wu B, Bilbao R, Ortega P, Yang S, Sospedra-Alfonso R, Merryfield W, Kataoka T, Tatebe H, Imada Y, Ishii M and Matear RJ (2023). Initialization shock in the ocean circulation reduces skill in decadal predictions of the North Atlantic subpolar gyre. *Front. Clim.* 5:1273770. doi: 10.3389/fclim.2023.1273770

Tsartsali, E. E., Athanasiadis, P. J., Materia, S., Bellucci, A., **Nicoli, D.**, & Gualdi, S. (2023). Predicting precipitation on the decadal timescale: A prototype climate service for the hydropower sector. *Climate Services*, 32, 100422.

**Nicoli, D.**, Bellucci, A., Ruggieri, P., Athanasiadis, P. J., Materia, S., Peano, D., Fedele, G., Hénin, R., and Gualdi, S.: The Euro-Mediterranean Center on Climate Change (CMCC) decadal prediction system, *Geosci. Model Dev.*, 16, 179–197, <https://doi.org/10.5194/gmd-16-179-2023>, 2023.

Carlos Delgado-Torres, Markus G. Donat, Nube Gonzalez-Reviriego, Louis-Philippe Caron, Panos J. Athanasiadis, Pierre-Antoine Bretonnière, Nick J. Dunstone, An-Chi Ho, **Dario Nicoli**, Klaus Pankatz, Andreas Paxian, Núria Pérez-Zanón, Margarida Samsó Cabré, Balakrishnan Solaraju-Murali, Albert Soret, and Francisco J. Doblas-Reyes (2022). Multi-model forecast quality assessment of CMIP6 decadal predictions. *Journal of Climate*, 35(13), 4363-4382.

Nick Dunstone, Julia Lockwood, Balakrishnan Solaraju-Murali, Katja Reinhardt, Eirini E. Tsartsali, Panos J. Athanasiadis, Alessio Bellucci, Anca Brookshaw, Louis-Philippe Caron, Francisco J. Doblas-Reyes, Barbara Früh, Nube González-Reviriego, Silvio Gualdi, Leon Hermanson, Stefano Materia, Andria Nicodemou, **Dario Nicoli**, Klaus Pankatz, Andreas Paxian, Adam Scaife, Doug Smith, and Hazel E. Thornton (2022). Towards useful decadal climate services. *Bulletin of the American Meteorological Society*.

Leon Hermanson, Doug Smith, Melissa Seabrook, Roberto Bilbao, Francisco Doblas-Reyes, Etienne Tourigny, Vladimir Lapin, Viatcheslav V. Kharin, William J. Merryfield, Reinel Sospedra-Alfonso, Panos Athanasiadis, **Dario Nicoli**, Silvio Gualdi, Nick Dunstone, Rosie Eade, Adam Scaife, Mark Collier, Terence O’Kane, Vassili Kitsios, Paul Sandery, Klaus Pankatz, Barbara Früh, Holger Pohlmann, Wolfgang Müller, Takahito Kataoka, Hiroaki Tatebe, Masayoshi Ishii, Yukiko Imada, Tim Kruschke, Torben Koenigk, Mehdi Pasha Karami, Shuting Yang, Tian Tian, Liping Zhang, Tom Delworth, Xiaosong Yang, Fanrong Zeng, Yiguo Wang, François Counillon, Noel Keenlyside, Ingo Bethke, Judith Lean, Jürg Luterbacher, Rupa Kumar Kolli, and Arun Kumar (2022). WMO global annual to decadal climate update: a prediction for 2021–25. *Bulletin of the American Meteorological Society*, 103(4), E1117-E1129.

H. R. Langehaug, P. Ortega, F. Counillon, D. Matei, E. Maroon, N. Keenlyside, J. Mignot, Y. Wang, D. Swingedouw, I. Bethke, S. Yang, G. Danabasoglu, A. Bellucci, P. Ruggieri, **D. Nicoli**, and M. Årthun (2022). Propagation of Thermohaline Anomalies and their predictive potential along the Atlantic water pathway. *Journal of Climate*, 35(7), 2111-2131.

Yohan Ruprich-Robert, Eduardo Moreno-Chamarro, Xavier Levine, Alessio Bellucci, Christophe Cassou, Frederic Castruccio, Paolo Davini, Rosie Eade, Guillaume Gastineau, Leon Hermanson, Dan Hodson, Katja Lohmann, Jorge Lopez-Parages, Paul-Arthur Monerie, **Dario Nicoli**, Said Qasmi, Christopher D. Roberts, Emilia Sanchez-Gomez, Gokhan Danabasoglu, Nick Dunstone, Marta Martin-Rey, Rym Msadek, Jon Robson, Doug Smith & Etienne Tourigny (2021). Impacts of Atlantic multidecadal variability on the tropical Pacific: a multi-model study. *npj Clim Atmos Sci* 4, 33. <https://doi.org/10.1038/s41612-021-00188-5>

Paolo Ruggieri, Alessio Bellucci, **Dario Nicoli**, Panos J. Athanasiadis, Silvio Gualdi, Christophe Cassou, Fred Castruccio, Gokhan Danabasoglu, Paolo Davini, Nick Dunstone, Rosemary Eade, Guillaume Gastineau, Ben Harvey, Leon Hermanson, Saïd Qasmi, Yohan Ruprich-Robert, Emilia Sanchez-Gomez, Doug Smith, Simon Wild, and Matteo Zampieri (2021). Atlantic multidecadal variability and North Atlantic jet: a multimodel view from the decadal climate prediction project. *Journal of Climate*, 34(1), 347-360.

**Nicoli, D.**, Bellucci, A., Iovino, D., Ruggieri, P., & Gualdi, S. (2020). The impact of the AMV on Eurasian summer hydrological cycle. *Nature Scientific Reports*, 10(1).

Muhammad Azhar Ehsan, **Dario Nicoli**, Fred Kucharski, Mansour Almazroui, Michael K. Tippett, Alessio Bellucci, Paolo Ruggieri & In-Sik Kang. Atlantic Ocean influence on Middle East summer surface air temperature. *npj Clim Atmos Sci* 3, 5 (2020). <https://doi.org/10.1038/s41612-020-0109-1>

D. M. Smith, A. A. Scaife, R. Eade, P. Athanasiadis, A. Bellucci, I. Bethke, R. Bilbao, L. F. Borchert, L.-P. Caron, F. Counillon, G. Danabasoglu, T. Delworth, F. J. Doblas-Reyes, N. J. Dunstone, V. Estella-Perez, S. Flavoni, L. Hermanson, N. Keenlyside, V. Kharin, M. Kimoto, W. J. Merryfield, J. Mignot, T. Mochizuki, K. Modali, P.-A. Monerie, W. A. Müller, **D. Nicoli**, P. Ortega, K. Pankatz, H. Pohlmann, J. Robson, P. Ruggieri, R. Sospedra-Alfonso, D. Swingedouw, Y. Wang, S. Wild, S. Yeager, X. Yang & L. Zhang (2020). North Atlantic climate far more predictable than models imply. *Nature*, 583(7818), 796-800.

R. Sciascia, C. Cenedese, **D. Nicoli**, P. Heimbach and F. Straneo (2014) Impact of periodic intermediary flows on submarine melting of a Greenland glacier. *Journal of Geophysical Research*. DOI: 10.1002/2014JC009953

## Conference Abstracts:

### **MedCLIVAR-SISC 2024, Lecce, Italy**

Oral presentation: Decadal predictions outperform climate projections in forecasting Mediterranean winter precipitation

### **European Meteorological Society 2024 GA, Barcelona, Spain**

Oral presentation: Decadal predictions outperform climate projections in forecasting winter precipitation over the Mediterranean region

### **CMCC Webinar, online, 16/07/2024**

Oral presentation: Decadal predictability of European precipitation: insights from the Decadal Climate Prediction Project

### **Workshop on Climate Prediction and Services over the Atlantic-Arctic region, online, 27–30/05/2024**

Oral presentation: Decadal predictions outperform climate projections in forecasting Mediterranean winter precipitation

### **European Geosciences Union 2024 GA, Vienna, Austria**

Oral presentation: Decadal predictions outperform climate projections in forecasting Mediterranean winter precipitation

### **9th Metmed, Genova, Italy, 22–24/05/2024**

Oral presentation: Multi-model assessment of the next-decade climate over the Mediterranean region

### **Ocean Reanalysis Workshop of the Copernicus Marine Service, Toulouse, France, 9-12/10/2023**

**Invited talk:** Coupled community: Decadal predictions

### **CMCC Webinar, online, 25/10/2022**

Oral presentation: predicting Mediterranean climate on interannual to decadal timescales: perspectives from the CMCC decadal prediction system

### **MedCLIVAR 2022 CONF, Marrakech, Morocco, 4–8/10/2022**

Oral presentation: Predicting Mediterranean Climate on annual-to-decadal timescales – perspectives from the CMCC Decadal Prediction System

### **Third WMO Workshop on Operational Climate Prediction (OCP-3), Lisbon, Portugal, 20–22/09/2022**

Poster presentation: Predicting Mediterranean Climate on annual-to-decadal timescales – perspectives from the CMCC Decadal Prediction System

**European Meteorological Society 2021 GA, online**

Oral presentation: Predicting Climate Change over the multi-annual range: a perspective from CMCC Decadal Prediction System

**IX Annual SISC Conference 2021, online**

Oral presentation: Predicting Climate Change over the multi-annual range: a perspective from CMCC Decadal Prediction System

**European Meteorological Society 2019 GA, Copenhagen, Denmark**

Oral presentation: Decadal-scale predictability of Eurasian summer precipitation: the role of AMV

**European Geosciences Union 2019 GA, Vienna, Austria**

Oral presentation: Decadal-scale predictability of Eurasian summer precipitation: the role of AMV

**THEMES 2018 - Workshop on “Oceanic and Atmospheric variability, from long-term trends to abrupt shifts”, Venice, Italy**

Oral presentation: Atlantic Multidecadal Variability: assessing climate impact in an idealized framework with a state-of-the-art model

**European Geosciences Union 2018 GA, Vienna, Austria**

Poster presentation: Global climate impacts of the Atlantic Multidecadal Variability: a model-based approach

**V Annual SISC Conference 2017, Bologna, Italy**

Oral presentation: Global climate impacts of the Atlantic Multidecadal Variability: a model-based approach

**Bologna, 30/08/2024**