

TETHYS ENGINEERING BLAST



22 May 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. 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.

[Announcements](#)
[Upcoming Events](#)

[New Documents](#)
[News & Press Releases](#)

Announcements

TEAMER Request for Technical Support

The [Testing Expertise and Access for Marine Energy Research \(TEAMER™\) program](#), sponsored by the US Department of Energy and directed by the Pacific Ocean Energy Trust, will provide testing and expertise support to technology developers and researchers seeking access to the nation's best facilities and expertise through 3 to 4 annual open funding calls over each of the next three years. The first [Request for Technical Support](#) application period will open on 26 May 2020 and remain open through 31 July 2020. An informational webinar will be available at 9:00am PT on 2 June 2020.

EMEC Consultation

The European Marine Energy Centre (EMEC) has opened a [consultation on the revised decommissioning programme](#) for Magallanes Renovables' 2 MW ATIR platform, which is currently deployed at the Fall of Warness test site. EMEC invites stakeholders and members of the public to provide responses via email (info@emec.org.uk) or phone by 9 June 2020.

Funding Opportunities

The [PORTOS PROJECT](#) is providing the opportunity to test renewable energy devices or technologies for up to two weeks in some of Europe's state of the art test facilities. Applications are due to nathan.kirwan@ucc.ie by 22 May 2020.

The U.S. Department of Energy announced up to \$38 million in funding for a new Advanced Research Projects Agency-Energy (ARPA-E) program, [Submarine Hydrokinetic And Riverine Kilo-megawatt Systems \(SHARKS\)](#). The program seeks to design economically attractive hydrokinetic turbines for tidal and riverine currents. Concept papers are due 27 May 2020 at 9:30am ET.

The UK Research and Innovation's [Innovate UK Smart Grants](#) fund for research and development projects that can make a significant impact on the UK economy across a variety of fields is still accepting applications. Applications are due 27 May 2020 at 12:00pm BST.

Employment Opportunity

The European Marine Energy Centre (EMEC) is seeking a [Performance Test Engineer](#) to deliver EMEC's services into collaborative R&D projects, focused on marine energy device testing and performance assessment. Applications are due 1 June 2020.

Maritime Employers Wanted

In collaboration with Launch206 and Seattle Goodwill, the [Youth Maritime Collaborative](#) (YMC) is looking for employers to host high school interns this summer from 7-31 July 2020. Interns will receive course credit and a stipend paid by the YMC, while employers will be provided an orientation and equity and diversity training. If you are interested in hosting, please contact Veasna Hoy, YMC Program Director, at 206-948-9492 or veasna@maritimeblue.org.

Upcoming Events

Event Updates

The [2020 Ocean Power Innovation Network \(OPIN\) Annual Symposium](#), originally scheduled for 11 June 2020 in Nantes, France, has been delayed until further notice.

The [International Conference on Marine Energy and Marine Current Power \(ICMEMCP 2020\)](#), originally scheduled for 18-19 June 2020 in Toronto, Canada, will now be held virtually.

The [International Symposium on Power Electronics, Electrical Drives, Automation and Motion \(SPEEDAM 2020\)](#), originally scheduled for 24-26 June 2020 in Sorrento, Italy, will now be held virtually. Register [here](#).

The [49th Power Sources Conference](#), originally scheduled for June 2020 in Jacksonville, Florida (US) has been rescheduled to 7-10 June 2021.

New Documents on *Tethys Engineering*

Collective control in arrays of wave energy converters – Zou and Abdelkhalik 2020

A Collective Control is developed in this paper for arrays of Wave Energy Converters (WECs). The proposed controller applies a Proportional-Derivative feedback control law for each WEC with the optimized controller gains. A surrogate model, composed of only mechanical elements, is adopted to replace the hydrodynamic model during the optimization process. An indirect exterior penalty function approach is implemented to handle the constraints on the displacement and control. The weight of the penalty function is updated in subsequent iterations in the Sequential Unconstrained Minimization Technique.

Wind-Induced Currents in the Gulf of California from Extreme Events and Their Impact on Tidal Energy Devices – Gross and Magar 2020

In-stream and tidal energy devices are less exposed to extreme weather events than wind energy. Nevertheless, during tropical storms, the currents may intensify to levels that threaten the integrity of the devices. This paper presents Hurricane Odile and its impact on the currents in the Gulf of California (GC) as a worst-case scenario. A methodology to analyze the impact and its potential effects on tidal energy converters installed within the region are presented. The analysis is based on predictions obtained with a 3D shallow water model forced by tides and the meteorological conditions generated by Odile.

Energy, exergy and economic analyses of a novel hybrid ocean thermal energy conversion system for clean power production – Yilmaz 2019

In this study, comprehensive thermodynamic performance and economic evaluation of the ocean thermal energy conversion (OTEC) and wind turbine combined hybrid plant is investigated. The proposed system consists of the two main sub-cycles, which are isobutene working fluid ocean thermal energy conversion system and wind turbine. Energetic, exergetic performances and total irreversibility as well as economic assessment of the whole plant and its components are investigated according to various factors for example dead state temperature, turbine isentropic efficiency and inlet pressure of turbine.

Mooring forces in a floating point-absorbing WEC system – a comparison between full-scale measurements and numerical simulations – Ringsberg et al. 2020

The study presents an investigation of Waves4Power's WaveEL 3.0 wave energy converter (WEC). It was used as a reference for full-scale measurements of the mooring forces and buoy motions in a measurement campaign 2017 at an installation location off the coast of Runde in Norway. A numerical simulation model of the installation was developed in the DNV GL software SESAM. Unfortunately, the sea state conditions were not measured during the measurement campaign. Hence, a methodology was developed that used the recorded motion data to compute the sea state conditions at the test site.

[A Tidal Resource Evaluation-Based Method for Tidal Current Generation Farm Allocation Considering the Directionality of Tidal Currents](#) – Li and Ren 2020

This paper proposes a tidal resource evaluation-based planning method for profitable and reasonable allocations of tidal current generation farms (TCGFs). The directionality and variability of tidal current velocity (TCV) and their correlation are addressed. First, a TCGF power output model is developed. The correlations between tidal current directions and the probability distributions of TCV magnitudes are modeled by rose diagram, and wake effects in TCGFs are simulated by the semi-analytical wake model. Second, a tidal current resource evaluation method is proposed to determine the TCGFs capacity.

[Effects of water pretreatment on the extractable salinity gradient energy at river mouths: the case of Magdalena River, Caribbean Sea](#) – Alvarez-Silva et al. 2020

River mouths are locations with high theoretical potential for harvesting salinity gradient energy (SGE) since waters of different salinities are abundant in these places. However, the net extractable SGE potential—or site-specific potential (SSP)—is determined not only by the available natural resources but also by the energy consumption required for operating the power plant. In this paper, the required energy consumed during water pretreatment was estimated, comparing conventional and membrane-based methods. This energy input was included in the formulations of the SSP and was used to assess the extractable SGE potential at the Magdalena River mouth.

News & Press Releases

[DTOceanPlus unveils early version of ocean energy tools](#) – Offshore Energy

The DTOceanPlus project partners have just finalized the implementation of standalone alpha versions for the different tools and modules. The tools are for the selection, development and deployment of ocean energy systems. The project partners will now check the code of each tool and module leading to a beta version. Then the software integration should wrap up followed by the demo from real case technology projects. All deliverables of the project are public and available for download.

[Bombora and ORE Catapult develop co-located floating wave and wind technology](#) – Bombora

Wave energy developer Bombora has joined forces with the Offshore Renewable Energy (ORE) Catapult's Marine Energy Engineering Centre of Excellence (MEECE) in Wales to launch a cutting-edge floating wave technology research project. The research will carry out a techno-economic appraisal of extending Bombora's mWave™ technology into an offshore environment and will investigate the feasibility of co-location with

floating wind structures. Bombora's patented membrane mWave wave energy converter offers a unique opportunity to rapidly develop a floating wave platform solution.

[How Australia could harness its tides for energy](#) – CNN

Australia is famous for its beaches and exhilarating surf. But the ocean offers more than just a surfer's paradise: its tides are also a source of renewable energy. Among those harnessing this tidal potential is Sydney-based Mako Energy. The company makes underwater turbines ranging between two and four meters in diameter. One turbine operating in constantly flowing water can produce enough electricity to power up to 20 homes. Their design enables them to generate electricity even in slow-flowing water, meaning they could be used in rivers and irrigation canals as well as the ocean.

[Waves4Power eyes EMEC setup in 2021](#) – Offshore Energy

Swedish wave energy developer Waves4Power will install its WaveEL system at the European Marine Energy Centre (EMEC) in 2021. The company has secured EU Interreg Ocean Demo grant, giving it access to EMEC's power-connected test berths for three years. The grant also allows Waves4Power to deliver and sell electricity to Scotland's power grid based on a Power Purchase agreement. Through Scotland-guaranteed Contract for Difference Waves4Power will get up to GBP 300,000 per year for the three-year demo period. Included in the grant is also a free third-party verification of the WaveEL system.

[An archipelago in the Atlantic wants to add tidal power to its energy mix by using kite-like tech](#) – CNBC

Situated in the wilds of the northeast Atlantic between Iceland and Scotland, the Faroe Islands are peaceful, remote and beautiful. The archipelago is also the site of a trial that, using tidal "kite" technology, could radically alter its energy mix and, in the long run, make it greener. At the beginning of April, Swedish firm Minesto announced that, together with the Faroese utility SEV, it had been granted the necessary permits and consents to install two grid-connected tidal kite systems in the Vestmannaund strait, which is located in the northwest of the Faroe Islands.