

PERSONAL INFORMATION

Marco Possega



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Gender Male | **Date of birth** 30 August 1995 | **Nationality** Italian

WORK EXPERIENCE

February 2024 – Present

Post-doctoral Fellow

Italian National Research Council - Institute of Atmospheric Sciences and Climate (CNR-ISAC)
Via Piero Gobetti, 101 - Bologna, Italy

Post-doc research grant on 'Study and modeling of land-atmosphere interactions with particular focus on the feedbacks between drought extremes/transitions and the large-scale circulation' - OptimESM (Optimal High Resolution Earth System Models for Exploring Future Climate Change) project

Protocoll num. 0308722, 17/10/2023

Supervisor: Dr. A. Alessandri

Main activities Study of soil modulation of the drought memory process for CMIP6 and CMIP6+ models, with a focus on the Mediterranean region, exploiting different standardized drought indices. Mainly involved in OptimESM Work Package 4, contributing to Milestone 12: Sicardi et al. 'Preliminary analysis of ESM biases in mean state, variability and trends in the historical period'

February 2023 – January 2024

Post-doctoral Fellow

Alma Mater Studiorum - University of Bologna
Via Irnerio, 46 - Bologna, Italy

Post-doc research grant on 'Interaction between heat waves and urban heat island through weather prediction modelling' - TRIGGER (SoluTions foR mltiGatinG climate-induced hEalth tReaths) project

Protocol num. 2521 Rep. 370 Fascicolo 7943560, 23/11/2022

Supervisor: Prof. S. Di Sabatino

Main activities Study of urban climate in present and future conditions of extremely hot weather through numerical simulations, mainly involved in I-CHANGE (Individual Change of HABits Needed for Green European transition) project. The methodology involves using the Weather Research & Forecasting (WRF) model with diverse parameterizations and boundary conditions, emphasizing local-scale analysis. Lead of I-CHANGE Deliverable D3.5: Possega et al. 'Impact of behavioral changes on global and local climate'

EDUCATION AND TRAINING

2019–2023

PhD "Future Earth, climate change and societal challenges" EQF level: 8

Alma Mater Studiorum - University of Bologna, Italy

PhD cycle: 35

Dissertation title Analysis of heat-related phenomena and their interactions at different spatio-temporal scales

Supervisors: Prof. S. Di Sabatino, Dr. P. Ruggieri and Dr. L. Aragão

Dissertation keywords: urban heat island, heat wave, drought propagation, extreme events

Main activities Analysis of synergy between heat waves and urban heat island using observational and numerical data, climatological study of drought propagation process, implementation of Python codes, participation in OPERANDUM (OPEN-air laboRatories for Nature baseD soLutions to Manage environmental risks) project activities

PhD defense date: 21/06/2023

2017–2019 Master's Degree in Earth System Physics EQF level: 7

Alma Mater Studiorum - University of Bologna, Italy

LM-17 - 2nd level degree in Physics

Thesis title Wavelet analysis of downslope flows in MATERHORN 2012 experiment

Supervisors: Prof. S. Di Sabatino, Dr. T. Grenga, Dr. L. Leo

Dissertation keywords: wavelet transform, downslope flows, MATERHORN 2012

Main activities Observational data pre-processing, analysis of diurnal mountain wind system through the Wavelet Transform method, implementation of MATLAB codes

Final degree mark: 110/110

Graduation date: 24/10/2019

2014–2017 Bachelor's Degree in Physics EQF level: 6

University of Modena and Reggio Emilia, Italy

L-30 - 1st level degree in Physics

Thesis title Analysis of the propagation of indirect excitons diffused by time-dependent potentials

Supervisor: Prof. G. Goldoni

Dissertation keywords: excitons, splitstep, time-dependent, semiconductors, quantum-probability

Main activities Implementation of numerical codes in Fortran90 for the study of the dynamics of quantum particles

Final degree mark: 110/110 cum laude

Graduation date: 28/09/2017

PRE-UNIVERSITY STUDIES

2009-2014 Classical High School Diploma

Liceo 'Rinaldo Corso', Correggio (RE), Italy

Italian secondary school diploma

School-leaving examination mark: 100/100

ACADEMIC STUDIES IN FOREIGN COUNTRIES

2022 Visiting PhD Student

University of Granada, Spain

Duration: 3 months

Supervisors: Prof. S. Gàmez-Fortis, Dr. M. García-Valdecasas Ojeda

Main activities Study of drought phenomena on the Iberian Peninsula through indices calculated from numerical simulations and reanalysis data

2019 Visiting Master's Degree Student

RWTH University of Aachen, Germany

Duration: 3 months

Supervisors: Dr. T. Grenga, Dr. L. Leo

Main activities Preparation of the Master's Degree thesis in Earth System Physics

FURTHER EDUCATION AND TRAINING

2023 MOOC Machine Learning in Weather & Climate

ECMWF (Online)

Duration: 3 months

Main activities Massive Open Online Course (MOOC) regarding the basic knowledge of Machine Learning applied to numerical weather and climate predictions

2022 3BMeteo School

3BMeteo, Bergamo, Italy

Duration: 1 week

Main activities Training week in operational meteorology at the headquarters of the main Italian private meteorological centre, with theoretical lessons and exercises on methods of forecasting, nowcasting and communication of weather forecasts through the media

2021 24 CFU Educational Path in Anthropological, Psychological, and Pedagogical Studies for Teaching

Alma Mater Studiorum - University of Bologna, Italy

Main activities Certificate of completion of the anthropological, psychological, and pedagogical exams required for teaching in Italian secondary schools

2020 Basic Meteorologist Training Certificate

Alma Mater Studiorum - University of Bologna, Italy

Main activities Certificate of basic training of Meteorologist according to the World Meteorological Organization (WMO-WMO)

PERSONAL SKILLS

Mother tongue Italian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	C1	C1
International English Language Testing System (IELTS) - CEFR Level C1, British Council					
Spanish	A2	A2	A2	A2	A2

Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user
[Common European Framework of Reference for Languages](https://europass.cedefop.europa.eu)

Teaching activities

- Tutoring for WRF Model Laboratory of the course “Dynamical meteorology” held by Prof. F. Barbano and included in the Earth System Physics Master's Degree of Alma Mater Studiorum - University of Bologna (2023)
- Tutoring for WRF Model Laboratory of the course “Dynamical meteorology” held by Prof. S. Di Sabatino and included in the Earth System Physics Master's Degree of Alma Mater Studiorum - University of Bologna (2022)
- Tutoring for the course “Laboratory of atmospheric physics”, held by Prof. F. Porcù and included in the Earth System Physics Master's Degree of Alma Mater Studiorum - University of Bologna (2021)

Digital competences

SELF-ASSESSMENT

Information Processing	Communication	Content creation	Safety	Problem solving
Independent user	Independent user	Independent user	Independent user	Independent user

[Digital competences - Self-assessment grid](#)

Computer skills

- Operating systems: UNIX and Linux/WINDOWS
- Programming languages: advanced skill in MATLAB, Python, good knowledge of Fortran90, shell scripting and parallel programming (MPI), limited experience with R
- Graphic software known and used: MATLAB, Python, NCL
- Advanced experience with Linux clusters and Slurm Workload Manager
- Advanced experience in numerical simulations with Weather Research & Forecasting (WRF) model
- Preliminary experience with EC-Earth model
- Advanced experience with Microsoft Word, Excel, PowerPoint, Outlook

Other skills and activities

- Reviewer for International Journal of Climatology and Oxford Open Climate Change
- Contribution to Proposal of Alma Cares Project "SINTESI – Sinossi di eventi estremi costieri per l'adattamento climatico in Emilia-Romagna" for Alma Mater Studiorum - University of Bologna (2023)
- Involved in Land and Vegetation Working Group in the EC-Earth consortium
- Attended OptimeESM General Assembly, CINECA and CNR, Bologna (Italy), 12-14 March 2024
- Attended EC-Earth meeting (online) organised by DMI, September 16-19 2024
- AISAM (Italian Association of Atmospheric Sciences and Meteorology) Member

Driving licence B

PUBLICATIONS

Peer-Reviewed Publications

Multi-Scale Analysis of Agricultural Drought Propagation on the Iberian Peninsula Using Non-Parametric Indices, Marco Possega, Matilde García-Valdecasas Ojeda and Sonia Raquel Gámiz-Fortis, Water, MDPI (2023) doi.org/10.3390/w15112032

Observational evidence of intensified nocturnal urban heat island during heatwaves in European cities, Marco Possega, Leonardo Aragão, Paolo Ruggieri, Marco Antonio Santo, Silvana Di Sabatino, Environmental Research Letters, IOP (2022) iopscience.iop.org/article/10.1088/1748-9326/aca3ba

Peer-Reviewed Publications in Preparation

Analysis of Urban Thermal Patterns during Projected Hot Weather Events under Different Scenarios: The Bologna Case Study, Marco Possega, Erika Brattich, Carlo Cintolesi, Paolo Ruggieri, Silvana Di Sabatino, In Preparation (2025)

On the diverging soil-moisture response of land surface models when prescribing vegetation variability from observations, Andrea Alessandri, Annalisa Cherchi, Emanuele Di Carlo, Marco Possega, Fransje Van Orschoot, In Preparation (2025)

A new diagnostic tool for discovery of medium-sized nonlinear surprises in CMIP-class models, Valerio Lembo, Susanna Corti, Andrea Alessandri, Marco Possega, Annalisa Cherchi, In Preparation (2025)

PROFESSIONAL
SCHOLARSHIPS/AWARDS

Scholarships

Early Career Scientist's Travel Support for participation in the EGU General Assembly, for submitted abstract *Understanding Soil Modulation of Drought Persistence in CMIP6 Models* (2025)

Marco Polo scholarship for research periods abroad provided by Alma Mater Studiorum - University of Bologna to PhD students and researchers (2021)

Scholarship for the preparation of Master's Degree thesis abroad provided by Alma Mater Studiorum - University of Bologna (2019)

Awards

Study award provided by the Cassa di Risparmio di Carpi Foundation for the achievement of the first level degree with honors (2018)

Study award provided by the Cassa di Risparmio di Carpi Foundation for obtaining the high school diploma with honors (2015)

CONFERENCES

2024 **5° Congresso Nazionale dell'Associazione Italiana di Scienze dell'Atmosfera e Meteorologia, AISAM**

Università del Salento , Lecce, Italy

Unraveling the Three-dimensional Dynamics of Urban Heat Islands under Heat Wave Conditions Through Numerical Simulations: A Case Study for Bologna, Marco Possega, Erika Brattich, Carlo Cintolesi, Paolo Ruggieri, and Silvana Di Sabatino

2023 **EMS Annual Meeting 2023**

Bratislava, Slovakia

Characterization of agricultural drought propagation on the Iberian Peninsula through non-parametric indices, Marco Possega, Matilde García-Valdecasas Ojeda, Sonia Raquel Gámiz-Fortis, and Silvana Di Sabatino

2022 **EMS Annual Meeting 2022**

Bonn, Germany

Drought characteristic projections over the Iberian Peninsula: the effect of using nonparametric multivariate standardized drought indices, Matilde García-Valdecasas Ojeda, Marco Possega, Emilio Romero-Jiménez, Juan José Rosa-Cánovas, Patricio Yeste, Yolanda Castro-Díez, María Jesús Esteban-Parra, Silvana Di Sabatino, and Sonia Raquel Gámiz-Fortis

2022 **4° Congresso Nazionale dell'Associazione Italiana di Scienze dell'Atmosfera e Meteorologia , AISAM**

Milano, Italy

Urban heat island and heat waves characteristics and interactions: a review of the state-of-the-art, Silvana Di Sabatino, Leonardo Aragão, Francesco Barbano, Erika Brattich, Laura Leo, Marco Possega, Paolo Ruggieri, Marco Santo

2022 **4° Congresso Nazionale dell'Associazione Italiana di Scienze dell'Atmosfera e Meteorologia , AISAM**

Milano, Italy

Evidence of intensified Urban Heat Island during Heatwaves in European cities through observational data, Marco Possega, Leonardo Aragão, Paolo Ruggieri, Marco A. Santo, and Silvana Di Sabatino

2021 **EGU General Assembly 2021**

Online

Observational evidence of urban heat island intensification during heatwaves in European cities, Marco Possega, Leonardo Aragão, Paolo Ruggieri, Marco A. Santo, and Silvana Di Sabatino

2021 **EMS Annual Meeting 2021**

Online

Observational evidence of urban heat island intensification during heatwaves in European cities, Marco Possega, Leonardo Aragão, Paolo Ruggieri, Marco A. Santo, and Silvana Di Sabatino