



MINISTERIO
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AGENCIA
ESTATAL DE
INVESTIGACIÓN

CV date	05/06/2023
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Part A. PERSONAL INFORMATION

First name	Cristina		
Family name	Aguilar Porro		
Gender (*)	Female	ID Scopus	36674489000
e-mail	caguilar@uco.es	URL Web:	https://www.uco.es/dfh/
Open Researcher and Contributor ID (ORCID)	0000-0002-9418-1679		

A.1. Current position

Position	Associate Professor (tenured, civil servant).		
Initial date	08/03/2019		
Institution	University of Cordoba (UCO)		
Department/Center	Mechanics Department	School of Engineering Sciences	
Country	Spain	Telephone number	957212229
Key words	Physical modelling, stochastic processes, uncertainty assessment, hydrology, water quality, remote sensing, vibration analysis		

A.2. Previous positions (research activity interruptions, art. 14.2.b))

<i>Period</i>	<i>Position/Institution/Country/Interruption cause</i>
01/11/2016-07/03/2019	Associate Professor (tenured)/UCO/Spain/Promotion
01/09/2016-31/10/2016	Assistant Professor/UCO/Spain/Promotion
15/01/2014-31/08/2016	Postdoctoral Juan de la Cierva/UGR/Spain/Promotion
12/01/2010-14/01/2014	Teaching assistant/UCO/Spain/Promotion
13/11/2015-14/11/2016	Birth of child
22/07/2018-21/07/2019	Birth of child

A.3. Education

<i>PhD, Licensed, Graduate</i>	<i>University/Country</i>	<i>Year</i>
PhD Forestry Engineer	Universidad de Córdoba/Spain	2008
Advanced studies diploma (MEng)	Universidad de Córdoba/Spain	2006
Forestry Engineer	Universidad de Córdoba/Spain	2004

Part B. CV SUMMARY (max. 5000 characters, including spaces)

I have been associate professor of mechanical engineering at UCO since 2016 and belong to the research group Fluvial Dynamics and Hydrology (TEP248-PAIDI). I focused my research activity to advance knowledge base regarding hydrological processes and water quality modeling in Mediterranean catchments and on the uncertainty assessment in physical processes. In particular, I have dedicated my attention to modeling the hydrometeorological variables involved in the water and energy balance at their representative spatial and temporal scales for their integration in a physically based distributed hydrological modelling tool including uncertainty assessment. To this end I proposed a topographic solar radiation algorithm for the generation of time-series solar radiation maps using limited data and simple methods. My research on water quality modeling has contributed to the study of environmental protection in Mediterranean areas and the development of parametric models and indexes for the spatial characterization of the nonpoint source pollution potential. The use of remote sensing data to characterize and monitor hydrological and land-use parameters also plays an important role in my work. I later included stochastic analysis to properly account for inherent uncertainty in hydrology with operational applications in semi-arid environments as well as for real time updating of flood forecasting. In this latter topic, I recently got funding in two competitive national calls to lead as principal researcher two projects related to the incorporation of uncertainty and risk analysis to the operation of hydropower facilities in Mediterranean mountain watersheds.



I completed my PhD studies and my early-stage researcher career entirely funded by public competitive calls, starting with a grant (2003/04) of the Spanish Ministry of Science and Education to initiate research activities, later as a PhD candidate at UCO by the Andalusian Ministry of Science and Innovation (2004/08) and finally, as a PhD researcher of the Juan de la Cierva program at the Univ. of Granada (2014/16). I have also carried out several stays abroad (>1 year) funded by competitive calls at the University of Leuven (Belgium), at Brown University (USA), at the VCU (USA) and at the University of Bologna (Italy). As a result, I have co-authored several indexed papers and contributions to international conferences setting the basis of a long-term international collaborative research framework that lasts nowadays.

Regarding dissemination activities I have participated in several actions devoted to the transfer of knowledge and technological tools for the hydrological modeling of watersheds to Andalusian water management public entities since 2009. I collaborated in the assessment of the environmental flow regime in the definition of the hydrologic plan of the Atlantic Andalusian watershed with the private technical enterprise (FULCRUM-INITEC) in 2009. I also participated in a R+D transfer contract of the CENIT 2009 program and was the principal researcher in a research contract with an enterprise (DBO5) for the computation of water quality variables in reservoirs from remote sensing data.

I have supervised 3 PhD students (2012, 2014 and 2020), all of them qualified with the highest honors, 3 grants for young researchers (research initiation scholarships) and 20 MSc students from 2009 to present, and actively participated in different national and international projects, including LIFE, FP7, and H2020 programs. I have been a researcher in projects that sum up to 3.5 M€ in R+D+i since 2009, whose transference meant the III award to transference from the Social Board UCO (2010) and the register of 3 open-source hydrological simulation tools with user graphic interface in English and Spanish. My current Scopus h-index is 10 (Scholar h-index: 13) and I have authored 31 papers (Scopus indexed) and 70+ conference proceedings.

I act as reviewer for 10+ international scientific journals and from 2017 on, I have been the Coordinator at UCO of the Bio-geo-chemical flow dynamics inter-university doctoral program with mention through the Excellence in 2011 (MEE2011-0270). I have also been part of the scientific committee and co-chair in several international conferences since 2013 at the EGU in Vienna (Austria), in 2014 at the 11th International Conference on Hydroinformatics in New York (USA) and in 2021 at the National Conference on Mechanical engineering in Jaen (Spain).

I was appointed as collaborator of the Spanish Research Agency in 2019, in the Civil Engineering Panel, and have reviewed up to 7 proposals of the national research call. I was appointed in June 2021 by the European Research Executive Agency and have recently acted as an expert evaluating 8 proposals of a topic within Cluster 6: Food, Bioeconomy, Natural Resources, Agriculture and Environment of the Horizon Europe Program 2021.

Part C. RELEVANT MERITS

C.1. Publications

- [1] **C. Aguilar**, M.L Ruz-Ruiz, F.J. Blanco-Rodríguez. 2023. R. A modified polynomial-based approach to obtaining the eigenvalues of a uniform Euler-Bernoulli beam carrying any number of attachments. *Journal of Vibration and Control*. *In press*
- [2] **C. Aguilar**, R. Pimentel, M.J. Polo. 2021. Two decades of distributed global radiation time series across a mountainous semiarid area (Sierra Nevada, Spain). *Earth System Science Data*, 13 (3): 1335-1359. (Q1, 3/93) IF: 9.197
- [3] E. Contreras, J. Herrero, L. Crochemore, **C. Aguilar**, M.J. Polo. 2020. Seasonal climate forecast skill assessment for the management of water resources in a run of river hydropower system in the Poqueira River (Southern Spain). *Water (Switzerland)*, 12(8): 2119. (Q2, 31/94) IF: 2.544
- [4] T. Iliopoulou, **C. Aguilar**, B. Arheimer, M. Bermúdez, N. Bezak, A. Ficchi, D. Koutsoyiannis, J. Parajka, M.J. Polo, G. Thirel, A. Montanari. 2019. A large sample analysis of European rivers on seasonal river flow correlation and its physical drivers. *Hydrology and Earth System Sciences*, 23(1), 73-91. (Q1, 5/90) IF: 4.936
- [5] **C. Aguilar**, M.J. Polo, A. Montanari. 2017. Real-time updating of the flood frequency distribution through data assimilation. *Hydrology and Earth System Sciences*, 21(7): 3687-3700. (Q1, 5/90) IF: 4.256
- [6] **C. Aguilar**, M.J. Polo. 2016. Assessing minimum environmental flows in nonpermanent rivers: the choice of thresholds. *Environmental modeling & software*, 79: 120 – 134. (Q1, 25/229) IF: 4.404
- [7] M. Egüen, **C. Aguilar**, S. Solari, M.A. Losada. 2016. Non-stationary rainfall and natural flows modeling at the watershed scale. *Journal of Hydrology*, 538: 767 - 782. (Q1, 29/188) IF: 3.483.

- [8] P.J. Gómez-Giráldez, **C. Aguilar**, M.J. Polo. 2014. Natural vegetation covers as indicators of the soil water content in a semiarid mountainous watershed. *Ecological Indicators*, 46: 524-535. (Q1, 34/223) IF: 3.444
- [9] **C. Aguilar**, J.C. Zinnert, M.J. Polo, D.R. Young. 2012. NDVI as an indicator for changes in water availability to woody vegetation. *Ecological Indicators*, 23: 290-300. (Q1, 43/210) IF: 2.890
- [10] **C. Aguilar**, M.J. Polo. 2011. Generating reference evapotranspiration surfaces from the Hargreaves equation at watershed scale. *Hydrology and Earth System Sciences*, 15(8): 2498-2508. (Q1, 2/78) IF: 3.148
- [11] **C. Aguilar**, J. Herrero, M.J. Polo. 2010. Topographic effects on solar radiation distribution in mountainous watersheds and their influence on reference evapotranspiration estimates at watershed scale. *Hydrology and Earth System Sciences*, 14(12): 2479-2494. (Q1, 5/76) IF: 2.463

C.2. Congresses

- [1] **C. Aguilar**, M.L. Ruz, R. Sola, F.J. Blanco-Rodríguez. Virtual laboratory for the stochastic analysis of discrete vibrating systems. XXIII National Congress of Mechanical Engineering. 21-23 October 2021. Jaen (Spain). Speaker.
- [2] M.L. Ruz, R. Sola, F.J. Gómez, **C. Aguilar**. Design of a shaft and its elements as a teaching tool. XXIII National Congress of Mechanical Engineering. 21-23 October 2021. Jaen (Spain). Speaker.
- [3] M.J. Polo, R. Pimentel, P. Torralbo, J. Aparicio, E. Contreras, J. Herrero, **C. Aguilar**, M.J. Pérez-Palazón. Impacts of global warming on snow dynamics in Mediterranean regions: implications for reservoir operation and water resource management. 2nd International Symposium on Water Systems Operations. 1-3 September 2021. Online. Invited Speaker (M.J. Polo)
- [4] **C. Aguilar**, J.C. Zinnert, R. Pimentel, M.J. Pérez-Palazón, L. Wood, M.J. Polo. Linking the hydrological regime and the vegetation cover evolution in a mountainous region in southern Spain from Landsat TM data for long term assessment. Remote Sensing and Hydrology Symposium (ICRS-IAHS). 8-10 May 2018. Cordoba (Spain). Speaker.
- [5] **C. Aguilar**, J.C. Zinnert, M.J. Pérez-Palazón, L. Wood, R. Pimentel, M. Egüen, M.J. Polo. Annual and seasonal assessment of the hydrological signature of mountain areas in semiarid regions from the evolution of selected vegetation covers and derived indicators. IAHS Scientific Assembly 2017: "Water and Development: scientific challenges in addressing societal issues". 10-14 July 2017. Port Elisabet. Speaker.
- [6] T. Iliopoulou, **C. Aguilar**, B. Arheimer, M. Bermúdez, N. Bezak, A. Ficchi, D. Koutsoyiannis, J. Parajka, M.J. Polo, G. Thirel, A. Montanari. Investigating the physical basis of river memory and application to flood frequency prediction. European Geosciences Union General Assembly 2017. 23-28 April 2017. Vienna (Austria). Poster.
- [7] **C. Aguilar**, A. Montanari, M.J. Polo. Long term prediction of flood occurrence. 7th International Water Resources Management Conference of ICWRS. 18-20 May 2016. Bochum (Germany). Speaker.
- [8] A. Montanari, **C. Aguilar**, M.J. Polo. Is the likelihood of getting a flood increased by higher than usual flows in the previous months?. American Geosciences Union Fall Meeting 2015. 14-18 December 2015. San Francisco (USA). Speaker.
- [9] **C. Aguilar**, M. Egüen, J.M. Perales, M.A. Losada, M.J. Polo. Stochastic assessment of environmental flows in semiarid environments. 11th International Conference on Hydroinformatics. 17-21 August 2014. New York (USA). Speaker.
- [10] **C. Aguilar**, J. Herrero, A. Millares, M.A. Losada, M.J. Polo. Meteomap: generation of meteorological variables for distributed physically-based hydrological modeling. 11th International Conference on Hydroinformatics. 17-21 August 2014. New York (USA). Speaker.
- [11] J. Herrero, A. Millares, **C. Aguilar**, M. Egüen, M.A. Losada, M.J. Polo. Coupling spatial and time scales in the hydrological modelling of Mediterranean regions: WiMMed. 11th International Conference on Hydroinformatics. 17-21 August 2014. New York (USA). Speaker.
- [12] M.J. Polo, **C. Aguilar**, A. Millares, J. Herrero, R. Gómez-Beas, E. Contreras, M.A. Losada. Assessing risks for integrated water resource management: coping with uncertainty and the human factor. 6th IAHS-EGU International Symposium on Integrated Water Resource Management. 4-6 June 2014. Bolonia (Italy). Speaker.

C.3. Research projects

- [1] ENFLOW-MED. Incorporating climatic variability and water quality in the definition of environmental flows in Mediterranean basins. Ministry of Science & Innovation (Strategic Projects Oriented to the Ecological and Digital Transition). PI: **C. Aguilar**. 2022-2024. 76.651 €.

- [2] HYPOMED. Incorporating hydrological uncertainty and risk analysis to the operation of hydropower facilities in Mediterranean mountain watersheds. Ministry of Science & Innovation. R+D+i 2018 “Societal Challenges”. PI: **C. Aguilar**. 2022-2025. 123.299 €.
- [3] CEI20_00074. Integrated management to control water and sediment loads in reservoir systems in the Guadalquivir watershed. 2021. Andalusian Ministry of Economic Transformation, Industry, Knowledge and Universities. R+D+i projects. Call: Challenges. Cei Cambio. PI: M.J. Polo. 2021-2022. 52.470,55 €.
- [4] PY20_00178. Hydrometeorological trends in mountainous protected areas in Andalusia: examples of co-development of climatic services for strategies of adaptation to climatic change. 2021. Andalusian Ministry of Economic Transformation, Industry, Knowledge and Universities. R+D+i projects. PI: M.J. Polo. 05/10/2021-31/12/2022. 95.968,33 €.
- [5] UCO-1381239. Tool for the stochastic forecast of river flows for water management in hydropower facilities in Mediterranean watersheds at different temporal scales. Andalusian Ministry of Economic Transformation, Industry, Knowledge and Universities. R+D+i projects of the FEDER Operative program. PI: **C. Aguilar**. 12/2021-12/2022. 47.419,37 €.
- [6] RTI2018-099043-B-I00. OPERA. Operationality in hydrological management under snow torrentiality/drought conditions in high mountain in semiarid watersheds. Ministry of Science, Innovation and Universities. R+D+i 2018 “Societal Challenges” PI: M.J. Polo. 01/01/2018-31/12/2021. 108.900 €.
- [7] ERA-NET ERA4CS/PCIN-2017-072. AQUACLEW - Advancing QUALity of CLimate services for European Water. Ministry of Economy, Industry and Competitiveness/EU. APCIN call associated to ERANET. PI: M.J. Polo (UCO). 18/09/2017- 31/12/2020. 95.000 €.
- [8] H2020-SC5-2016-2017- 730482-1. CLARA - Climate forecast enabled knowledge services. EU H2020. PI: Jaroslav Mysiak (CMCC) & M.J. Polo (at UCO). 01/06/2017- 30/09/2020. 486.875 €.
- [9] LIFE13 ENV/ES/001182. EBRO-ADMICLIM-Adaptation and mitigation measures to climate change in the Ebro Delta. EU. LIFE+ Environment Policy and Governance project application 2013. PI: Carlos Ibáñez (IRTA), M.J. Polo (at UCO). 02/06/2014-01/06/2018. 167.605 €.
- [10] CGL2014-58508-R. Global monitoring system of the snow cover in Mediterranean regions: trend analysis and implications in water resources availability in Sierra Nevada. Ministry of Economy and Competitiveness. Call: Challenges. PI: M.J. Polo. 01/01/2015-31/12/2017. 84.700 €.
- [11] FP7- 245460. NOVIWAM. Novel integrated water management system for southern European regions. European Commission. FP7-Regions. PI: M.J. Polo (at UCO). 01/01/2014-31/12/2017. 78.110 €.

C.4. Contracts, technological or transfer merits

- [1] Modeling and forecasting of water resources availability in Lanjarón springs. Aguas Danone, S.A. PI: **C. Aguilar**. 01/03/2023-31/12/2023. 31.353 €
- [2] Obtaining surface water quality variables from remote sensing data. DBO5, S.L. PI: **C. Aguilar**. 15/11/2012- 14/06/2013 24.200 €
- [3] Inventors/authors: **C. Aguilar**, J. Herrero, **M.J. Polo**, A. Millares, M.A. Losada. Title registered industrial property: HIDRODEM. Calculation of morphological characteristics of watersheds and drainage networks. Number of register: CO 287/09 Type of industrial property: Software. Date: 09/11/2009.
- [4] Inventors/authors: J. Herrero, **C. Aguilar**, **M.J. Polo**, S. Nieto, M.A. Losada
Title registered industrial property: METEOMAP. Interpolation of meteorological variables. Number of register: CO 286/09 Type of industrial property: Software. Date: 09/11/2009
- [5] Inventors/authors: J.Herrero, A. Millares, **C. Aguilar**, **M.J. Polo**, A. Moñino, A. Díaz, S. Nieto, M.A. Losada Title registered industrial property: WIMMED. Hydrological model. Number of register: CO 288/09 Type of industrial property: Software. Date: 09/11/2009.
- [6] Award to the Transfer of Knowledge to Society by the Social Council of the University of Cordoba in the Awards for the transference of knowledge-III EDITION-2011, for the project "Transfer of advanced tools in hydrology: a multidisciplinary perspective from research to application" of the Research Group Fluvial Dynamics and Hydrology.