Sonia Ponce de León, PhD

https://sciencehub.esa.int/sciencehub_team/sonia-ponce-de-leon/

Enthusiastic and committed Earth Sciences scientist with more than 14 years of experience in wind-wave modelling, analyzing, and interpreting data. Developed operational wave forecasts (America's CUP, METEOCAT, and SOCIB) and pursued a deep understanding of the data to produce helpful information for society. Excellent organizational, teamwork, solely work, and problem-solving skills. Approach difficulties with curiosity, broad-mindedness, and innovative thinking. In recent years, she focused on extreme waves, wave-current interaction, remote sensing, ocean wave modeling, cyclones, and renewable energies. She developed a method to estimate the wave power resources using satellite altimetry data and wave buoys in the coastal zones. She was Visiting Scientist at the European Space Agency in 2023, ESA-ESRIN, in the Earth Observation Science, Applications and Climate Department, where she worked on assessing wave power using high-resolution altimetry products.

Projects

2024 Principal Investigator of a European Space Agency project entitled: "Assessment of wave energy resource in the European and Mediterranean coastal zones using high-resolution altimetry products". Budget: 200k.

2023, Principal Investigator of a European Commission OCRE Earth Observation grant project entitled: OCRE EO "Assessment of renewable wave energy resources in the coastal zone using high-resolution altimetry products". Budget: 200k. Consortium: Earth Console and CENTEC-Instituto Superior Tecnico de Lisboa.

2022-2025, Collaborator of the National Spanish project SIHROCO: "Study of the Impact of climate change on Hybrid Marine Renewable energy projects using high-resolution simulations with a Regional Coupled Model." University of Alcala de Henares, Spain.

2024-2027, Collaborator of the ISSI (INTERNATIONAL SPACE SCIENCE INSTITUTE) project: "Coastal sea level rise: observations and causes", PI: Dr Anny Cazenave, LEGOS, Toulouse, France.

Sonia Ponce de León Álvarez, Phone: ++(351)915639891, Email: sonjapdla@protonmail.com Scopus Factor H: 16, about 1000 citations, Scopus author ID: 9244667400, orcid.org/0000-0002-3332-9908

2022, European Space Agency expert for SEA LEVEL AND COASTAL HAZARDS ESA project (EOatSEE).

2014-2016, Collaborator of European Research Council Advanced Grant Project MULTIWAVE PI: Prof. Frederic Dias, University College Dublin, Ireland, where I developed research on the evolution of extreme waves using spectral waves, numerical modeling, and remote sensing. http://www.ercmultiwave.eu/

Most relevant publications

2024, Ponce de León, S.; Restano, M.; Benveniste, J. Assessing the Wave Power Density in the Atlantic French Façade from High-Resolution CryoSat-2 SAR Altimetry Data. Energy, ELSEVIER, 131712, ISSN 0360-5442, https://doi.org/10.1016/j.energy.2024.131712

2023, Ponce de León, S.; Restano, M.; Benveniste, J. Assessment of Wave Power Density Using Sea State Climate Change Initiative Database in the French Façade. J. Mar. Sci. Eng. 2023,11,1970. https://doi.org/10.3390/jmse11101970

2023, Ponce de León, S.; Restano, M.; Benveniste, J. Assessment of Wave Power Density Using Sea State Climate Change Initiative Database in the French Façade. J. Mar. Sci. Eng. 2023,11,1970. https://doi.org/10.3390/jmse11101970

2023, S. Ponce de León, M. Restano, J. Benveniste, Assessment of wave power in the French façade inferred from high-resolution altimetry. Energy (Under Review), ELSEVIER.

2023, Ponce de León S., J. Bettencourt, J. Ringwood, J. Benveniste. Assessment of combined wind and wave energy in European Coastal waters using satellite altimetry data. Applied Ocean Research (Under Review).

2022 S. Ponce de León, Guedes Soares C., Numerical study of the effect on waves in the Agulhas Current Retroflection. Ocean Engineering 264 (2022) 112333 https://doi.org/10.1016/j.oceaneng.2022.112333

2022 S. Ponce de León, I. Young, T. Waseda, A.R.Osborne, Extreme Waves, Special Issue Editorial, *Journal of Marine Science and Engineering*. 10, 697. https://doi.org/10.3390/ jmse10050697

2021 S. Ponce de León, J.H. Bettencourt. Composite analysis of North Atlantic extra-tropical cyclone waves from satellite altimetry observations, *Advances in Space Research 68 762-772*, https://doi.org/10.1016/j.asr.2019.07.021

2021, S. Ponce de León, Guedes Soares, C. Extreme Waves in the Agulhas Current Region Inferred from SAR Wave Spectra and the SWAN Model. *J. Mar. Sci. Eng.*, 9, 153 https://doi.org/10.3390/jmse9020153

2021 International Altimetry Team 2021, Altimetry for the future: Building on 25 years of progress, *Advances in Space Research 68, 319-363*, Special Issue entitled "25 Years of Progress in Altimetry" https://doi.org/10.1016/j.asr.2021.01.022

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2021 S. Ponce de León, Guedes Soares C., Numerical Modelling of the Effects of the Gulf Stream on the Wave Characteristics. *J. Mar. Sci. Eng.* 9,42 https://doi.org/10.3390/ jmse9010042

2020 S. Ponce de León, Osborne A.R. Role of Nonlinear Four-Wave Interactions Source Term on the Spectral Shape. *J. Mar. Sci. Eng.* 2020, 8, 251; https://doi.org/10.3390/jmse8040251

2019 Osborne A.R., Donald T. Resio, A. Costa, S. Ponce de León, E. Chirivi. Extreme Wind Waves in Currituck Sound. Ocean Dynamics 69: 187-219. https://doi.org/10.1007/s10236-018-1232-y

2017 S. Ponce de León, J.H. Bettencourt, F. Dias. Comparison of hindcasted extreme waves with a Doppler radar measurements in the North Sea. Ocean Dynamics 67:103–115 DOI 10.1007/s10236-016- 1014-3

2016, Fedele, F., Brennan, J., Ponce de León, S. et al. Real world ocean rogue waves explained without the modulational instability. Sci Rep 6, 27715 (2016) https://doi.org/10.1038/srep27715

2016 S. Ponce de León, Orfila A., Simarro G., Wave energy in the Balearic Sea. Evolution from a 29 years spectral wave hindcast. Renewable Energy 82: 1192-1200, doi: 10.1016/j.renene.2015.07.076

2016 Akpınar A, S. Ponce de León. An assessment of the wind re-analyses in the modelling of an extreme sea state in the Black Sea. Dynamics of Atmospheres and Oceans 73: 61-75, doi: 10.1016/j.dynatmoce.2015.12.002

2014 S. Ponce de León, Guedes Soares C. Extreme wave parameters under North Atlantic extratropical cyclones. Ocean Modelling 81: 78-88, http://dx.doi.org/10.1016/j.ocemod.2014.07.005

2013 S. Ponce de León, A. Orfila. Numerical study of the marine breeze around Mallorca Island. Applied Ocean Research 40: 26-34, http://dx.doi.org/10.1016/j.apor.2012.12.003

2012 S. Ponce de León, A. Orfila, Ll. Gómez-Pujol, L. Renault, G. Vizoso, J. Tintoré. Assessment of wind models around the Balearic Islands for operational wave forecast. Applied Ocean Research 34: 1- 9, doi: 10.1016/j.apor.2011.09.001

2011 S. Ponce de León, J. Bettencourt, N. Kjerstad. Simulations of irregular waves in an offshore wind farm with a spectral wave model. *Continental Shelf Research* 31: 1541-1557, doi:10.1016/j.csr.2011.07.003

Editorial Responsibilities

Member of the Editorial Board of Marine Energy Journal https://www.sciepublish.com/journals/mer

https://www.sciepublish.com/journals/mer/editors

Since 2021 Topic Editor "Ocean Wave Dynamics" including the Journals: Fluids, Oceans, Remote Sensing, and JMSE.

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Guest Editor for the Special Issue "Extreme Waves". Journal JMSE (Journal of Marine Science and Engineering), MDPI (2020-2021).

Reviewer for the FONDECYT Regular 2017 grant competition, an initiative of the Chilean National, Science and Technology Commission (CONICYT - Chile), Reviewer of project number: 1171224 "Toward a near-surface wind field climatology using remote sensing and numerical simulation for ocean energy in south-central".

Reviewer for the following peer-reviewed journals: Journal of Geophysical Research, Ocean Modelling, Continental Shelf Research, Ocean Engineering, Applied Energy, Estuarine, Coastal and Shelf Science, Applied Ocean Research, Ocean Dynamics, Journal of Oceanography, Journal of Zhejiang University-SCIENCE A, Journal of Coastal Research, Journal of Marine Science and Engineering, among many others.

Session and Topic organizer of two sessions for the ASME-The American Society of Mechanical Engineers, 37th (OMAE-2018) Conference, Madrid in 2018.

Professional experience

2022 Visiting Scientist at ESA-ESRIN, Directorate of Earth Observation Programmes EO Science, Applications and Climate Department, Frascati (Roma), I-00044, Italy

2019-to present. Assistant Researcher at CENTEC.

2017-2019. Researcher at CENTEC, Lisbon, Portugal.

2014-2016, Postdoctoral research position level 2 at University College Dublin, School of Mathematics and Statistics, Ireland. Contracted in the frame of the MULTIWAVE ERC (European Research Council) project: http://www.ercmultiwave.eu/

2012-2014, Postdoctoral research position at University of Lisbon; Instituto Superior Tecnico de Lisboa; CENTEC-Centre for Marine Technology and Engineering, Portugal. Sponsor: Portuguese Science Foundation (FCT) http://www.mar.ist.utl.pt/en/centec/

2009-2012, Post-doctoral research position sponsored by the Spanish Ministry of Economy and Competitiveness (MINECO), grant Juan de la Cierva. Host institution: IMEDEA-Mediterranean Institute for Advanced Studies, CSIC- Spanish National Research Council, Balearic Islands, Spain http://www.imedea.uib.es/?lang=en

2008-2009, Associate Professor at HIALS-University College of Aalesund, now NTNU, Norway http://www.hials.no/

2005-2007, Research scientist sponsored by the Spanish Ministry of Economy and Competitiveness (MINECO), grant Torres Quevedo (intended to companies), host institution TECNOCEAN Eng., Barcelona, Spain http://www.tecnocean.com/

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1998-2002, Sr. Engineer and Visiting Lecturer; UPC-Technical University of Catalonia; LIM- Laboratorio de Ingeniería Marítima, Barcelona, Spain http://www.lim.cat/

Workshops and Conferences

Member of the Scientific Committee of the 30 Years of Progress in Radar Altimetry Symposium (2-7 September 2024), sponsor: European Space Agency

Invited Keynote Speakers of 45th COSPAR Scientific Assembly – COSPAR 2024 and Member of the Scientific Organizing Committee, Busan, South Korea, 13 - 21 July 2024

Member of the Scientific Committee of 45th COSPAR Scientific Assembly – COSPAR 2024 and Member of the Scientific Organizing Committee, Busan, South Korea, 13 - 21 July 2024

https://www.cospar-assembly.org/admin/session_cospar.php?session=1176

Keynote: Waves in the Coastal Zone – Sonia Ponce de León, **13th Coastal Altimetry Workshop & Coastal Altimetry Training** held 6-10 February 2023, Universidad de Cádiz, Spain.

https://youtu.be/pwxEl_R-YaE?list=PLZdR1iYGe6yzDyEE4Zpjbrch_5GOmi5u0&t=1216

Assessment of wave power density in the French and Portuguese coastal zones inferred from satellite altimetry data. Sonia Ponce de León, Marco Restano, Jérôme Benveniste. American Geophysical Union, San Francisco, USA.

https://agu.confex.com/agu/fm23/meetingapp.cgi/Person/1198230

Taught the Training course on the **13th Coastal Altimetry Workshop** (CAW13) organized by the European Space Agency, Cadiz, Spain, entitled: "Waves from Space in Synergy with Wave Modelling".

Assessment of renewable wave energy resources in the French façade coastal zone using high-resolution altimetry products. Sonia Ponce de León, Marco Restano and Jérôme Benveniste, **Coastal Altimetry Workshop** (CAW13).

Marco Restano, Jérôme Benveniste, Anrijs Abele, Lotfi Aouf, Florence Birol, David Cotton, Nicole Delpeche-Ellmann, Luciana Fenoglio, Guoqi Han, Clara Lázaro, Claire Maraldi, Francesco Nencioli, Julius Oelsmann, Sonia Ponce de León, Marie-Isabelle Pujol, Laura Ruiz-Etcheverry, Matea Tomic, Stefano Vignudelli, and John Wilkin (2023) **13th Coastal Altimetry Workshop Final Report**, ESA Publication, https://doi.org/10.5270/esa.caw13_2023.final_report

https://eo4society.esa.int/wp-content/uploads/2023/09/CAW13_final-report_230822-combined.pdf

Chairman of Session 4, Wind and Waves on the **13th Coastal Altimetry Workshop**, 6-10 February 2023, Universidad de Cádiz, Spain.

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Renewable Wave Energy Resources Inferred from High-resolution Radar Altimetry, Sonia Ponce de León, Marco Restano, Jérôme Benveniste, **28th IUGG General Assembly**, 11-20 July 2023, Berlin, Germany

ID: 1250280 Final Paper Number and Abstract Title: G41B-0457: Assessment of wave power density in the French and Portuguese coastal zones inferred from satellite altimetry data, Presentation Type: Poster Sonia Ponce de León, Marco Restano and Jérôme Benveniste, **American Geophysical Union**, San Francisco, USA, 11-15 December 2023.

Sonia Ponce de León, Marco Restano and Jérôme Benveniste. Assessment of renewable wave energy resources in the French facade coastal zone using high-resolution altimetry products. **World Ocean Circulation, User Consultation Meeting**, 10-12 October 2022, ESA-ESRIN, Frascati.

Sonia Ponce de León and Jérôme Benveniste Predicting extreme waves in the French and Iberian Peninsula façade", **OCEAN FROM SPACE**, 24-28 October 2022, Venice, Italy POSTER

Sonia Ponce de León,Yvan Gouzenes, Anny Cazenave, Jérôme Benveniste. Revisiting the coastal sea level rise using altimetry, wave buoys and a high-resolution spectral wave modeling in the French and Iberian peninsula Atlantic coast", **American Geophysical Union Fall Meeting**, 12-16 December 2022, Chicago, USA. https://ui.adsabs.harvard.edu/abs/2022AGUFMOS45C1208P/abstract

Legaz, M.J., Ponce de León S., Guedes Soares, C. 2021, "Validation of a spectral wave model for wave energy assessments in the Bay of Cadiz", Developments in Renewable Energies Offshore, Guedes Soares, C. (Ed.), Taylor and Francis, London, UK, pp. 38-44.

S. Ponce de León, C. Guedes Soares, J. A. Johannessen 2021. Modelling of the Surface Stokes drift in the Agulhas current system. 5th International Conference on Maritime Technology and Engineering (MARTECH 2020). In proceedings: Guedes Soares, C. & Santos T. A., (Eds.). Book: Developments in Maritime Technology and Engineering London, UK: Taylor and Francis, 2021. CRC Press, eBook ISBN 9781003216599

S. Ponce de León, C., J. A. Johannessen. Wave-current interactions in the Agulhas Current. 12th Coastal Altimetry Workshop, 4-7 February 2020, ESA-ESRIN, Fraskati, Italy. Page 39 in: Marco Restano, Marcello Passaro, Stefano Vignudelli, and Jérôme Benveniste (2020) 12th Coastal Altimetry Workshop (CAW12) Final Report, ESA Publication, http://doi.org/10.5270/esa.caw12_2020.final_report.

S. Ponce de León and J. Bettencourt, 2020. Composite distribution of North Atlantic extreme wind waves inferred from satellite altimetry data. EGU2020-5909, EGU General Assembly 2020. https://doi.org/10.5194/egusphere-egu2020-5909

2019 S. Ponce de León, J. Bettencourt. North Atlantic Extratropical cyclones extreme waves from satellite altimetry observations. Atlantic from Space Workshop, 22-25 January 2019, hosted by NOC- National Oceanography Centre, South Hampton, UK. Organizing Entity: ESA (European Space Agency).

https://www.eo4atlantic.info/QuickEventW ebsitePortal/atlantic-from-space-workshop/eo4atlantic

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2018 S. Ponce de León, Joao Bettencourt, F. Dias. Assessment of severe waves with satellite altimetry data and Doppler radar observations in the North Sea. 25 YEARS OF PROGRESS IN RADAR ALTIMETRY SYMPOSIUM, Ponta Delgada, Sao Miguel, Azores Archipelago, Portugal, 24-29 September 2018. Organized by ESA (European Space Agency).

2018 S. Ponce de León, G. Van Vledder, J. Bettencourt, Doohan P., Higgins C., C. Guedes Soares, F. Dias. Performance of WAVEWATCH-III and SWAN models in the North Sea. 37th International Conference on Ocean, Offshore and Arctic Engineering, OMAE2018, June 17-22, 2018, Madrid, Spain. http://proceedings.asmedigitalcollection.asme.org/proceeding.aspx?articleid=2705056&resultClick=3

2018 S. Ponce de León, A. Osborne, On the importance of the exact nonlinear interactions in the spectral characterization of rogue waves. 37th International Conference on Ocean, Offshore and Arctic Engineering, OMAE2018, June 17-22, 2018, Madrid, Spain. http://proceedings.asmedigitalcollection.asme.org/proceeding.aspx?articleid=2703663&resultClick=3

2017 S. Ponce de León, A. Osborne. Spectral characterization of rogue seas using high resolution nonlinear interactions in Portugal. 15th International Workshop on Wave Hindcasting and Forecasting and 6th Storm Surges and Coastal Hazards Symposium, Storm Surges and Coastal Hazards, 10-15 September 2017, Liverpool, UK http://www.waveworkshop.org/15thWaves/index.htm

Committees and supervisions

2023 Member of the MSc Thesis: High-resolution wave energy assessment for the Sines region. Student: Martim Sena Sancho. CENTEC-IST, Naval Arquitecture and Ocean Engineering. Portugal.

2020 Member of the PhD Thesis Committee: Determination of oceanic extremes using spatial ensemble of satellite data. Student: Alicia Takbash. Supervisor: Professor Ian Young. The University of Melbourne, Victoria, Australia.

2019. Member of Master of Science thesis committee. Student: Francisco Ferreira da Cunha Barros. Validation and quality assessment of HF Radar wave measurements in the Algarve shore. (26/11/2019). Faculty of Sciences of the University of Lisbon, Portugal.

2015. Advisor of the postgraduate's students Patrick Doohan and Christopher Higgins, at University College Dublin, Ireland. Research Projects 2015, UCD, School of Mathematical Sciences. Title of the project: Extreme events in deep and shallow waters around Ireland and the North Sea.

2012-2015. M.Sc. Thesis advisor of Jamila Humeniuk. Period: 2012-2015. Oceanography Engineering Program, COPPE Faculty, UFRJ-Federal University of Rio de Janeiro, Brazil. Thesis title: Influence of islands in the wave field inferred from SAR imagery, wave buoys and WAM model which. Date of conclusion: 30/09/2015.

Taught the Ocean Climate course at NTNU Aalesund University College, NTNU, Norway, Course: 2008-2009.

Sonia Ponce de León Álvarez, Phone: ++(351)915639891, Email: sonjapdla@protonmail.com Scopus Factor H: 16, about 1000 citations, Scopus author ID: 9244667400, orcid.org/0000-0002-3332-9908

Port Engineering Master's course: Wind Wave Theory and Wave Predictions. LIM-Laboratory of Maritime Engineering, UPC-Technical University of Catalonia, Barcelona, Spain. Course: 1999-2001.

Education

2008. PhD in Naval Architecture and Marine Engineering, University of Lisbon, Instituto Superior Técnico de Lisboa, Portugal

1995. Master of Science in Physical Oceanography, CICESE (Center for Scientific Research and Higher Education), Ensenada, Baja California, México

1986. Degree in Oceanographic Engineer; Master of Science in Geography, Odessa State Environmental University, OGMI Institute of Hydrometeorology, Russia

Languages

Spanish - English - Portuguese - Russian - Italian

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