Rui Guo

E-mail:rui.guo2@unibo.it Date of birth : July 8, 1996

University of Bologna, DICAM, Bologna, Italy

CURRENT POSITION

Postdoctoral researcher (Nov 2024 – to date)

Department of Civil, Chemical, Environmental and Materials Engineering (DICAM), Alma Mater Studiorum – **University of Bologna, Bologna, Italy**

EDUCATION

PhD (Oct 2021 – Mar 2025) **- University of Bologna**

- Major: Hydrology and Water Resources
- Supervisor: Prof. Alberto Montanari
- Thesis: Understanding Long-Term Multi-Year Drought Characteristics in Europe Under Climate Change. **(Cum Laude)**

Master (Sep 2018 – Jul 2021) **- Dalian University of Technology**

- Major: Hydrology and Water Resources (Rank in the entrance examination: 1/312)
- Supervisor: Prof. Xinyu Wu
- Thesis: Research on Two-stage Aggregation Decomposition Method to Derive Operation Rules for Hydropower Stations.

RESEARCH EXPERIENCE

Understanding the oceanic drivers of multiyear drought in European Alps ***Jun 2024-Now***

- Integrating observation, reconstructions and model simulations to understand the potential oceanic drivers of multiyear hydrological drought in European Alps.
- Millennium-long evolution of multiyear hydrological drought features in Alpine regions and teleconnection with large-scale climate modes.

Reconstruct the streamflow of European Alps by using tree rings data ***Dec 2023-May 2024***

- Reconstruct the streamflow of past nine centuries of European Alps by a climate-informed regression framework.
- Millennium-long evolution of multiyear hydrological drought features in Alpine regions under anthropogenic global warming.

Reconstruct the streamflow of Po River by using tree rings data ***Dec 2022-Dec 2023***

- To alleviate the uncertainty of information derived from tree rings data, a stationary bootstrapping method is used to the Old World Drought Atlas.
- Reconstruct the streamflow of past nine centuries of Po River by a climate-informed regression framework.
- Analysis the regime of past megaflood and megadrought events.

Future changes of average and extreme rainfall for the Bologna region ***Nov 2021-Oct 2022***

- Evaluate the capacity of Global Climate Model in reproducing historical mean and extreme

rainfall in Bologna region.

- Analysis the future change of mean annual precipitation and monthly climatology.
- Analysis the ability of GCM in replicating the characteristics of multi-year drought.

TEACHING EXPERIENCE

- **Large-scale water structures** (UNIBO, Spring 2024 and 2025)
  Delivered two lectures on China's hydropower systems and optimal operation to master students.

ACADEMIC AND RESEARCH ACTIVITY

Review activity

- **Reviewer** for AGU Advances, Hydrology and Earth System Sciences, Environmental Modelling & Software, Climatic Change, and Stochastic Environmental Research and Risk Assessment

Organization of scientific conferences

- **Member** of the Local Organising Committee, EGU 2025 Leonardo Conference

Attendance and presentation in national and international conferences

- From Science to People: Expecting the Unexpected in Flood and Drought Risk Management. EGU Leonardo Conference on Earth's Hydrological Cycle. *(Jun 2025, Bologna, Italy)*
  Poster presentation: *Long-term influence of climate variability on hydrological extremes across European alpine rivers*. Guo, R., Nguyen, H. T. T., Galelli, S., Ceola, S., & Montanari, A.

- European Geosciences Union (EGU) General Assembly 2025. *(Apr 2025, Vienna, Austria)*
  Poster presentation: *Long-term influence of climate variability on hydrological extremes across European alpine rivers*. Guo, R., Nguyen, H. T. T., Galelli, S., Ceola, S., & Montanari, A.

- European Meteorological Society (EMS) annual meeting 2024. *(Sep 2024, Barcelona, Spain)*
  Poster presentation: *Streamflow changes in the European Alps indicate increasing drought risk from past to future*. Guo, R., Nguyen, H., Galelli, S., Ceola, S., and Montanari, A.

- PhD Days and Marchi Lecture *(Jun 2024, Trieste, Italy)*
  Oral presentation: *Streamflow changes in the European Alps indicate increasing drought risk from past to future*. Guo, R.

- Giornate dell'Idrologia della Società Idrologica Italiana 2024. *(Jun 2024, Udine, Italy)*
  Poster presentation: *Streamflow changes in the European Alps indicate increasing drought risk from past to future*. Guo, R., Nguyen, H., Galelli, S., Ceola, S., and Montanari, A.

- European Geosciences Union (EGU) General Assembly 2024. *(Apr 2024, Vienna, Austria)*
  Poster presentation: Past and future changes of streamflow in the European Alps. Guo, R., Nguyen, H., Galelli, S., Ceola, S., and Montanari, A.

- Giornate dell'Idrologia della Società Idrologica Italiana 2023. *(Sep 2023, Matera, Italy)*
  Poster presentation: *Nine centuries streamflow reconstruction for the Po River*. Guo, R., Nguyen, H., Galelli, S., Ceola, S., and Montanari, A.

- International Union of Geodesy and Geophysics (IUGG) General Assembly 2023. *(Jul 2023, Berlin, Germany)*
  Poster presentation: *Nine centuries streamflow reconstruction for the Po River*. Guo, R., Nguyen, H., Galelli, S., Ceola, S., and Montanari, A.

- Panta Rhei Symposium, International Association of Hydrological Sciences (IAHS). *(Jul 2023, Potsdam, Germany)*
  Poster presentation: *Nine centuries streamflow reconstruction for the Po River*. Guo, R., Nguyen, H., Galelli, S., Ceola, S., and Montanari, A.

- European Geosciences Union (EGU) General Assembly 2023. *(Apr 2023, Vienna, Austria)*
  Poster presentation: *Future changes of extreme precipitation and meteorological drought in Northern Italy*. Guo, R. and Montanari, A.

- Giornate dell'Idrologia della Società Idrologica Italiana 2022. *(Nov 2022, Genova, Italy)*
  Oral presentation: *Future changes of average and extreme rainfall for the Bologna region.* Guo, R. and Montanari, A.

- European Geosciences Union (EGU) General Assembly 2022. *(Apr 2022, Vienna, Austria)*
  Oral presentation: *Future changes of average and extreme rainfall for the Bologna region.* Guo, R. and Montanari, A.

MEMBERSHIP OF SCIENTIFIC SOCIETIES

- **Member** of the European Geoscience Union (2021 – to date)
- **Member** of the Italian Hydrological Association (2022 – to date)

PUBLICATIONS

Peer-reviewed journal articles

- **Guo, R.,** Nguyen, H. T. T., Galelli, S., Ceola, S., & Montanari, A. (2025). Bridging information from paleo-hydrological and climate model ensembles to assess long term hydrological drought hazard. *AGU Advances*, 6, e2024AV001393. https://doi.org/10.1029/ 2024AV001393
- **Guo, R.** and Montanari, A.: Historical rainfall data in northern Italy predict larger meteorological drought hazard than climate projections, *Hydrol. Earth Syst. Sci.*, 27, 2847–2863, https://doi.org/10.5194/hess-27-2847-2023, 2023.
- Xinyu Wu, **Rui Guo**, Xilong Cheng, Chuntian Cheng. Combined Aggregated Sampling Stochastic Dynamic Programming and Simulation-Optimization to Derive Operation Rules for Large Scale Hydropower System. *Energies*, 2021, 14(3):625. https: //doi.org/10.3390/en14030625

Submitted and In-Prep articles

- Qiu J., Dell'Olio I., **Guo R.,** Timmermans J., Durán-Quesada A.M., Montanari A., & Tarolli P. Impact of El Niño-Induced Drought on Vegetation Greenness Decline in Costa Rica. (submitted)
- **Guo, R.,** Nguyen, H. T. T., Galelli, S., Ceola, S., & Montanari, A. Coherent Pacific–Atlantic modulation of multi-year hydrological droughts in European Alps since 1100 CE. (in-prep)

- **Guo, R.** and Montanari, A. Increasing temperature fingerprint in multi-year hydrological droughts in European Alps. (in-prep)

Conference abstracts

- **Guo, R.,** Nguyen, H., Galelli, S., Ceola, S., and Montanari, A.: Long-Term Influence of Climate Variability on Hydrological Extremes across European Alpine Rivers, EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025, EGU25-14526, https://doi.org/10.5194/egusphere-egu25-14526, 2025.
- Lai, Y., **Guo, R.,** and Montanari, A.: Extreme future rainfall in Bologna: exploring climate scenarios depicted by CMIP6 models, EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025, EGU25-4091, https://doi.org/10.5194/egusphere-egu25-4091, 2025.
- **Guo, R.,** Nguyen, H., Galelli, S., Ceola, S., and Montanari, A.: *Streamflow changes in the European Alps indicate increasing drought risk from past to future.* In: Arnone, E., Nicolini, M., Toth, E. (2024). Le Giornate dell'Idrologia della SII 2024. "*La gestione delle acque in condizioni di emergenze climatiche: la risposta della comunità idrologica al territorio*". Giornate dell'Idrologia della SII 2024, Udine. https://doi.org/10.5281/zenodo.13149408
- **Guo, R.,** Nguyen, H., Galelli, S., Ceola, S., and Montanari, A.: Streamflow changes in the European Alps indicate increasing drought risk from past to future, EMS Annual Meeting 2024, Barcelona, Spain, 1–6 Sep 2024, EMS2024-615, https://doi.org/10.5194/ems2024-615, 2024.
- **Guo, R.**, Nguyen, H., Galelli, S., Ceola, S., and Montanari, A.: Past and future changes of streamflow in the European Alps, EGU General Assembly 2024, Vienna, Austria, 14–19 Apr 2024, EGU24-1050, https://doi.org/10.5194/egusphere-egu24-1050, 2024.
- Li, Y., **Guo, R.,** Tian, F., and Montanari, A.: Historical and Future Climate Impacts on Hydrological Regimes: A case Study in the Upper Aral Sea Basin, EGU General Assembly 2024, Vienna, Austria, 14–19 Apr 2024, EGU24-12405, https://doi.org/10.5194/egusphere-egu24-12405, 2024.
- **Guo, R.** and Montanari, A.: Future changes of extreme precipitation and meteorological drought in Northern Italy, EGU General Assembly 2023, Vienna, Austria, 24–28 Apr 2023, EGU23-355, https://doi.org/10.5194/egusphere-egu23-355, 2023.
- **Rui Guo** and Alberto Montanari. Future changes of average and extreme rainfall for the Bologna region, EGU General Assembly 2022, Vienna, Austria, 23–27 May 2022, EGU22-4704, https://doi.org/10.5194/egusphere-egu22-4704, 2022.

HONORS

- **Outstanding Student Scholarship** (QHU, 12/2017)
- **Second Prize Scholarship** (DUT, 10/2018,10/2019,10/2020)
- **Roland Schlich Travel Award** (EGU23, 01/2023)
- **Ministero degli Affari Esteri e della Cooperazione Internazionale (MAECI) Scholarship** (Italy, 09/2023)
- **Outstanding Student and PhD candidate Presentation Awards (OSPP) (**EGU 2024**)**

PERSONAL SKILLS

Computer programming

- Python, R, Database (MySQL)
- GIS
- Latex

Languages

- Chinese – Native speaker
- English – IELTS: 7.0 (L7.0 / R9.0 / W6.5 / S5.5)
- Italian – Basic

Bologna, 1 July 2025 Rui Guo (digital signed)