

TETHYS ENGINEERING BLAST



31 July 2020

[Tethys Engineering](#) is an online knowledge base that facilitates the exchange and dissemination of information on the technical and engineering aspects of marine renewable energy (MRE). The bi-weekly *Tethys Engineering Blast* highlights new publications in the [Tethys Engineering Knowledge Base](#); relevant announcements, opportunities, and upcoming events; and news articles of international interest. If you have specific content you would like circulated to the greater MRE community, please send it to tethys@pnnl.gov for consideration.

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Announcements

[Tethys Engineering Peer Review Survey](#)

As part of the international community working to advance the marine renewable energy industry, we would like to hear from you! We ask that you please fill out a brief [survey](#) (~3 min) by 31 August 2020 to help us evaluate and guide further development of *Tethys Engineering*.

[Aggregate Search on Tethys Engineering](#)

[Tethys](#) and [Tethys Engineering](#) fit within a larger framework of MRE databases known as [PRIMRE](#) (The Portal and Repository for Information on Marine Renewable Energy). As part of an effort to increase the accessibility and discoverability of information supporting MRE development, the search bar at the top of *Tethys Engineering* now allows users to simultaneously search for information hosted on *Tethys*, *Tethys Engineering*, and the [MHK Data Repository](#).

[Funding/Testing Opportunities](#)

The [TEAMER](#) (Testing Expertise and Access for Marine Energy Research) program, sponsored by the U.S. Department of Energy and directed by the Pacific Ocean Energy Trust, is accepting applications for its [1st Request for Technical Support](#) application period. Applications are due by 5:00pm ET (9:00pm UTC) on 31 July 2020.

[Canada's Ocean Supercluster](#) has launched its July 2020 [Call for Proposals](#) under its Accelerated Ocean Solutions Program (AOSP). The AOSP Project Themes are (i) remote operations, (ii) digital/automated technologies, and (iii) environmental technologies. Expressions of Interest are due by 4:00pm ADT (7:00pm UTC) on 11 August 2020.

Employment Opportunity

Offshore Renewable Energy Catapult (ORE Catapult) is recruiting for a [Research Engineer – Electrical Cable Systems](#) to be based within their Research & Disruptive Innovation Directorate. As a key member of the Electrical Research Team, you will focus on pioneering methodologies and applications related to electrical cables technologies, mainly through R&D project delivery.

Upcoming Events

Upcoming Conferences

The American Society of Mechanical Engineers' [39th International Conference on Ocean, Offshore & Arctic Engineering \(OMAE Virtual\)](#) will be held online from 3-7 August 2020. Register [here](#).

The Institute of Electrical and Electronics Engineers' [3rd International Conference on Renewable Energy and Power Engineering \(REPE 2020\)](#) will be held in Edmonton, Canada from 9-11 October 2020. The Call for Papers closes 20 August 2020.

New Documents on *Tethys Engineering*

[Evaluating the Potential for Tidal Phase Diversity to Produce Smoother Power Profiles – Preziuso et al. 2020](#)

Tidal energy resources are unique in that they have the potential to produce relatively smoother power profiles over time through aggregation. In order to generate smooth power profiles from tidal resources, sufficient complexity within the timing of tides is necessary within electrical proximity. This study evaluates the concept of aggregating diverse tides for the purpose of reducing periods of no and low energy production and creating smoother power profiles in regions around Alaska and Washington by calculating cross-correlations of tidal current velocity time series.

[Emerging Triboelectric Nanogenerators for Ocean Wave Energy Harvesting: State of the Art and Future Perspectives – Rodrigues et al. 2020](#)

A triboelectric nanogenerator (TENG) is a new energy harvester that converts small scale mechanical motions into electrical energy by a combination of triboelectrification and electrostatic induction through the periodic contact-separation and/or sliding movement

between two tribo-materials with different abilities of gaining or losing electrical charges. This new approach to harvest mechanical energy can produce high power outputs capable of supplying equipment and sensors deployed in remote offshore locations and of supporting offshore activities whilst being able to be used in conjunction with traditional energy harvesting technologies.

Adaptable Monitoring Package Development and Deployment: Lessons Learned for Integrated Instrumentation at Marine Energy Sites – Polagye et al. 2020

Integrated instrumentation packages are an attractive option for environmental and ecological monitoring at marine energy sites, as they can support a range of sensors in a form factor compact enough for the operational constraints posed by energetic waves and currents. Here we present details of the architecture and performance for one such system—the Adaptable Monitoring Package—which supports active acoustic, passive acoustic, and optical sensing to quantify the physical environment and animal presence at marine energy sites.

Effects of environmental exposure on the mechanical properties of composite tidal current turbine – Nachtane et al. 2020

Tidal current turbines are used to extract this energy and installed on the seabed at locations where the nozzle can be prone to the accidental impact and critical loads. The principal objective of this research is to investigate the effects of environmental exposure on the mechanical properties of composite tidal current turbine, the most advanced features currently available in finite element (FE) Abaqus/Explicit have been employed to simulate the behavior of the composite nozzle under static and dynamic loading conditions. To investigate this situation, a parametric analysis is conducted which deals with the effect of velocity and geometry of the impactor.

Wave loads on a land-based dual-chamber Oscillating Water Column wave energy device – Wang et al. 2020

Due to the mechanical and structural simplicity, Oscillating Water Column (OWC) Wave Energy Converter (WEC) is considered to be one of the most promising marine renewable energy devices. However, OWC remains not commercialized mainly due to its complex hydrodynamic performance and uncertainty in wave loads. In the present study, based on potential flow theory and time-domain higher-order boundary element method (HOBEM), a fully nonlinear numerical model is developed and used to investigate the wave-induced force and bending moment on a land-fixed dual-chamber OWC device. The Bernoulli equation is used to calculate the wave force and bending moment.

Estimation of ocean thermal energy potential in the Aguni Basin – Liu et al. 2020

As a marine renewable resource, ocean thermal energy conversion (OTEC) is gaining attention because of its sustainability and environment-friendly characteristics. The thermal energy potential in the open ocean has been well documented in the previous

literature. However, regional potential near the coast is not easily estimated using methods and parameters for global estimation. This study estimates the thermal energy potential of the Aguni Basin in the East China Sea using a high-resolution ocean model. An additional simulation without tide is performed to clarify the tidal effect.

News & Press Releases

[Radar test equipment to be deployed by OceanBased Perpetual Energy](#) – Renewable Energy Magazine

OceanBased Perpetual Energy is to lay highly specialized radar test equipment to help determine the optimal location for its ocean current energy converters in the Florida Gulf Stream. During a recent four-day mission aboard a 150-ft. research vessel, OceanBased demonstrated that clean energy can be generated for a consistent 24 hours simply by enabling the perpetually flowing current of Florida's Gulf Stream to turn specially configured turbines. During late July or early August 2020, OceanBased will deploy Acoustic Doppler Current Profiler systems within the Florida Gulf Stream to record current velocities throughout the water column at predetermined strategic locations.

[Supergen ORE Hub awards £1.2 million to advance research in offshore renewable energy sector](#) – Supergen Offshore Renewable Energy Hub

The Supergen Offshore Renewable Energy Hub has awarded almost £1.2 million to UK universities to support ambitious research projects investigating all aspects of offshore renewable energy (ORE). The Hub's Flexible Funding has been established to enable UK researchers to respond to a number of key research challenges in ORE. It also aims to support project areas that complement existing research, fill gaps or add cross-cutting activities to explore the transfer of research findings between sectors within ORE.

[ESA and DMEC join forces to accelerate Marine Energy solutions through space](#) – Dutch Marine Energy Centre (DMEC)

DMEC joins forces with The European Space Agency (ESA) to accelerate marine energy solutions. The partnership will explore the opportunities of space tech and data in the development of marine energy solutions, in the fields of logistics, operations & maintenance activities, remote (environmental) monitoring and business case development including resource assessment, site selection and revenue forecasting. The first step in the partnership will be the launch in September 2020 of the Marine Energy Tender for feasibility studies to assess the technical and economic viability of using space technology and data in support of marine energy.

[Carnegie wraps up 'Wave Predictor' tank trials in Spain](#) – Offshore Energy

Australian developer Carnegie has completed wave tank testing campaign at the Cantabria Coastal and Ocean Basin (CCOB) in Spain. The testing campaign, which

kicked off on 13 July 2020, delivered over 200 wave tests. Specifically, the tests covered a range of wave conditions, which reflect potential deployment sites for the CETO technology. The campaign generated over 15 GB of physical data, which Carnegie will use to validate its machine learning Wave Predictor. It will furthermore allow Carnegie's analysis team not only to validate the tool, but also to optimize it more.

£100M Growth Deal to Support Green Recovery and Net Zero Ambitions of Scottish Islands – European Marine Energy Centre

The Leaders of the three Scottish island councils – the Orkney Islands, Shetland Islands, and Comhairle nan Eilean Siar – have warmly welcomed announcements by the UK and Scottish Government's that the islands will receive £50m from each towards the Islands Growth Deal. The multimillion-pound deal will provide investment for local projects across the Scottish islands, driving sustainable economic recovery and growth, creating jobs and attracting further private and public sector investment. A range of areas, including tourism, infrastructure, innovation, skills, energy transition, and renewable energy systems, will be targeted with the funding which will be invested over ten years.