



Roshanak Tootoonchi

Postdoctoral Researcher

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Main Research Focus

Climate Change; Climate Dynamics; Hydrological Cycle; Drought; Internal Variability; Impacts Assessment

Professional Experience

Sep 2025 – Present **Postdoctoral Researcher, Environmental and Energy Systems Engineering**
 ▪ **Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC), Italy**
 Project: “The Impact of Extreme Events on Africa’s Water and Energy Systems”

Nov 2024 – Sep 2025 **Research Fellow, Climate Dynamics**
 ▪ **Università di Trento (UNITN), Italy**
 Project Title: “Drought and Aridity in the Mediterranean Region ([DROMEDAR project](#))”

Education

Apr 2021 – Oct 2024 **PhD in Climate Sciences**
 ▪ **Università di Trento (UNITN), Italy**
 PhD Thesis: “Climate Change in the Mediterranean Region: Changes in Atmospheric Circulations and the Impacts on the Hydroclimate”
 PhD Supervisor: Simona Bordoni (UNITN)
 PhD Thesis/Defense Committee: Riccardo Rigon (UNITN); Robert Inglin Wills (ETH Zürich); Annalisa Cherchi (CNR-ISAC Bologna)

Sep 2018 – Aug 2020 **MSc in Civil Engineering: Hydrology and Water Resources Management**
 ▪ **University of Tabriz, Iran**
 MSc Thesis: “Hydroclimatic and Vegetation Change Detection Using Remote Sensing and Wavelet Coherence Tools – Case Study; Lake Urmia Watershed”

Research Interests / Relevant Skills

- Atmospheric Physics, Meteorology, Hydrological Cycle, Climate Dynamics, Internal Variability
- Handling and visualizing large ensembles of NetCDF data (NCL, CDO, MATLAB, Python, UNIX-Bash, Panoply)
- Working with different properties and scenarios of Global Climate Models (GCMs) data (CMIP5, CMIP6); Working with Large Ensemble models (SMILEs)
- Statistical hydrology, statistical analysis of time series (AR(I)MA, student’s t-test, Mann-Kendall test)
- Signal analysis and investigation of non-stationary behaviors in time-frequency domain (wavelet-based methods); Time of emergence of the signal of change from the background noise (ToE)
- Application of remote sensing in hydroclimate studies, satellite imagery, and land cover changes analysis (ArcGIS, QGIS, ENVI, Google Earth pro)

Teaching and Working Experiences

- EGU short course “DataViz: Visualise your data effectively and avoid common pitfalls” – Organized by the Young Hydrologic Society (YHS).
 Conveners: Edoardo Martini, Roshanak Tootoonchi, Paola Mazzoglio, Epari Ritesh Patro
 EGU 23: <https://meetingorganizer.copernicus.org/EGU23/session/46503> *(presented material is [here](#))
 EGU 24: <https://meetingorganizer.copernicus.org/EGU24/session/49448> *(presented material is [here](#))
 EGU 25: <https://meetingorganizer.copernicus.org/EGU25/session/53347> *(presented material is [here](#))
- Member of the “Tabriz Symphonic Orchestra”, as a professional Violinist 🎻 [2008 – 2016]

Scientific Contribution / Outreach

- Member of the **Young Hydrologic Society (YHS)** board
 - ❖ *Outreach committee member since March 2022*
 - Reviewer since 2020 for the following journals:
 - **Journal of Hydrology; Journal of Climate; Earth System Dynamics; Journal of Geophysical Research (JGR) Biogeosciences; Stochastic Environmental Research and Risk Assessment (SERRA) Journal**
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Publications and Proceedings

Articles (Published)

- **Tootoonchi, R.**, Bordoni, S., and D'Agostino, R. (2025). "Revisiting the moisture budget of the Mediterranean region in the ERA5 reanalysis". *Weather Clim. Dynam.*, 6, 245–263, <https://doi.org/10.5194/wcd-6-245-2025>
- Kreibich, H., Sivapalan, M., AghaKouchak, A., ..., **Tootoonchi, R.**, ..., Blöschl, G. (2025). *Panta Rhei: a decade of progress in research on change in hydrology and society. Hydrological Sciences Journal*, 70(7), 1210–1236. <https://doi.org/10.1080/02626667.2025.2469762>
- Van Loon, A. F., Kchouk, S., ..., **Tootoonchi, R.**, ..., Werner, M. (2024). "Review article: Drought as a continuum – memory effects in interlinked hydrological, ecological, and social systems". *Nat. Hazards Earth Syst. Sci.*, 24, 3173–3205, <https://doi.org/10.5194/nhess-24-3173-2024>
- Nourani, V., **Tootoonchi, R.**, & Andaryani, S. (2021). "Investigation of climate, land cover and lake level pattern changes and interactions using remotely sensed data and wavelet analysis". *Ecological Informatics Journal*, 64, 101330. <https://doi.org/10.1016/J.ECOINF.2021.101330>

Selected Conferences/Talks and Posters (From 2023)

- **Tootoonchi, R.** and Bordoni, S. (2025): Is the Projected Aridification in the Mediterranean Region a Simple "Dry-Get-Drier" Response?, EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025, EGU25-2949, <https://doi.org/10.5194/egusphere-egu25-2949>
 - **Tootoonchi, R.**, Bordoni, S., and D'Agostino, R. (2024): The Role of Atmospheric Circulations on the Mediterranean Hydrological Cycle, MEDCLIVAR-SISC 2024, Lecce, Italy, 24-27 Sep 2024. (access [link](#))
 - **Tootoonchi, R.**, Bordoni, S., and D'Agostino, R. (2024): Climate Change in the Mediterranean: Assessing Changes in Different Circulations and the Impacts on the Mediterranean Hydroclimate, EGU General Assembly 2024, Vienna, Austria, 14–19 Apr 2024, EGU24-6769, <https://doi.org/10.5194/egusphere-egu24-6769>
 - **Tootoonchi, R.**, Bordoni, S., D'Agostino, R. (2023): Revisiting the Moisture budget of the Mediterranean Region in the ERA5 Reanalysis, EGU General Assembly 2023, Vienna, Austria, 23 – 28 Apr2023,EGU23-13767,<https://doi.org/10.5194/egusphere-egu23-13767>
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Languages

Persian | Native **Azerbaijani** | Native **English** | Fluent **Turkish** | Fluent **Italian** | Intermediate