Emanuele Bevacqua

Curriculum Vitae

Reading
United Kingdom
✉ *e.bevacqua@reading.ac.uk*
🖰 *emanuele.bevacqua.eu*
skypeID: emanuele_bevacqua

Personal Data

Date of Birth	29th June 1990.
Nationality	Italian.

Postdoctoral work experience

03/2019–present	**Postdoc scientist**. Department of Meteorology, University of Reading, UK.
09/2018–02/2019	**Postdoc scientist**. Wegener Center for Climate and Global Change, University of Graz, Austria.

Research experience

I study the impact of past and future climate change on extreme events via focusing on compound events, i.e. impacts caused by the combination of multiple drivers/hazards. For example, I have studied long-lasting precipitation events caused by consecutive cyclones, compound flooding happening in low-lying coastal areas due to co-occurring precipitation and sea level extremes, and meteorological droughts in combination with heatwaves. I employ climate models, outputs from hydrological models, and statistical tools to understand the physical mechanisms driving these extreme events and associated future changes, with a focus on uncertainties. I have gained experience in multivariate statistics (copulas and pair copula constructions), statistical downscaling, regional climate modelling, and collaborated on research about soil moisture drought.

Education

11/2014–09/2018	**PhD (Dr. rer. nat) in Physics (Climate Science)**. 2016–2018: Wegener Center for Climate and Global Change, University of Graz, Austria. 2014-2015: GEOMAR – Helmholtz Centre for Ocean Research Kiel, Germany. *Pass with distinction.*
Thesis	*Multivariate statistical modelling and analysis of compound events.*
Supervisor	Prof. Douglas Maraun.
2012–2014	**Master of Science in Physics (Astrophysics and Geophysics)**. University of Calabria, Cosenza, Italy. *Cum laude, and honourable mention for career.*

Thesis *Analysis of the magnetohydrodynamic turbulence anisotropy based on a new definition of the mean magnetic field.*

2009–2012 **Bachelor's degree in Physics**.
University of Calabria, Cosenza, Italy.

Cum laude, and honourable mention for career.

Thesis *Focus on the last glacial period.*

2004–2009 **Scientific High School**.
Cosenza, Italy.

Score of *100 out of 100.*

Publications

- **Bevacqua, E.**, Vousdoukas, M. I., Shepherd, T. G., and Vrac, M. (2019). "Brief communication: The role of using precipitation or river discharge data when assessing global coastal compound flooding". Accepted for publication in Nat. Hazards Earth Syst. Sci., https://doi.org/10.5194/nhess-2019-415..

- Zscheischler, J., Martius, O., Westra, S., **Bevacqua, E.**, Raymond, C., Horton, R., van den Hurk, B., AghaKouchak, A., Jézéquel, A., Mahecha, M. D., Maraun, D., Ramos, A. M., Ridder, N., Thiery, W., Vignotto, E. (2019). "A typology of compound weather and climate events". Accepted for publicaiton in Nature Reviews Earth & Environment.

- Jézéquel, A., **Bevacqua, E.**, D'Andrea, F., Thao, S., Vautard, R., Vrac, M., Yiou, P. (2020). "Conditional and residual trends of singular hot days in Europe". e. Environmental Research Letters 15, 064018. DOI: 10.1088/1748-9326/ab76dd.

- **Bevacqua, E.**, Maraun, D., Vousdoukas, M. I., Voukouvalas, E., Vrac, M., Mentaschi, L., and Widmann, M. (2019). "Higher probability of compound flooding from precipitation and storm surge in Europe under anthropogenic climate change". Science Advances, Vol. 5, no. 9, eaaw5531 DOI: 10.1126/sciadv.aaw5531.

- Manning, C., Widmann, M., **Bevacqua, E.**, Van Loon, A. F., Maraun, D.,and Vrac, M. (2019). "Increased probability of compound long-duration dry & hot events in Europe during summer (1950-2013)". Environ. Res. Lett. 14 094006.

- **Bevacqua, E.** (2018). "Multivariate statistical modelling and analysis of compound events". PhD thesis, University of Graz, Graz, Austria.

- Manning, C., Widmann, M., **Bevacqua, E.**, Van Loon, A. F., Maraun, D.,and Vrac, M. (2018). "Soil moisture drought in Europe: a compound event of precipitation and potential evapotranspiration on multiple timescales". Journal of Hydrometeorology, 19(8), 1255-1271.

- **Bevacqua, E.**, Maraun, D., Haff, I. H., Widmann, M., and Vrac, M. (2017). "Multivariate statistical modelling of compound events via pair-copula constructions: analysis of floods in Ravenna (Italy)". Hydrology and Earth System Sciences, 21, 2701-2723.

- **Bevacqua, E.** (2017). "CDVineCopulaConditional: an R package for conditional sampling from multivariate copula decomposed via C- or D-vines". R–package.

- Alberti, T., Lepreti, F., Vecchio, A., **Bevacqua, E.**, Capparelli, V., and Carbone,V. (2014). "Natural periodicities and Northern Hemisphere–Southern Hemisphere connection of fast temperature changes during the last glacial period: EPICA and NGRIP revisited". Climate of the Past, 10, 1751-1762.

Under review or To be submitted

- **Bevacqua, E.**, Vousdoukas, M. I., Zappa, G., Hodges, K., Shepherd, T. G., Maraun, D., Mentaschi, L., and Feyen, L. (2020). "Global projections of compound coastal meteorological extremes". In review. Preprint available at `https://eartharxiv.org/4x2u8/`.

- **Bevacqua, E.**, Zappa, G., and Shepherd, T. G. (2020). A paper about future projections of precipitation extremes from cyclone clusters. To be submitted in the next weeks.

Honours, awards, and grants

2019 Grant awarded for a *Short Term Scientific Mission* from the COST action DAMOCLES.

2018 Grant. Secondary proposer of the funded COST Action "DAMOCLES: UnDerstanding And Modeling cOmpound CLimate and weather EventS", CA17109.

2018 Winner of the *Outstanding Student Poster and PICO (OSPP) Award contest of the EGU General Assembly 2018, including a fee waiver for the EGU General Assembly and for a publication in a EGU journal.*.

2017 Winner of the *SWGEN-Hydro conference young scientist travel support*.

2012, 2014 Winner of scholarship for merit *John R. Mott Scholarship Foundation*.

2013 Grant. Selected international graduate student for attending the International Spring School on Towards a complete assessment of the impact of solar variability on the Earth's climate (*1st TOSCA training school "Sun2Climate school"*).

2005-2006 Winner at the regional stages of the *Olympics of mathematics*. Participation by invitation in the national stage of the *Olympics of mathematics*, *Honourable Mention*.

Outreach and appearances in media

Interviews

03/2020 Sciences et Avenir (French science magazine), about the anomalous stormy season in France and its potential associatation with climate change.

03/2019 BBC, about future changes in compound flooding.

03/2019 New Scientist, about future changes in compound flooding.

Blog posts

12/2019 "Climate change increases the "perfect storm" coastal flood potential". Meteorology blog of the University of Reading [Link] .

04/2019 "Towards a categorisation of statistical methods to study compound events". Blog of the COST action DAMOCLES.

04/2019	"Session report: Understanding and modelling compound climate and weather events and their impacts". Blog of the COST action DAMOCLES.
11/2018	"Climate change visualizations". Blog on personal website [Link].
09/2017	"Recent major compound flooding in Texas". Blog on opersonal website.

Mentions

03/2019	Our Science Advances paper on future changes of compound flooding was largely discussed by the media. [Link to some articles].
03/2019	"Visualizzazione dei cambiamenti climatici, cosa sta succedendo?" Scopriamone di più". Published on calabrianews24.it and MeteoCalabria.net.
12/2018	"Visualizzazione dei cambiamenti climatici, perchè è importante conoscere questa minaccia? Scopriamone di più. PARTE 1", Published on calabrianews24.it and MeteoCalabria.net.
11/2018	Eguraldia show (EiTB TV) discussed global warming based on some visualisations developed by my self.

Skills

Computer skills

Programming languages: R , IDL, Fortran, C, C++; Bash.

Operating Systems: Linux, Windows.

Geophysical models: FES astronomical tide model, COSMO-CLM (Regional Climate Model).

Languages

Italian (mother tongue), English (fluent), German (conversant), French (basic).

Research visits

03/2019	**Laboratoire de Météorologie Dynamique (LMD)**, Paris, France.
	One-week short term scientific mission (STSM) within DAMOCLES project.
06/2015– 12/2015	**Laboratoire des Sciences du Climat et de l'Environnement**, Gif-sur-Yvette, France.
	Development statistical model for the CE:LLO project.
Supervisor	Dr. Mathieu Vrac.
02/2015	**Norwegian Computing Center**, Oslo, Norway.
	Training in Pair-copula constructions.
Supervisors	Dr. I. Hobaeck-Haff and Prof. A. Frigessi.

Experience

Teaching

03/2020	Exam marking for the Master programme (MTMG05) at the Department of Meteorology, University of Reading.

02/2020	Supervisor of a group project ("Present and future changes in tropical cyclone translation speeds") undertaken by a group of five master students. Department of Meterology, University of Reading.
09/2019	Trainee at the "Training School on Statistical Modelling of Compound Events" (together with Prof. Carlo De Michele): supervision and organisation of the group project "Model evaluation of bivariate relationships with copulas", undertaken by a group of six among PhD students and early Postdocs.
10/2019	Invited lecturer at the "Training School on Statistical Modelling of Compound Events": "Physical processes driving compound flooding (CF) and its future changes".

Memberships

2018-present	Member of the funded COST Action "DAMOCLES: UnDerstanding And Modeling cOmpound CLimate and weather EventS", CA17109.
2019-present	Management committee (MC) member for the United Kingdom in the COST Action "DAMOCLES" (CA17109).
2018-2019	Management committee (MC) member substitute for Austria in the COST Action "DAMOCLES" (CA17109).
2015-present	European Geosciences Union (EGU).
2013-2014	Member of the amateur weather association "Cosenza Meteo".

Organisational experience

11/2020	Organiser of the workshop "Bottom-up identification of key elements of compound events" funded by the COST Action "DAMOCLES" (CA17109), *Tirana, Albania, June 1-3 2020*.
2019-present	Manager of the Group Workspace "storycc" on the JASMIN computing infrastructure.
2016-2019	Seminar series organiser for the Reloclim group at the Wegener Center for Climate and Global Change.
2016-12-15	Moderator of T4Science seminar "How to ask good scientific questions? A panel discussion" at the University of Graz.
2012-2014	Seminar series co-organiser for the CuboRisonante group at the Physics Department of the University of Calabria.

Voluntary work

2013-2015	Student representative at the Physics Department of the University of Calabria.

Conference and workshop presentations

Oral presentations

03/2020	**Bevacqua, E.**, "Projections of precipitation extremes driven by cyclone clusters in Europe". Seminar series HHH, University of Reading.
10/2019	**Bevacqua, E.**, "Physical processes driving compound flooding (CF) and its future changes". Climate and Ocean Dynamics (COD) group Seminars, University of Reading.

04/2019 Maraun, D., and **Bevacqua, E.** (presenter), "Storylines of a future precipitation extreme event - what is the event, what are the storylines, and are they sensible?". Workshop on physical modeling supporting a "storyline approach". Oslo Science Park, Norway.

04/2019 **Bevacqua, E.**, Maraun, D., Vousdoukas, M. I., Mentaschi, L., Voukouvalas, E., Zappa, G., and Vrac, M. "Changing compound flood probability at the global scale under anthropogenic climate change". EGU General Assembly 2019, Vienna, Austria.

03/2019 **Bevacqua, E.** Assessing the impact caused by compound events, with a focus on the future changes in the compound flooding hazard, Workshop on Compound Events, Paris, France.

01/2019 **Bevacqua, E.**, Maraun, D., Vousdoukas, M. I., Voukouvalas, E., Vrac, M., Mentaschi, L., and Widmann, M. "Higher compound flood probability in Europe under anthropogenic climate change". Jour-fixe, University of Graz, Austria.

10/2018 **Bevacqua, E.**, Piazza, M., Maraun, D., and Truhetz, H. "An attempt to estimate the climate change effect on the June 2009 Austrian extreme event based on the storyline approach". Annual CORDEX-FPS meeting on Convection over Europe and the Mediterranean, University of Lisbon, Portugal.

09/2018 **Bevacqua, E.**. "Multivariate statistical modelling and analysis of compound events". Public PhD defence, University of Graz, Austria.

11/2017 **Bevacqua, E.**, Maraun, D., Vousdoukas, M. I., Voukouvalas, E., Vrac, M., Mentaschi, L., and Widmann, M. "Increasing likelihood of compound flooding over northern europe in response to anthropogenic climate change". Compound flood events meeting, European Joint Research Centre, Ispra, Italy (Invited).

11/2017 **Bevacqua, E.**, and Maraun, D. "On the link between cyclones and potential compound flooding". Compound flood events meeting, European Joint Research Centre, Ispra, Italy (Invited).

09/2017 **Bevacqua, E.**, Maraun, D., Haff, I. H., Widmann, M., and Vrac, M. "Multivariate statistical modelling of compound events via pair-copula constructions: analysis of floods in Ravenna (Italy)". International Workshop on Stochastic Weather Generators for Hydrological Applications (SWGen-Hydro), Berlin, Germany.

04/2017 **Bevacqua, E.**, Maraun, D., Haff, I. H., Widmann, M., and Vrac, M. "Multivariate statistical modelling of compound events via pair-copula constructions: analysis of floods in Ravenna (Italy)". EGU General Assembly 2017, Vienna, Austria.

04/2017 **Bevacqua, E.**, Maraun, D., Haff, I. H., Widmann, M., and Vrac, M. "The R-package CDVineCopulaConditional for modelling Compound Events". Workshop on Addressing the Challenge of Compound Events, ETH Zurich, Switzerland (Invited).

09/2016 **Bevacqua, E.**, Maraun, D., Haff, I. H., Widmann, M., and Vrac, M. "Statistical modeling of compound events via pair-copula constructions: Ravenna flooding case study". Statussymposium "Extremes" 2016: VolkswagenStiftung, Hannover, Germany (Invited).

06/2016 **Bevacqua, E.**, Maraun, D., Haff, I. H., Widmann, M., and Vrac, M. "A model based on Pair-Copula Construction to analyze and represent Compound Flooding". The 13th International Meeting on Statistical Climatology, Canmore, Canada.

Poster presentations

04/2018   **Bevacqua, E.**, Maraun, D., Vousdoukas, M. I., Voukouvalas, E., Vrac, M., Mentaschi, L., and Widmann, M. "Changing risk of compound flooding over Europe in response to climate change". EGU General Assembly 2018, Vienna, Austria.

09/2017   **Bevacqua, E.**, Maraun, D., Haff, I. H., Widmann, M., and Vrac, M. "The R-package CDVineCopulaConditional for modelling Compound Events". International Workshop on Stochastic Weather Generators for Hydrological Applications (SWGen-Hydro), Berlin, Germany.

04/2017   **Bevacqua, E.**, Maraun, D., Voukouvalas, E., Vousdoukas, M. I., Widmann, M., Manning, C., and Vrac, M. "Analysis of present and future potential compound flooding risk along the European coast". EGU General Assembly 2017, Vienna, Austria.

04/2017   **Bevacqua, E.**, Maraun, D., Voukouvalas, E., Vousdoukas, M. I., Widmann, M., Manning, C., and Vrac, M. "Analysis of present and future potential compound flooding risk along the European coast". Workshop on Addressing the Challenge of Compound Events, ETH Zurich, Switzerland (Invited).

04/2016   **Bevacqua, E.**, Maraun, D., Haff, I. H., Widmann, M., and Vrac, M. "Statistical Modelling of Compound Floods: a Sensitivity Analysis". EGU General Assembly 2016, Vienna, Austria.

04/2016   **Bevacqua, E.**, Maraun, D., Vrac, M., Widmann, M., and Manning, C. "Statistical Modelling of Compound Floods". 17th Austrian Climate Day - "KlimaTag", Graz, Austria (Pitch and Poster).

11/2015   **Bevacqua, E.**, Maraun, D., Haff, I. H., Widmann, M., and Vrac, M. "Multivariate Statistical Modelling of Compound Floods". Statistical and mathematical tools for the study of climate extremes, Cargèse, France.

08/2015   **Bevacqua, E.**, Maraun, D., Haff, I. H., Widmann, M., and Vrac, M. "Statistical Modelling of Compound Floods". 14th Swiss Climate Summer School - "Extreme Events and Climate", Ascona, Switzerland.

03/2013   Alberti, T., **Bevacqua, E.** (presenter), Capparelli, V., Lepreti, F., Vecchio, A., and Carbone, V. "Natural periodicities and North–South hemispheres connection of fast temperature changes during the last glacial period: EPICA and NGRIP revisited". 1st TOSCA training school "Sun2Climate school", Thessaloniki, Greece.