

Marco GAETANI (PhD) - Curriculum Vitae

Birth: 3/5/1973, Roma, Italia

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Position

Associate Professor in Physics of the Earth System (since May 2022) at Istituto Universitario di Studi Superiori (IUSS), Palazzo del Broletto, Piazza della Vittoria 15, 27100 Pavia, Italia.

Roles

- Head of the Climate Change Impact Studies for Risk Management [CARISMA](#) research centre (since 2021).
- Member of the board of the National PhD Program on “Sustainable Development and Climate Change” (since 2021).
- Member of the board of the PhD program on “Understanding and Managing Extremes” (since 2021).

Research

Climate variability and change, predictability and modelling: Large-scale atmospheric circulation and teleconnections; West African Monsoon dynamics; Euro-Mediterranean climate, variability and interaction with tropical and mid-latitude systems; Mineral dust transport over Mediterranean and Atlantic; Climate-related impacts.

Teaching

- Introduction to climate dynamics. Course for undergraduate, graduate and PhD students (25 hours). Held at IUSS Pavia since 2019.
- Climate change: future projections and the IPCC Report. Short course for undergraduate, graduate and PhD students (10 hours). Held at IUSS Pavia since 2021.
- Climate dynamics and change. Course for PhD students (25 hours). Held at IUSS Pavia since 2023.
- Climate dynamics and change. Course for MS students (45 hours). Held at University of Pavia, Department of Civil Engineering and Architecture, since 2023.

Projects

- 2023-2027: Dipartimenti di Eccellenza, funded by the Italian Ministry of University and Research (MUR), PI of the research line R2 on Weather-Climate modelling for the characterisation of extreme events.

Professional experiences

- May 2019 - April 2022: Researcher at Istituto Universitario di Studi Superiori, Pavia, Italia.
- October 2014 - April 2019: Researcher at Laboratoire Atmospheres, Milieux, Observations Spatiales, Institut Pierre Simon Laplace, CNRS, Paris, France.
- September 2012 - September 2014: Scientific Officer at Institute for Environment and Sustainability, European Commission Joint Research Centre, Ispra, Italia.
- July 2012 - August 2012: Postdoctoral Researcher (Assegno di Ricerca) at Istituto di Biometeorologia, CNR, Roma, Italia.
- March 2012 - June 2012: Postdoctoral Researcher at Departamento de Geofísica y Meteorología, Universidad Complutense de Madrid, España.
- July 2011 - February 2012: Research Assistant (Assegno di Ricerca) at Istituto di Biometeorologia, CNR, Roma, Italia.
- September 2010 - March 2011: Research Fellowship (Borsa di Studio) at CETEMPS, Università dell’Aquila, Italia.
- March - May 2010: visit to Centre de Recherches de Climatologie, Université de Bourgogne, Dijon, France.
- March 2005 - December 2009: Research Assistant (Assegno di Ricerca) at Istituto di Biometeorologia, CNR, Roma, Italia.

- March 2004 - February 2005: Post-Master Fellowship (Borsa Post-Laurea) at Istituto di Biometeorologia, CNR, Roma, Italia.
- July - December 2003: Research Assistant (Contratto di Collaborazione) at Fondazione per la Meteorologia Applicata, Campi Bisenzio, Italia.

Qualifications

- National Scientific qualification as associate professor in the Italian higher education system for the disciplinary field of 02/C1 - Astronomy, astrophysics, Earth and planetary physics: Abilitazione Scientifica Nazionale alle funzioni di Professore Universitario di Seconda Fascia nel Settore Concorsuale 02/C1 - ASTRONOMIA, ASTROFISICA, FISICA DELLA TERRA E DEI PIANETI. The qualification will expire on the 31 January 2031.
- Licensed to teach as Associate Professor in the field of Meteorology, Physical Oceanography and Physics of the Atmosphere: Qualification aux fonctions de Maître de Conférences au titre de la section 37: Météorologie, Océanographie Physique et Physique de l'Atmosphère, Ministère de l'Enseignement supérieur, de la Recherche et de l'Innovation, France. The qualification will expire on the 31 December 2023.

Education

- March 2011: **PhD in Physics** at Università dell'Aquila, Italia. Thesis: Interaction between the West African Monsoon and the summer Mediterranean climate; supervisor: Guido Visconti.
- June 2003: **Master Degree in Physics** at Università La Sapienza, Roma, Italia. Thesis: Distribuzioni Spettrali di Energia di oggetti BL Lacertae dalla banda radio ai raggi X; supervisor: Roberto Nesci.

Technical Skills

Statistical methods applied to climatology and atmospheric dynamics. Data processing of NetCDF gridded datasets: observational, satellite and reanalysis products; numerical model outputs. Climate models: designing and running simulations with LMDZ atmospheric general circulation model. Software: MATLAB, GrADS.

Languages

Italian (mother tongue), English (C1), French (B2), Spanish (B1).

Publications

Bibliometric Indicators

	h-index	Citations
Scopus	19	1194
Web of Science	18	940
Google Scholar	22	1765

Peer-reviewed papers

1. Flamant, C., **Gaetani, M.**, Chaboureau, J.-P., Chazette, P., Cuesta, J., Piketh, S. J., Formenti, P., 2022: Smoke in the river: an Aerosols, Radiation and Clouds in southern Africa (AEROCLO-sA) case study, *Atmospheric Chemistry and Physics*, 22, 5701–5724, <https://doi.org/10.5194/acp-22-5701-2022>.
2. **Gaetani, M.**, Pohl, B., Alvarez Castro, M. C., Flamant, C., Formenti, P., 2021: A weather regime characterisation of winter biomass aerosol transport from southern Africa, *Atmospheric Chemistry and Physics*, 21, 16575–16591, <https://doi.org/10.5194/acp-21-16575-2021>.
3. Kodera, K., N. Eguchi, R. Ueyama, B. M. Funatsu, **M. Gaetani**, C. M. Taylor, 2021: The impact of tropical tropopause cooling on Sahelian extreme deep convection. *Journal of the Meteorological Society of Japan*, 99, 1127-1139, <https://doi.org/10.2151/jmsj.2021-055>.
4. Chauvigné A., F. Waquet, F. Auriol, L. Blarel, C. Delegove, O. Dubovik, C. Flamant, **M. Gaetani**, P. Goloub, R. Loisil, M. Mallet, J.M. Nicolas, F. Parol, F. Peers, B. Torres, P. Formenti, 2020: Aerosol above-cloud direct radiative effect and properties in the Namibian region during the AEROSOL, RADIATION, and CLOUDS in southern Africa (AEROCLO-sA) field campaign – Multi-Viewing, Multi-Channel, Multi-Polarization (3MI) airborne simulator and sun photometer measurements. *Atmospheric Chemistry and Physics*, 21, 8233–8253, <https://doi.org/10.5194/acp-21-8233-2021>.
5. Monerie P.A., B. Pohl, **M. Gaetani**, 2021: The fast response of Sahel precipitation to climate change allows effective mitigation action. *npj Climate and Atmospheric Science*, 4, 24, <https://doi.org/10.1038/s41612-021-00179-6>.

6. Selami N., G. Sèze, **M. Gaetani**, J.Y. Grandpeix, C. Flamant, J. Cuesta, N. Benabadi, 2021: Cloud Cover over the Sahara during the Summer and Associated Circulation Features. *Atmosphere*, 12, 428, <https://doi.org/10.3390/atmos12040428>.
7. Monerie P.A., E. Sanchez-Gomez, **M. Gaetani**, E. Mohino, B. Dong, 2020: Future evolution of the Sahel precipitation zonal contrast in CESM1. *Climate Dynamics*, 55, 2801-2821, <https://doi.org/10.1007/s00382-020-05417-w>.
8. Cuesta J., C. Flamant, **M. Gaetani**, P. Knippertz, A.H. Fink, P. Chazette, M. Eremenko, G. Dufour, C. Di Biagio, P. Formenti, 2020: Three-dimensional pathways of dust over the Sahara during summertime 2011 as revealed by new IASI observations. *Quarterly Journal of the Royal Meteorological Society*, 146, 2731– 2755, <https://doi.org/10.1002/qj.3814>.
9. **Gaetani M.**, S. Janicot, M. Vrac, A.M. Famien, B. Sultan, 2020: Robust assessment of the time of emergence of precipitation change in West Africa, *Scientific Reports*, 10, 7670, <https://doi.org/10.1038/s41598-020-63782-2>.
10. Andersen, H., J. Cermak, J. Fuchs, P. Knippertz, **M. Gaetani**, J. Quinting, S. Sippel, R. Vogt, 2020: Synoptic-scale controls of fog and low-cloud variability in the Namib Desert, *Atmospheric Chemistry and Physics*, 20, 3415–3438, <https://doi.org/10.5194/acp-20-3415-2020>.
11. Pausata F.S.R., **M. Gaetani**, G. Messori, A. Berg, D. Maia de Souza, R.F. Sage, P.B. deMenocal, 2020: The Greening of the Sahara: Past Changes and Future Implications. *One Earth*, 2, 235-250, <https://doi.org/10.1016/j.oneear.2020.03.002>.
12. Chazette P., C. Flamant, J. Totems, **M. Gaetani**, G. Smith, A. Baron, X. Landsheere, K. Desboeufs, J.F. Doussin, P. Formenti, 2019: Evidence of the complexity of aerosol transport in the lower troposphere on the Namibian coast during AEROCLO-sA. *Atmospheric Chemistry and Physics*, 19, 14979–15005, <https://doi.org/10.5194/acp-19-14979-2019>.
13. Menut L., P. Tuccella, C. Flamant, A. Deroubaix and **M. Gaetani**, 2019: The role of aerosol-cloud interactions in linking anthropogenic pollution over southern West Africa and dust emission over the Sahara. *Atmospheric Chemistry and Physics*, 19, 14657–14676, <https://www.atmos-chem-phys.net/19/14657/2019/>.
14. Formenti P., B. D’Anna, C. Flamant, M. Mallet, S.J. Piketh, K. Schepanski, F. Waquet, F. Auriol, G. Brogniez, F. Burnet, J. Chaboureaud, A. Chauvigné, P. Chazette, C. Denjean, K. Desboeufs, J. Doussin, N. Elguindi, S. Feuerstein, **M. Gaetani**, C. Giorio, D. Klopfer, M.D. Mallet, P. Nabat, A. Monod, F. Solmon, A. Namwoonde, C. Chikwililwa, R. Mushi, E.J. Welton, and B. Holben, 2019: The Aerosols, Radiation and Clouds in southern Africa (AEROCLO-sA) field campaign in Namibia: overview, illustrative observations and way forward. *Bulletin of the American Meteorological Society*, 100, 1277–1298, <https://doi.org/10.1175/BAMS-D-17-0278.1>.
15. Sultan B., B. Parkes, **M. Gaetani**, 2019: Direct and indirect effects of CO2 increase on crop yield in West Africa. *International Journal of Climatology* 39, 2400-2411, <https://doi.org/10.1002/joc.5960>.
16. Messori G., **M. Gaetani**, Q. Zhang, Q. Zhang, F.S.R. Pausata, 2019: The Water Cycle of the Mid-Holocene West African Monsoon: the Role of Vegetation and Dust Emission Changes. *International Journal of Climatology*, 39, 1927-1939, <https://doi.org/10.1002/joc.5924>.
17. Flamant, C., A. Deroubaix, P. Chazette, J. Brito, **M. Gaetani**, P. Knippertz, A.H. Fink, G. de Coetlogon, L. Menut, A. Colomb, C. Denjean, R. Meynadier, P. Rosenberg, R. Dupuy, A. Schwarzenboeck, J. Totems, 2018: Aerosol distribution in the northern Gulf of Guinea: local anthropogenic sources, long-range transport and the role of coastal shallow circulations. *Atmospheric Chemistry and Physics*, 18, 12363-12389, <https://doi.org/10.5194/acp-18-12363-2018>.
18. Dalu G.A., **M. Gaetani**, C. Lavaysse, C. Flamant, A.T. Evan, M. Baldi, 2018: Simple solutions for the summer shallow atmospheric circulation over North Africa. *Quarterly Journal of the Royal Meteorological Society*, 144, 765-779, <https://doi.org/10.1002/qj.3246>.
19. Knippertz P., A.H. Fink, A. Deroubaix, E. Morris, F. Tocquer, M.J. Evans, C. Flamant, **M. Gaetani**, C. Lavaysse, C. Mari, J.H. Marsham, R. Meynadier, A. Affo-Dogo, T. Bahaga, F. Brosse, K. Deetz, R. Guebsi, I. Latifou, M. Maranan, P.D. Rosenberg, A. Schlueter, 2017: A meteorological and chemical overview of the DACCIWA field campaign in West Africa in June–July 2016. *Atmospheric Chemistry and Physics*, 17, 10893-10918, <https://doi.org/10.5194/acp-17-10893-2017>.
20. **Gaetani M.**, G. Messori, Q. Zhang, C. Flamant, F.S.R. Pausata, 2017: Understanding the mechanisms behind the northward extension of the West African Monsoon during Mid-Holocene. *Journal of Climate*, 30, 7621-7642, <https://doi.org/10.1175/JCLI-D-16-0299.1>.

21. **Gaetani M.**, C. Flamant, S. Bastin, S. Janicot, C. Lavaysse, F. Hourdin, P. Braconnot, S. Bony, 2017: West African Monsoon dynamics and precipitation: the competition between global SST warming and CO₂ increase in CMIP5 idealized simulations. *Climate Dynamics*, 48, 1353-1373, <https://doi.org/10.1007/s00382-016-3146-z>.
22. Sultan B., **M. Gaetani**, 2016: Agriculture in West Africa in the Twenty-first Century: climate change and impacts scenarios, and potential for adaptation. *Frontiers in Plant Science*, 7, 1262, <https://doi.org/10.3389/fpls.2016.01262>.
23. Messori, G., R. Caballero, **M. Gaetani**, 2016: On cold spells in North America and storminess in western Europe. *Geophysical Research Letters*, 43, 6620-6628, <https://doi.org/10.1002/2016GL069392>.
24. Evan A.T., C. Flamant, **M. Gaetani**, F. Guichard, 2016: The Past, Present and Future of African Dust. *Nature*, 531, 493-495, <https://doi.org/10.1038/nature17149>.
25. Lavaysse C., C. Flamant, A. Evan, S. Janicot, **M. Gaetani**, 2016: Recent climatological trend of the Saharan Heat Low and its impact on the West African climate. *Climate Dynamics*, 47, 3479-3498, <https://doi.org/10.1007/s00382-015-2847-z>.
26. Otero N., E. Mohino, **M. Gaetani**, 2016: Decadal prediction of Sahel rainfall using dynamics-based indices. *Climate Dynamics*, 47, 3415-3431, <https://doi.org/10.1007/s00382-015-2738-3>.
27. Monforti F., **M. Gaetani**, E. Vignati, 2016: How synchronous is wind energy in European countries? Assessing present and future complementarity of wind power production in EU-28 and its member states from ENSEMBLES regional climate models. *Renewable and Sustainable Energy Reviews*, 59, 1622-1638, <https://doi.org/10.1016/j.rser.2015.12.318>.
28. **Gaetani M.**, M. Pasqui, A. Crisci, F. Guarnieri, 2016: A synoptic characterization of the dust transport and associated thermal anomalies in the Mediterranean basin. *International Journal of Climatology*, 36, 2779-2791, <https://doi.org/10.1002/joc.3615>.
29. Rodriguez-Fonseca B., E. Mohino, C.R. Mechoso, C. Caminade, M. Biasutti, **M. Gaetani**, J. Garcia-Serrano, E.K. Vizzy, K. Cook, Y. Xue, I. Polo, T. Losada, L. Druryan, B. Fontaine, J. Bader, F.J. Doblas-Reyes, L. Goddard, S. Janicot, A. Arribas, W. Lau, A. Colman, M. Vellinga, D.P. Rowell, F. Kucharski, A. Voltaire, 2015: Variability and Predictability of West African Droughts: A Review of the Role of Sea Surface Temperature Anomalies. *Journal of Climate*, 28, 4034-4060, <https://doi.org/10.1175/JCLI-D-14-00130.1>.
30. Pausata F.S.R., **M. Gaetani**, G. Messori, S. Kloster, F.J. Dentener, 2015: The role of aerosol in altering North Atlantic atmospheric circulation in winter and its impact on air quality. *Atmospheric Chemistry and Physics*, 15, 1725-1743, <https://doi.org/10.5194/acp-15-1725-2015>.
31. **Gaetani M.**, M. Pasqui, 2014: Synoptic patterns associated with extreme dust events in the Mediterranean basin. *Regional Environmental Change*, 14, 1847-1860, <https://doi.org/10.1007/s10113-012-0386-2>.
32. **Gaetani M.**, T. Huld, E. Vignati, F. Monforti-Ferrario, A. Dosio, F. Raes, 2014: The near future availability of photovoltaic energy in Europe and Africa in climate-aerosol modelling experiments. *Renewable and Sustainable Energy Reviews*, 38, 706-716, <https://doi.org/10.1016/j.rser.2014.07.041>.
33. **Gaetani M.**, E. Mohino, 2013: Decadal prediction of the Sahelian precipitation in CMIP5 simulations. *Journal of Climate*, 26, 7708-7719, <https://doi.org/10.1175/JCLI-D-12-00635.1>.
34. Lorrey A., G. Dalu, J. Renwick, H. Diamond, **M. Gaetani**, 2012: Reconstructing the South Pacific Convergence Zone position during the pre-satellite era: a La Niña case study. *Monthly Weather Review*, 140, 3653-3668, <https://doi.org/10.1175/MWR-D-11-00228.1>.
35. Fontaine B., P.A. Monerie, **M. Gaetani**, P. Roucou, 2011: Climate adjustments over the African-Indian monsoon regions accompanying Mediterranean Sea thermal variability. *Journal of Geophysical Research*, 116, D23122, <https://doi.org/10.1029/2011JD016273>.
36. **Gaetani M.**, M. Baldi, G.A. Dalu, G. Maracchi, 2011: Jetstream and rainfall distribution in the Mediterranean region. *Natural Hazards and Earth System Science*, 11, 2469-2481, <https://doi.org/10.5194/nhess-11-2469-2011>.
37. **Gaetani M.**, B. Pohl, H. Douville, B. Fontaine, 2011: West African Monsoon influence on the summer Euro-Atlantic circulation. *Geophysical Research Letters*, 38, L09705, <https://doi.org/10.1029/2011GL047150>.
38. Fontaine B., **M. Gaetani**, A. Ullmann, P. Roucou, 2011: Time evolution of observed July-September SST-Sahel climate teleconnection with removed quasi-global effect (1900-2008). *Journal of Geophysical Research*, 116, D04105, <https://doi.org/10.1029/2010JD014843>.

39. Fontaine B., P. Roucou, **M. Gaetani**, R. Marteau, 2011: Recent changes in precipitation, ITCZ convection and northern tropical circulation over North Africa (1979-2007). *International Journal of Climatology*, 31, 633-648, <https://doi.org/10.1002/joc.2108>.
40. **Gaetani M.**, B. Fontaine, P. Roucou, M. Baldi, 2010: Influence of the Mediterranean Sea on the West African Monsoon: intraseasonal variability in numerical simulations. *Journal of Geophysical Research*, 115, D24115, <https://doi.org/10.1029/2010JD014436>.
41. Dalu G.A., **M. Gaetani**, M. Baldi, 2009: A hydrological onset and withdrawal index for the West African monsoon. *Theoretical and Applied Climatology*, 96, 179-189, <https://doi.org/10.1007/s00704-008-0022-8>.

Chapters in books

42. Di Biagio C., J.R. Banks, **M. Gaetani**, 2021: Dust Atmospheric Transport Over Long Distances. Reference Module in Earth Systems and Environmental Sciences, Elsevier, <https://doi.org/10.1016/B978-0-12-818234-5.00033-X>.
43. Ulbrich U., E. Xoplaki, S. Dobricic, R. Garcia-Herrera, P. Lionello, M. Adani, M. Baldi, D. Barriopedro, P. Coccimiglio, G. Dalu, D. Efthymiadis, **M. Gaetani**, M.B. Galati, L. Gimeno, C.M. Goodess, P.D. Jones, F.G. Kuglitsch, G.C. Leckebusch, J. Luterbacher, M. Marcos-Moreno, A. Mariotti, R. Nieto, K.M. Nissen, D. Pettenuzzo, N. Pinardi, C. Pino, A.G.P. Shaw, P. Sousa, A. Toreti, R.M. Trigo, M. Tsimplis, 2013: Past and Current Climate Changes in the Mediterranean Region. *Advances in Global Change Research*, 50, 9-51, https://doi.org/10.1007/978-94-007-5781-3_2.

Scientific and technical reports

44. **Gaetani M.**, E. Vignati, F. Monforti, T. Huld, A. Dosio, F. Raes, 2015: Climate modelling and renewable energy resource assessment. JRC 95440.
45. Bartholome E., A. Belward, K. Bodis, F. Bouraoui, J.F. Dallemand, T. Huld, **M. Gaetani**, A. Jaeger-Waldau, P. Mayaux, M. Moner-Girona, F. Monforti, V. Motola, H. Ossenbrink, L. Pozzoli, S. Russo, N. Scarlat, J. Skoien, S. Szabo, J. Thielen, E. Vignati, 2013: The availability of renewable energies in a changing Africa. JRC 81645, EUR 25980 EN, <https://doi.org/10.2790/88194>.

Field work

- September 2021: operation director and weather forecaster for the CADDIWA aircraft campaign, Sal, Cabo Verde (<https://www.ipsl.fr/campagne/caddiwa-clouds-atmospheric-dynamics-dust-interactions-in-west-africa/>).
- September 2017: weather forecaster for the AEROCLO-SA aircraft campaign, Walvis Bay, Namibia (<http://www.agence-nationale-recherche.fr/?Project=ANR-15-CE01-0014>).
- June-July 2016: weather forecaster for the DACCIWA aircraft campaign, Lomé, Togo (<http://www.dacciwa.eu/>).

Academic Service

Supervisor

- Giorgia Fosser (2020-2022), Postdoctoral Researcher (Assegno di Ricerca) at IUSS Pavia.
- Lia Rapella, “Impact of Climate Change on Renewable Energy Availability”, Master of Science 2021, Università di Pavia, Italia (co-advisor with Prof. Dario Gerace).
- Irene Trombini, “Atmospheric Rossby waves: barotropic models on the beta-plane”, Bachelor of Science 2020, Università di Pavia, Italia (co-advisor with Prof. Claudio Dappiaggi).
- Noelia Otero Felipe, “Prediccion decadal del Monzon de Africa Occidental”, Master of Science 2013, Universidad Complutense de Madrid, Spain (co-advisor with Prof. Elsa Mohino Harris).

Editor

- Research topic on Impact of Climate Variability and Change on the Water-Energy-Food Nexus, *Frontiers in Climate* (<https://www.frontiersin.org/research-topics/17958/impact-of-climate-variability-and-change-on-the-water-energy-food-nexus>, ISSN: 2624-9553).
- Special Issue on West African Monsoon Climate Dynamics and Impacts: Past, Present and Future, *Atmosphere*, MDPI (https://www.mdpi.com/journal/atmosphere/special_issues/African_Monsoon, ISSN: 2073-4433).
- Climate variability and teleconnections in West Africa and the Mediterranean, *Fisica de la Tierra*, 25, 2013, Universidad Complutense de Madrid, Spain (<https://revistas.ucm.es/index.php/FITE/issue/view/2467>, ISSN: 0214-4557).

Reviewer

Advances in Meteorology (Hindawi); Atmospheric Chemistry and Physics (EGU); Atmospheric Research (Elsevier); Climate and Atmospheric Science (Nature Research); Climate Dynamics (Springer); Climate of the Past (EGU); Communications Earth & Environment (Nature Research); Earth System Dynamics (EGU); Environmental Research Letters (IOP Publishing); Geophysical Research Letters (AGU); International Journal of Climatology (RMets); Journal of Atmospheric and Solar-Terrestrial Physics (Elsevier); Journal of Climate (AMS); Journal of Geophysical Research (AGU); Natural Hazards and Earth System Sciences (EGU); Nature Communications (Nature Research); Nature Sustainability (Nature Research); Regional Environmental Change (Springer); Tellus A: Dynamic Meteorology & Oceanography (Taylor & Francis).

Conferences and workshops

+ 77 contributions since 2004.

Memberships

- European Geoscience Union (EGU)
- Società Italiana per le Scienze del Clima (SISC)