PRIFYSGOL BANGOR / BANGOR UNIVERSITY


# Special issue

Neill, Simon; Yang, Zhaoqing; Hashemi, M. Reza

## Renewable Energy

*DOI:*
10.1016/j.renene.2017.07.054

Published: 01/12/2017

Peer reviewed version

Cyswllt i'r cyhoeddiad / Link to publication

*Dyfyniad o'r fersiwn a gyhoeddwyd / Citation for published version (APA):*
Neill, S., Yang, Z., & Hashemi, M. R. (2017). Special issue: Wave and tidal resource characterization. *Renewable Energy*, *114*, 1-2. https://doi.org/10.1016/j.renene.2017.07.054

**Hawliau Cyffredinol / General rights**
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

• Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
• You may not further distribute the material or use it for any profit-making activity or commercial gain
• You may freely distribute the URL identifying the publication in the public portal ?

**Take down policy**
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

11. May. 2021

# Special Issue: Wave and tidal resource characterization

Simon P. Neill[a,*], Zhaoqing Yang[b], M. Reza Hashemi[c]

[a] *School of Ocean Sciences, Bangor University, Marine Centre Wales, Menai Bridge, UK*
[b] *Pacific Northwest National Laboratory, 1100 Dexter Ave North, Suite 400, Seattle, WA 98109, USA*
[c] *Department of Ocean Engineering and Graduate School of Oceanography, University of Rhode Island, Narragansett Bay Campus, Rhode Island, USA*

---

The ocean represents a vast, and largely untapped, energy resource that could be exploited as a form of low carbon electricity generation. There has been much academic research, R&D, and commercial progress in marine renewable energy over the last decade. However, for the sector to flourish, and before electricity can be generated at significant scale, it is essential that the resource is fully, and accurately, characterized. This special issue comprises a range of articles relating to wave and tidal energy resource characterization in coastal waters throughout the world.

The special issue begins with a consideration of the wave and tidal resource of Scotland [1] – a nation that has been instrumental in the progress of the industry due to its energetic resource, and the foundation of the European Marine Energy Centre (EMEC) that has become a template for other test centres throughout the world. The next two articles consider country-scale wave and tidal resource assessments from two contrasting continents – the Uruguayan shelf seas [2] and, within the context of post-Fukushima,

*Corresponding author
*Email address:* s.p.neill@bangor.ac.uk (Simon P. Neill)

Japan [3].

It is interesting to note that the majority of accepted submissions (62%) examined waves, demonstrating the global interest and significance of this resource. These contributions include wave energy resource assessments that span the Middle East [4, 5], Australasia [6, 7], South America [8, 9], North America [10], and Europe [11, 12], considering issues such as model calibration [13], spatial/temporal variability [12], and wave/tide interaction [14].

A number of tidal stream resource assessments are included in the special issue, discussing the tidal resource of the Bosphorus [15], Puget Sound [16], the Massachusetts coast [17], Rathlin Sound in Northern Ireland [18], and the famous Pentland Firth [19]. These studies consider issues that include characterising the shape of the velocity profile at highly energetic sites [20], turbulence [21, 22], representing energy extraction in three-dimensional (3D) models [19, 23], the impact of waves on the tidal resource [24], and novel floating tidal devices [25]. It is notable that the majority of tidal resource assessments in the special issue that included a modelling component used 3D models as standard.

Finally, there was one contribution on tidal range power plants [26]. Although not a new concept (La Rance has been in operation since 1966), this technology has recently gained momentum, particularly in the UK, with the possible development of tidal lagoon power plants.

This special issue is comprised primarily from papers that were initially presented in the "Marine Renewable Energy: Resource Characterization, Environmental Impacts, and Societal Interactions" session at the 2016 AGU/ASLO/TOS Ocean Sciences Meeting in New Orleans, USA, 21-26 February 2016. How-

ever, due to the nature of the topic, many contributions that were not initially presented at this meeting are included in the special issue.

**Acknowledgement**

The guest editors wish to thank the contributors, the Renewable Energy editors, the Elsevier staff, and especially the reviewers of the manuscripts, all of whom have contributed to bringing the special issue to successful fruition.

**References**

[1] S. P. Neill, A. Vögler, A. J. Goward-Brown, S. Baston, M. J. Lewis, P. A. Gillibrand, S. Waldman, D. K. Woolf, The wave and tidal resource of Scotland, Renewable Energy.

[2] R. Alonso, M. Jackson, P. Santoro, M. Fossati, S. Solari, L. Teixeira, Wave and tidal energy resource assessment in Uruguayan shelf seas, Renewable Energy.

[3] J. D. Bricker, M. Esteban, H. Takagi, V. Roeber, Economic feasibility of tidal stream and wave power in post-Fukushima Japan, Renewable Energy.

[4] V. Aboobacker, P. Shanas, M. Alsaafani, A. M. Albarakati, Wave energy resource assessment for Red Sea, Renewable Energy.

[5] B. Kamranzad, A. Etemad-Shahidi, V. Chegini, Developing an Optimum Hotspot Identifier for wave energy extracting in the northern Persian Gulf, Renewable Energy.

[6] V. M. Aboobacker, P. R. Shanas, M. A. Alsaafani, A. M. A. Albarakati, Wave energy resource assessment for eastern Bay of Bengal and Malacca Strait, Renewable Energy.

[7] M. A. Hemer, S. Zieger, T. Durrant, J. O'Grady, R. K. Hoeke, K. L. McInnes, U. Rosebrock, A revised assessment of Australia's national wave energy resource, Renewable Energy.

[8] D. Mediavilla, D. Figueroa, Assessment, sources and predictability of the swell wave power arriving to Chile, Renewable Energy.

[9] F. Lucero, P. A. Catalán, Á. Ossandón, J. Beyá, A. Puelma, L. Zamorano, Wave energy assessment in the central-south coast of Chile, Renewable Energy.

[10] Z. Yang, V. S. Neary, T. Wang, B. Gunawan, A. R. Dallman, W.-C. Wu, A wave model test bed study for wave energy resource characterization, Renewable Energy.

[11] Y. Perignon, Assessing accuracy in the estimation of spectral content in wave energy resource on the French Atlantic test site SEMREV, Renewable Energy.

[12] I. Fairley, H. Smith, B. Robertson, M. Abusara, I. Masters, Spatio-temporal variation in wave power and implications for electricity supply, Renewable Energy.

[13] B. Robertson, Y. Jin, H. Bailey, B. Buckham, Calibrating wave resource assessments through application of the triple collocation technique, Renewable Energy.

[14] N. Guillou, Modelling effects of tidal currents on waves at a tidal stream energy site, Renewable Energy.

[15] M. Ozturk, C. Sahin, Y. Yuksel, Current power potential of a sea strait: The Bosphorus, Renewable Energy.

[16] T. Wang, Z. Yang, A modeling study of tidal energy extraction and the associated impact on tidal circulation in a multi-inlet bay system of Puget Sound, Renewable Energy.

[17] G. W. Cowles, A. R. Hakim, J. H. Churchill, A comparison of numerical and analytical predictions of the tidal stream power resource of Massachusetts, USA, Renewable Energy.

[18] A. Pérez-Ortiz, A. G. Borthwick, J. McNaughton, A. Avdis, Characterization of the tidal resource in Rathlin Sound, Renewable Energy.

[19] A. J. G. Brown, S. P. Neill, M. J. Lewis, Tidal energy extraction in three-dimensional ocean models, Renewable Energy.

[20] M. Lewis, S. Neill, P. Robins, M. Hashemi, S. Ward, Characteristics of the velocity profile at tidal-stream energy sites, Renewable Energy.

[21] M. Togneri, M. Lewis, S. Neill, I. Masters, Comparison of ADCP observations and 3d model simulations of turbulence at a tidal energy site, Renewable Energy.

[22] R. M. Horwitz, A. E. Hay, Turbulence dissipation rates from horizontal velocity profiles at mid-depth in fast tidal flows, Renewable Energy.

[23] X. Li, M. Li, S. J. McLelland, L.-B. Jordan, S. M. Simmons, L. O. Amoudry, R. Ramirez-Mendoza, P. D. Thorne, Modelling tidal stream turbines in a three-dimensional wave-current fully coupled oceanographic model, Renewable Energy.

[24] S. F. Sufian, M. Li, B. A. O'Connor, 3D modeling of impacts from waves on tidal turbine wake characteristics and energy output, Renewable Energy.

[25] D. Coiro, G. Troise, F. Scherillo, A. De Marco, G. Calise, N. Bizzarrini, Development, deployment and experimental test on the novel tethered system GEM for tidal current energy exploitation, Renewable Energy.

[26] A. Angeloudis, R. A. Falconer, Sensitivity of tidal lagoon and barrage hydrodynamic impacts and energy outputs to operational characteristics, Renewable Energy.