

# Pedro Torralbo Muñoz

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## Educación

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Programmed for February 2024	<b>PhD in Biogeochemical fluxes dynamics and its applications Joint Program by the Universities of Cordoba, Granada and Malaga (Spain).</b> Dissertation: "Drought and Torrentiality of Snow in Mediterranean Catchments: Impact on the Streamflow Regime at Different Temporal Scales"
2017 - 2018	<b>Master in Environmental Hydraulics:</b> Basin Integrated Management. <i>Universities of Cordoba, Granada and Malaga, Spain.</i> Master thesis: "Trend analysis of ecohydrological indicators in mediterranean mountains oriented to the evaluation of the impacts of global warming"
2012 - 2019	<b>Mining and Renewable Sources Engineer, University of Cordoba, Spain.</b> Bachelor thesis: "Refraction seismic, vibration analysis and dynamic parameters of the namurian shale of the municipality Belmez"
2012 2016	<b>Civil Engineer, University of Cordoba, Spain.</b> Bachelor thesis: "Competitiveness strategies, technological innovation and internationalization in the in the field of civil engineering of the company INGESA"

## Professional Experience

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01/04/2023-Currently	<b>Hired on a project basis by the DFH - Fluvial Dynamics and Hydrology Group, University of Cordoba, Spain.</b>
22/10/2018 - 21/03/2023	<b>Highly Competitive National Predoctoral fellowship (FPU), University of Cordoba, Spain.</b> Proyecto: "Drought and Torrentiality of Snow in Mediterranean Catchments: Impact on the Streamflow Regime at Different Temporal Scales"
06/04/2017 - 20/10/2017	<b>Engineer, Ingeniería y Estudios de Andalucía S.L, INGESA. S.L.</b>
01/01/2016 - 30/04/2016	<b>Academic Internship, Ingeniería y Estudios de Andalucía S.L, INGESA. S.L.</b>
01/06/2016 - 01/09/2016	<b>Academic Internship, Laboratory of Quality Control of Construction and Public Works</b>

## Publications

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**P. Torralbo;** R. Pimentel; M. J Polo; C. Notarnicola. Characterizing Snow Dynamics in Semi-Arid Mountain Regions with Multitemporal Sentinel-1 Imagery: A Case Study in the Sierra Nevada, Spain. MDPI Remote Sensing, 15/11/2023

**P. Torralbo;** R. Pimentel; M. J Polo. Lessons Learnt from Separating Baseflow in Semiarid Mountain Areas: The Study Case of Sierra Nevada. Journal of Hydrology Regional Studies. Under Review.

**P. Torralbo;** R. Pimentel; M. J Polo. HESS Hydrology and Earth System Sciences (HESS). On Preparation

. R.Pimentel; M.J. Pérez-Palazón; P. Herrera-Grimaldi; **P. Torralbo;** J. Aparicio-Ibáñez; M.J Polo. Assessing water management issues under future climate scenarios in snow-fed Mediterranean mountain basins: a multimodel approach. Hydrological Science Journal. Under Review

F. Moreno; **P. Torralbo**. 4. Water efficiency in green buildings, sustainable buildings designing and management of cost-effective and eco-friendly systems. pp. 85 -105. Publishing House of Bialystok University of Technology. Book chapters.

*Work presented in national or international conferences*

R. Pimentel; **P. Torralbo**; J. Aparicio; M.J. Pérez-Palazón; M.J. Polo. Are precipitation and snowfall droughts concomitant in semiarid mountainous areas? 2022 Annual INARCH Workshop. International Network for Alpine Research Catchment Hydrology (INARCH)

M.J. Polo; R. Pimentel; M.J. Pérez-Palazón; **P. Torralbo**; J. Aparicio. How can we better describe the hydrological impacts of snow droughts in semiarid environments? 2022 Annual INARCH Workshop. International Network for Alpine Research Catchment Hydrology (INARCH)

R. Pimentel; **P. Torralbo**; J. Aparicio; A. Andreu; M.P. González-Dugo; M.J. Polo. Improving the hydrological role of vegetation over Mediterranean mountain areas: the study case of the dehesa ecosystem in Cardeña-Montoro Natural Park (Spain). XIth Scientific Assembly of the International Association of Hydrological Sciences 2022.

**P. Torralbo**; R. Pimentel; J. Herrero; C. Aguilar; F. Moreno; M.J. Polo. Using NDVI as an indicator of snowmelt runoff in Mediterranean mountain catchments: application to the Guadalfeo river basin, Sierra Nevada. XIth Scientific Assembly of the International Association of Hydrological Sciences 2022.

A. Andreu; R. Pimentel; **P. Torralbo**; J. Aparicio; M.P. González-Dugo; M.J. Polo. pp. EGU21-10898. Quantifying the importance of vegetation in water fluxes partitioning over Mediterranean mountain areas: a study case in Cardeña-Montoro Natural Park (Spain). European Geosciences Union General Assembly 2022.

R. Pimentel; J. Aparicio; **P. Torralbo**; E. Contreras; M.F. Moreno; C. Aguilar; M.J. Polo. pp. EGU21-10898. Quantifying the role of mixed pixels in snow cover distribution in semiarid regions: A study case in Sierra Mountain (Spain). European Geosciences Union General Assembly 2022.

**P. Torralbo**; C. Notarnicola; M. Callegari; G. Cuzzo, G, R. Pimentel; J. Herrero; M.J. Polo. Characterizing dry-wet snow transitions in semiarid areas from Sentinel SAR's data: a case-study in Sierra Nevada (Spain). International Conference on Snow Hydrology Challenges in Mountain Areas. SnowHydro2022.

R. Pimentel; **P. Torralbo**; J. Aparicio; M.J. Pérez-Palazón; A. Andreu; M.P. González-Dugo; M.J. Polo. pp. EGU21-10898. Combining remote sensing and hydrological information for improving hydrological characterization of dehesas in Mediterranean mountain areas: a study case in Cardeña-Montoro Natural Park (Spain). European Geosciences Union General Assembly 2021.

**P. Torralbo**; R. Pimentel; J. Aparicio; J. Herrero; C. Aguilar; M.J. Polo. Streamflow event classification in snowfed rivers in Mediterranean catchments: a process-oriented assessment. European Geosciences Union General Assembly 2021

**P. Torralbo**; R. Pimentel; M.J. Pérez-Palazón; J. Aparicio-Ibáñez; J. Herrero; C. Aguilar; M.J. Polo. Baseflow separation methods in snowfed rivers in Mediterranean catchments: a process-oriented assessment for hydrograph analysis

**P. Torralbo**; R. Pimentel; M.J. Pérez-Palazón; J. Aparicio-Ibáñez; J. Herrero; C. Aguilar; M.J. Polo. Baseflow separation methods in snowfed rivers in Mediterranean catchments: a process-oriented assessment for hydrograph analysis

M.J. Polo; R. Pimentel; M.J. Pérez-Palazón; **P. Torralbo**; L. Lorna; M. Menezes-Lomba; C. Photiadou; B. Arheimer. What methods of interaction with users have proved to better perform for advanced co-development of climate services in the water sector? European Geosciences Union General Assembly 2020

R. Pimentel; P. Herrera-Grimaldi; M.J. Pérez-Palazón; **P. Torralbo**; J. Herrero; M.J. Polo. Can climate models represent the snow occurrence in semiarid areas? The example of Sierra Nevada Mountain Range. International Conference on Snow Hydrology Challenges in Mountain Areas. SnowHydro2020.

M.J. Polo; M.J. Pérez-Palazón; J. Herrero; R. Pimentel; C. Aguilar; **P. Torralbo**. Can we learn from "snow islands" about future trends in different snow regions in the world? International Conference on Snow Hydrology Challenges in Mountain Areas. SnowHydro2020

**P. Torralbo**; M.J. Pérez-Palazón; R. Pimentel; J. Herrero; C. Aguilar; M.J. Polo. Process-oriented streamflow characterization in mountain rivers of semiarid areas: Sierra Nevada, Spain. International Conference on Snow Hydrology Challenges in Mountain Areas. SnowHydro2020

**P. Torralbo**; M. J. Pérez-Palazón; C. Galán; M. J. Polo. Assessing global warming impacts on the phenology of selected vegetation covers in Mediterranean mountain areas from terrestrial photography. European Geosciences Union (EGU) 2019.

J. Barberá; M. J. Pérez-Palazón; R. Pimentel; **P. Torralbo**; M.J. Polo. Can we use time-lapse camera imagery to partition snowfall/rainfall? A pilot study in Sierra Nevada (Spain). European Geosciences Union (EGU) 2019.

C. Gallego; **P. Torralbo**; M.J. Pérez-Palazón; C. Galán; M. J. Polo. Trend Analysis of climatic variables and impacts in dehesa systems: a study case in Sierra Morena, Southern Spain. European Geosciences Union (EGU) 2019.

M.J. Perez-Palazon; P. Gómez-Giraldez; **P. Torralbo**; R. Pimentel; J. Herrero; M. P. González-Dugo; M. J. Polo. What relevant information can terrestrial photography provide hydrologists with? A case study in Mediterranean Mountainous areas. European Geosciences Union (EGU) 2019.

M.J. Polo; J. Herrero; R. Pimentel; M.J. Pérez-Palazón; A. Gilabert; **P. Torralbo**. Combining remote sensing and terrestrial photography in a snowmelt modelling framework to retrieve snow evolution on different scales. International Geoscience and Remote Sensing Symposium (IGARSS 2018)

**P. Torralbo**; J. Herrero; A. Gilabert; C. Gallego-Galán; P. Gómez-Giraldez; M. J. Pérez-Palazón; J. L. Quero; C. Galán; M. J. Polo. Terrestrial photography for monitoring eco-hydrological variables in Mediterranean mountain areas. Terrestrial photography for monitoring eco-hydrological variables in Mediterranean mountain areas. European Geosciences Union (EGU) 2018

*Work presented in national or international seminars, workshops and/or courses*

Characterization of dry-wet snow transitions from Sentinel SAR data in semi-arid high mountain areas. Meeting of Early Career Researchers 2022. María de Maetzu Unit of Excellence, Department of Agronomy, University of Córdoba. (DAUCO).

Are precipitation and snowfall droughts concomitant in semiarid mountainous areas? IISTA 2022 Annual Meeting. University of Jaén. "Exploring synergies in IISTA". Interuniversity Institute for Research On The Earth System In Andalusia. (IISTA).

Integrating hydrology in the monitoring of plant communities in Mediterranean mountains. 1st IISTA WINTER WORKSHOP 2018. Instituto Interuniversitario De Investigación Del Sistema Tierra En Andalucía (IISTA).

*Participation in congresses with papers oriented to teacher training.*

**P. Torralbo**; J. Aparicio; M. J Polo II International Virtual Congress on University Teaching Innovation "We teach & We learn" 2021. Hydrological conflict resolution: debate as a tool.

R. Pimentel; M.J. Pérez-Palazón; **P. Torralbo** II International Virtual Congress on University Teaching Innovation "We teach & We learn" 2021. Use of images to understand the hydrological characteristic scales.

**P. Torralbo** EURASHE's conference 2019 - Future Students. Future Universities. Future Jobs. Professional Higher Education in the changing world. Poster Presentation - "The need to engage", in collaboration with ESU. 2019.

**P. Torralbo** Conference "Towards better university teaching". The Ministry of Education, Youth and Sports of the Czech Republic. From Lectures to Student Centred Learning.

## References

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María José Polo Gómez [mjpolo@uco.es](mailto:mjpolo@uco.es) Professor of Hydraulic Engineering and Vice Rector of Science Policy at the University of Cordoba.  
Professional relationship: PhD Supervisor

Rafael Pimentel Leiva [rpimentel@uco.es](mailto:rpimentel@uco.es) Associate Professor of Hydraulic Engineering at the University of Cordoba  
Professional relationship: PhD Supervisor

Claudia Notarnicola [claudia.notarnicola@eurac.edu](mailto:claudia.notarnicola@eurac.edu) Head of Institute, Institute for Earth Observation - Eurac Research, Bolzano/Bozen, Italy  
Professional relationship: Responsible for pre-doctoral stay at Eurac Research.

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## Participation in projects or contract

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PID2021-123235NB-I00. Incorporating hydrological uncertainty and risk analysis associated with the operation of hydroelectric infrastructures in Mediterranean mountain basins (HYPOMED). Ministry of Science and Innovation. 123.299 €. 01/09/2022 - 31/08/2025

TED2021-130937A-I00. Incorporating climate variability and water quality in the definition of environmental flows in Mediterranean basins (ENFLOW-MED). Ministry of Science and Innovation. 87.860 €. 01/12/2022-30/11/2024

12021121. Development of low-cost systems for the monitoring of snowpack density and water equivalent for the estimation of accumulated water resources in the form of snow in mountain basins. TRAGSATEC. 8.000 € 27/07/2021-27/01/2024

Conv 149/22. UCO-UPO agreement for the development of the Singular project of Knowledge Transfer Actions, entitled "Adaptation of the Water Framework Directive to the Andalusian reality: the Guadalquivir Estuary as a model of integrated management", TransDMA. Pablo de Olavide University. 01/01/2022-30/06/2023

PYC20\_RE020. Integrated Management for the control of water and sediment inputs in Reservoir Systems in the Guadalquivir river basin (SIMBA). Regional Government of Andalusia. 100.214,44 €. 01/01/2022-30/04/2023

P20\_00178 PAIDI 2020. "Hydrometeorological trends in mountain protected areas in Andalusia: examples of co-development of climate services for climate change adaptation strategies". PAIDI 2020 R&D&I Project Grants. Andalusian Regional Government. 95.968,33 € 05/10/21-31/03/2022

UCO-FEDER 18 REF. 1265875 "Hydrological monitoring of vegetation in Mediterranean mountains by remote sensing fusion in Andalusia (SIERRA)". Junta de Andalucía - UCO. 25.424 €. 01/01/2020-30/06/2022

RTI2018-099043-B-I00. Operativity in hydrological management under torrential/snow drought conditions in high mountains of semi-arid basins. Ministry of Science and Innovation. 108.900 €. 01/01/2019 - 31/12/2021

12019077. Review and analysis of water bodies in the new Hydrological Plans. Endesa Generación, S.A. Duration: 21.486,61 €. 6/09/2017 - 6/12/2018

H2020-SC5-2016-2017- 730482-1. CLARA. Servicios de conocimiento habilitados para la previsión climática. Unión Europea. 3.821.700 €. 01/06/2017 - 30/09/2020

## Scientific outreach activities and Academic achievements

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European Researchers' Night 2023 Ingenuity Fair. University of Cordoba. 2018, 2019, 2020, 2021, 2022, 2023

'Por el mar las liebres y por el monte las sardinas. Marathon of hoaxes against climate change'. Science Week 2022-2023. University of Cordoba.

Ingenios en Ruta VII and VIII Annual Plan of Scientific Dissemination of the University of Cordoba 2022. University of Cordoba.

**Participation in teaching innovation projects:** Massification of specific skills and competencies in engineering master's degrees using MOOCS. (University of Cordoba. Cordoba, Spain)

**Organization of International conferences/membership in the steering programme committee:** Searching answers for the twenty-three Unsolved Problems in Hydrology. Co-organized by HS11. Convener: Bethel Ugochukwu Ukazu | Co-convener: Iskra Mejia-Estrada, Pedro Torralbo Muñoz

### Grants and prizes

- 1. PhD Fellowship Ministry of Science, Innovation and Universities 2018-2023.
- 2. Extraordinary End of Degree Award in Civil Engineering, Joint Plan 2016.
- 3. PRINCE2 Foundation certificate in Project Management 2017

## International Experience

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Stays in public or private R&D&I centres

(2021– 3 months) PhD Student- Stay in EURAC.

(2017– 2 weeks) Virtual and Intensive Course Developing Practical Skills of Future Engineers, University of Bialystok and University of Cordoba. VIPSKILLS Erasmus + Project - Politechnika Bialostocka

(2017– 2 weeks) Summer school Course Project Management, From Theory to Practice, university of Utrecht. HU University of Applied Sciences Utrecht - Business School Utrecht

(2016– 5 months) Erasmus at CULS, Czech University Life of Science, Prague

(2011– 1 year) Academic and sport scholarship for the tennis team in Reedley College California.

Language skills

**Spanish** – Mother language // **English** – Fluent // **Italian** - Fluent

Programing skills

**Phyton, GIS, Hydrologically based modelling** - Expert // **R, Matlab, GEE**, - Basics

## Teaching Experience

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Official teaching in different lectures at graduate studies with more than 100 teaching hours.

Subjects:

- Hydrology (2019/2020, 2020/2021, 2021/2022, 2022/2023, 2023/2024) – Civil Engineering
- Forest Hydrology and Hydrology and Irrigation (2020/2021) - Agroalimentary and Environmental Engineering

Official teaching in different lectures at graduate in ADD ON SKILLS - Erasmus + (2020-1-PL01-KA226-HE-095244) Module:

- Green and Blue roofs (July 2022)

Co-supervisor of Bachelor thesis in the Civil Engineering field:

1. *Bcs thesis co-supervisor: 'Alcance del contratista asociado a la certificación BREEAM ES NC asociado al requisito: Gestión de residuos de construcción RSD1'- by M.E. Delgado. 2022. University of Cordoba, Spain.*
2. *Bcs thesis co-supervisor: 'Proyecto de diseño y construcción de estructura de alivio contra inundaciones en el río Guadalquivir en su paso por el aeropuerto de Córdoba, T.M. de Córdoba'- by D. Charkaoui. 2022. University of Cordoba, Spain.*

## Postgraduate Experience

Oct 2023	Remote sensing for soil moisture: sources, processing, and assimilation of data for hydrological modeling. (University of Cordoba. Cordoba, Spain)
Sep 2021	Workshop ICSH-STAHY 2021(University of Valencia, Valencia).
Sep 2021	STAHY 2020 EARLY CAREER (University of Valencia, Valencia, Spain).
Sep 2020 -2021	Expert Title in University Teaching (University of Cordoba. Cordoba, Spain)
Jan 2021	Geoframe Winter school 2021 online (University of Trento. Trento, Italy)
Sep 2019 - Jan 2021	Webconference seminars on innovation and digital competencies (#WebinarsUNIA)
Oct 2019	Mapping soil moisture from remote sensing sources: scaling, calibrating and assimilation of data in hydrological modelling. (University of Cordoba. Cordoba, Spain).
Jun 2019	Hydrodynamics for Water Resources MODWATER19
Feb 2019	Python 3: Optimization, Regression and Classifiers
Feb 2019	Winter School on Data Rich Hydrology, WARREDOC
Dec 2017	Unveiling soil moisture at any spatial scale: Measurement, monitoring and modelling Techniques. (University of Cordoba. Cordoba, Spain).

## Quality Assurance Experience

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01/09/2019 - 31/07/2021	Coordinator of the Student Recruitment Plan at the EPS Belmez (PACE)
01/07/2018 - 01/07/2022	Quality Assurance pool member of ESU:
Since 2017	Student member of the Panel of Experts in the field of engineering and architecture. UNIBASQ Quality Agency of the Basque University System.
Since 2019	Student member of the Panel of Experts of the School for Advanced Studies for Advanced Studies". ANVUR - Italian National Agency for the Evaluation of University and Research Systems.
Since 2020	Student member of the Panel of Experts in the ALCAEUS pilot program. ACPUA - University Quality and Prospective Agency of Aragon.
Since 2015	Student member of the Panel of Experts in the field of engineering and architecture. ANECA - National Agency for Quality Assessment and Accreditation.
Since 2020	Student member of the Panel of Experts in the Environmental Sciences program. SKVC - Center for Quality Assessment in Higher Education
Since 2022	Student member of the Panel of Experts in Engineering Programs. ASIIN
01/09/2016 - 21/07/2017	Undergraduate international mobility tutor EPS Belmez

During Bachelor period Student Representation  
2012-2017

- *Student representative in the quality commission of E.P.S. Polytechnic of Belmez, University of Cordoba, from 2015 until 2017.*
- *Former Vice-President of the Student's Council of University of Cordoba.*
- *Assistant at the II Formative Stage organized by the Spanish Coordinator of Student Representatives from Public Universities (CREUP), held in Madrid in September 2015.*
- *Former collaborator with CREUP'S International Affairs Committee.*
- *Student representative at the University of Cordoba Senate, and member of its board Student representative at the Board of E.P.S. Polytechnic of Belmez, University of Cordoba Student representative at the Master in Road, Canal and Port Engineering Committee Student representative at the master's in mining engineering Committee*
- *Student representative at the Libraries and Practices in Enterprises Committee*