

## **Mohamed Ali Ben Alaya**

Canadian Citizen

Research Associate, Pacific Climate Impacts Consortium

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## **RESEARCH DOMAINS**

Civil and Environmental Engineering

Water Sciences and Flood Hazards

Statistical and Stochastic Hydrology

Climate Change and Climate Variability

Climate related Risks for Natural Hazards

Statistical Downscaling

Univariate and Multivariate Extreme Value Theories

Probability Theory and Mathematical Statistics

## **EDUCATION**

- 2016      **Ph.D., Water Sciences**, Institut National de la Recherche Scientifique - Centre Eau, Terre et Environnement (INRS-ETE), University of Quebec, Quebec, Canada.
- 2012      **M.Sc., Water Sciences**, INRS-ETE, University of Quebec, Quebec, Canada.
- 2009      **B.Sc., Hydrometeorological Engineering**, Department of civil and environmental engineering, National school of engineering of Tunis (ENIT), University of Tunis El-Manar, Tunis, Tunisia.

## **PROFESSIONAL CAREER**

- 2020 – present      Research Associate, Pacific Climate Impacts Consortium (PCIC), University of Victoria (UVIC), British Columbia, Canada.
- 2019 – present      Adjunct Professor, INRS-ETE, University of Quebec, Quebec, Canada.
- 2016 – 2020      Post-doctoral fellow, PCIC, UVIC, British Columbia, Canada.
- 2013 – 2014      Visiting Researcher, Lab. Lille Economie Management (LEM). University Lille 3, Lille, France.
- 2007 – 2008      Engineering Internship, the weather prediction service of the National Institute of Meteorology of Tunisia, Tunis, Tunisia.
- 2007      Engineering Internship, the national water exploitation and distribution company- SONEDE, Tunis, Tunisia.

## SCHOLARSHIPS

2011	\$20.000	Exemption Scholarship for International Students, Ministry of Higher Education, Research and Science (MESRS) of Quebec
2009	\$10.000	Exemption Scholarship for International Students, Ministry of Higher Education, Research and Science (MESRS) of Quebec
2009	\$6.000	Scholarship for engineering End-of-Studies Internship, INRS-ETE and the National School of Engineering of Tunis

## PUBLICATIONS

### Peer-reviewed articles

1. **Ben Alaya, M. A.**, F. W. Zwiers, and X. Zhang, 2020: A bivariate approach to estimating the probability of very extreme precipitation events. *Weather and Climate Extremes*, 30, 100290.
2. **Ben Alaya, M. A.**, F. W. Zwiers, and X. Zhang, 2020: An Evaluation of Block-Maximum-Based Estimation of Very Long Return Period Precipitation Extremes with a Large Ensemble Climate Simulation. *Journal of Climate*, 33, 6957-6970.
3. **Ben Alaya, M. A.**, F. W. Zwiers, and X. Zhang, 2020: Probable maximum precipitation in a warming climate over North America in CanRCM4 and CRCM5. *Climatic Change*, 158, 611-629.
4. **Ben Alaya, M. A.**, C. Ternynck, S. Dabo-Niang, F. Chebana, and T. B. M. J. Ouarda, 2020: Change point detection of flood events using a functional data framework. *Advances in Water Resources*, 137, 103522.
5. **Ben Alaya, M. A.**, F. W. Zwiers, and X. Zhang, 2019: Evaluation and comparison of CanRCM4 and CRCM5 to estimate probable maximum precipitation over North America. *Journal of Hydrometeorology*, 20, 2069-2089.
6. **Ben Alaya, M. A.**, F. W. Zwiers, and X. Zhang, 2018: Probable Maximum Precipitation: Its Estimation and Uncertainty Quantification Using Bivariate Extreme Value Analysis. *Journal of Hydrometeorology*, 19, 679-694.
7. **Ben Alaya, M. A.**, T. B. M. J. Ouarda, and F. Chebana, 2017: Non-Gaussian spatiotemporal simulation of multisite daily precipitation: downscaling framework. *Climate Dynamics*, 50, 1-15.
8. **Ben Alaya, M. A.**, T. B. M. J. Ouarda, and F. Chebana, 2016: Multisite and multivariable statistical downscaling using a Gaussian copula quantile regression model. *Climate Dynamics*, 47, 1383-1397.
9. Ternynck, C., **M. A. Ben Alaya**, F. Chebana, S. Dabo-Niang, and T. B. M. J. Ouarda, 2016: Streamflow hydrograph classification using functional data analysis. *Journal of hydrometeorology*, 17, 327-344.
10. **Ben Alaya, M. A.**, F. Chebana, and T. B. M. J. Ouarda, 2015: Probabilistic multisite statistical downscaling for daily precipitation using a Bernoulli-generalized pareto multivariate autoregressive model. *Journal of Climate*, 28, 2349-2364.
11. **Ben Alaya, M. A.**, F. Chebana, and T. B. M. J. Ouarda, 2014: Probabilistic Gaussian Copula Regression Model for Multisite and Multivariable Downscaling. *Journal of Climate*, 27, 3331-3347.

### Ongoing peer-reviewed papers

1. **Ben Alaya, M. A., F. W. Zwiers, and X. Zhang, 2021:** On estimating long period wind speed return levels from annual maxima. *Submitted to Weather and Climate Extremes.*
2. **Ben Alaya, M. A., F. W. Zwiers, and X. Zhang, 2021.** Statistics of extremes in climate research. (paper in preparation)
3. **Ben Alaya, M. A., F. W. Zwiers, and X. Zhang, 2021.** Evaluation of BCCAQv2 for statistical downscaling of precipitation extremes using a large ensemble regional climate simulations and a high resolution convection permitting model. (paper in preparation)
4. **Ben Alaya, M. A., F. W. Zwiers and X. Zhang.** Probability of extreme precipitation events to inform engineering design: a review. (paper in preparation)

## CONFERENCE PRESENTATIONS AND SEMINARS

### Oral presentations

1. **Ben Alaya, M. A., F. W. Zwiers and X. Zhang:** On estimating long period precipitation return levels from annual maxima, 74st National Canadian Water Resources Association (CWRA) conference, Quebec(QC), Canada, May 31 – June 4 2021.
2. **Ben Alaya, M. A., F. W. Zwiers and X. Zhang:** On the use of annual maxima to estimate long period wind speed return levels, 75st Meteorological and Oceanographic Society (CMOS) Congress, Victoria(BC), Canada, May 31 – June 11 2021.
3. **Ben Alaya, M. A., F. W. Zwiers and X. Zhang:** Probability of compound extreme hydrometeorological events using multivariate extreme value analysis, IUGG (IAHS), H27 - Multivariate Statistics for hydrological Application, Montreal, QC, July 2019.
4. **Ben Alaya, M. A., F. W. Zwiers and X. Zhang:** Temperature-probable maximum precipitation scaling from regional climate models, IUGG (IAMAS, IAHS), JM04 - Hydrometeorologic and Coastal Extremes in Current and Future Climates, Montreal, QC, July 2019.
5. **Ben Alaya, M. A., F. W. Zwiers and X. Zhang:** An approach for projecting future probable maximum precipitation from regional climate models, Global Water Future, 2nd Annual Open Science Meeting, Saskatoon, SK, Canada, May 2019.
6. **Ben Alaya, M. A., F. W. Zwiers and X. Zhang:** Probability of compound extreme precipitation events to inform engineering design, Global Water Future, Annual Science Meeting, Hamilton (On), Canada, June 2018.
7. **Ben Alaya, M. A., F. W. Zwiers and X. Zhang:** Probable maximum precipitation in a warming climate, 71st National Canadian Water Resources Association (CWRA) conference, Victoria (BC), Canada, May 28 – June 1 2018.
8. **Ben Alaya, M. A., F. W. Zwiers and X. Zhang:** Probabilistic description of Probable maximum precipitation (PMP). Canadian Network for Regional Climate and Weather Processes (CNRCWP) meeting, Montreal, Canada, May 2017.
9. **Ben Alaya, M. A.:** Combinatorial approach to frequency analysis of extreme hydrometeorological phenomena. World climate research program (WCRP) workshop: Addressing the Challenge of Compound Events. ETH Zurich, April 2017.
10. **Ben Alaya, M. A.:** Probabilistic hybrid modular structure for multisite and multivariable statistical downscaling. Seminar, Pacific Climate Impact Consortium, Victoria (BC), October 19, 2016.

11. **Ben Alaya, M. A.**, F. Chebana, and T. B. M. J. Ouarda: On the use of copulas for downscaling multisite daily precipitations, Congr s  tudiants INRS-ETE, Quebec (QC), Canada, November 4-6, 2015.
12. **Ben Alaya, M. A.**, F. Chebana, and T. B. M. J. Ouarda: Multisite precipitation downscaling using a quantile regression multivariate autoregressive model, 68th National Canadian Water Resources Association (CWRA) conference, Winnipeg, Manitoba, Canada, June 2-4, 2015.
13. **Ben Alaya, M. A.**, C. Ternynck, S. Dabo-Niang, F. Chebana, T.B.M.J. Ouarda: Change point detection of flood events using a functional data framework. International Commission on Statistical Hydrology (STAHY). Abu Dhabi, 2014.
14. **Ben Alaya, M. A.**, F. Chebana, and T. B. M. J. Ouarda: Statistical downscaling using probabilistic Gaussian copula regression model. International Commission on Statistical Hydrology (STAHY). Abu Dhabi, 2014.
15. **Ben Alaya, M. A.**, F. Chebana, and T. B. M. J. Ouarda: Multivariate multisite statistical downscaling using a probabilistic Gaussian copula regression model. 48th Canadian Meteorological and Oceanographic Society (CMOS) Congress, 1-5 June 2014.
16. **Ben Alaya, M. A.**, D. Fasbender, and T. B. M. J. Ouarda: A spatial Bayesian model for statistical downscaling, Seminar, University of Lille 2, Lille, France, April 2013.
17. **Ben Alaya, M. A.**, D. Fasbender, and T. B. M. J. Ouarda: Spatial Bayesian method for downscaling AOGCM predictors to minimum and maximum daily temperatures in Quebec. Workshop: Probabilistic assessment of regional changes in climate variability and extremes, Montreal, 16-17 march 2011.

### **Poster presentations**

1. **Ben Alaya, M. A.**, F. W. Zwiers and X. Zhang: **Evaluation of BCCAQv2 for downscaling precipitation extremes using large ensemble regional climate simulations and a high-resolution convection-permitting model.** GWF annual meeting, online, May 2021.
2. **Ben Alaya, M. A.**, F. W. Zwiers and X. Zhang: **On annual maximum based estimation of very long return period precipitation extremes.** GWF annual meeting, online, June 2020.
3. **Ben Alaya, M. A.**, F. W. Zwiers and X. Zhang: On annual maximum based estimation of very long return period precipitation extremes. GWF annual meeting, online, June 2020.
4. **Ben Alaya, M. A.**, F. W. Zwiers and X. Zhang: Probable maximum precipitation using bivariate extreme value analysis. 8th GEWEX open science conference: extremes and water on the edge. May 6 - 11, 2018 | Canmore, Alberta, Canada.
5. **Ben Alaya, M. A.**, F. W. Zwiers and X. Zhang: Probabilistic description of Probable maximum precipitation (PMP). European Geophysical Union (EGU), General Assembly, Vienna, April 2017.
6. **Ben Alaya, M. A.**, T. B.M.J. Ouarda, F. Chebana: Non-Gaussian multisite simulation of extreme daily precipitation: downscaling application. International Commission on Statistical Hydrology (STAHY). Quebec (Canada), 2016.
7. **Ben Alaya, M. A.**, T. B.M.J. Ouarda, F. Chebana: Non-Gaussian multisite simulation of extreme daily precipitation: downscaling application. Workshop: Uncertainty Modeling in the Analysis of Weather, Climate and Hydrological Extremes, Banff, Alberta (Canada), 12-17 June 2016.

8. **Ben Alaya, M. A.**, F. Chebana, and T. B. M. J. Ouarda: Downscaling using Probabilistic Gaussian Copula Regression model, American Geophysical Union (AGU) Fall Meeting, San Francisco, 15-19 December 2014.

## TEACHING

### Teaching activities

- 2021-present** Sessional Instructor, STAT 254: Probability and Statistics for Engineers, Department of Mathematics and Statistics, University of Victoria, BC, Canada.  
**2019** Teaching assistant, GEOGRAPHY 226: Introduction to Quantitative Methods in Geography, Department of Geography, University of Victoria, BC, Canada

### Professional development

- 2021** Graduated from the Faculty Institute of Teaching FIT2, Division of Learning and Teaching Support and Innovation (LTSI), University of Victoria.  
**2020** Graduated from Faculty Institute of Teaching FIT1, Division of Learning and Teaching Support and Innovation (LTSI), University of Victoria.  
**2019** Peer-review for teaching enhancement, Conference, Division of Learning and Teaching Support and Innovation (LTSI), University of Victoria.  
**2019** Introduction to Active Learning with Technology, Conference, Division of Learning and Teaching Support and Innovation (LTSI), University of Victoria.  
**2018** Workshop Series on Improving Student Learning and Teaching Methods, Division of Learning and Teaching Support and Innovation (LTSI), University of Victoria.

## SCIENTIFIC SERVICES

- **Reviewer for:** Journal of Climate, Journal of Applied Meteorology and Climatology, Weather and Climate Extremes, International Journal of Climatology, Stochastic Environmental Research and Risk Assessment, Journal of Hydrology, Geoscientific Model Development, Advances in Meteorology, Water Resources Research, Advances in Water Resources, Hydrology-and-Earth-System-Sciences, Atmosphere-Ocean, Journal of Hydrometeorology.
- **Leadership:** organizing committee for the Community Climate Science Seminar (CCSS) at the University of Victoria.
- **Member of :**
  - The Topics board of the journal Atmosphere
  - The organization committee of the international workshop on statistical hydrology (STAHY-2016)
  - Canadian Water Resources Association (CWRA)
  - American Geophysical Union (AGU)
  - European Geophysical Union (EGU)
  - American meteorological society (AMS)
  - Scientific committee Canadian Water Resources Association 2021