TETHYS BLAST

9 August 2019

The bi-weekly *Tethys* Blast highlights new information on *Tethys*, news articles of international interest, and opportunities in wind and marine renewable energy. We hope you find this a valuable tool to keep you connected to colleagues, new research, opportunities, and industry milestones.

Call for Abstracts

Abstracts are being accepted for the Ocean Sciences 2020 meeting in San Diego on 16-21 February 2020. Consider submitting an abstract to the *Ocean Renewable Energy and Synergies with Ocean Technologies* session (84377). This session is looking for a broad range of papers on marine renewables and offshore wind that address environmental effects; resource characterization; modeling of device interactions; and potential for co-design of devices with ocean observation platforms, AUVs, and aquaculture facilities. For more information please contact Andrea Copping (andrea.copping@pnnl.gov), Zhaoqing Yang (zhaoqing.yang@pnnl.gov), Simon Neill (s.p.neill@bangor.ac.uk), or Reza Hashemi (reza_hashemi@uri.edu). Abstracts are due 11 September 2019 and can be submitted here.

Upcoming PRIMRE Event

You are invited to join a PRIMRE (Portal and Repository for Information on Marine Renewable Energy) side event on 2 September 2019 from 17:30 to 19:00 CEST as part of the European Wave and Tidal Energy Conference Series in Napoli, Italy. The purpose of the side event is to provide an overview of PRIMRE and the main knowledge hubs that are supported within PRIMRE: MHK Data Repository, *Tethys*, and *Tethys Engineering*. You can find more information on the side event here or register for it by registering for the conference here.

Upcoming PRIMRE Workshop

You are invited to attend a PRIMRE workshop on 11 September 2019 as part of the Ocean Renewable Energy Conference in Portland, Oregon. The purpose of the workshop is to interact with PRIMRE and the main knowledge hubs that are supported within PRIMRE: MHK Data Repository, *Tethys*, and *Tethys Engineering*. You can find more information on the workshop here or register for it by registering for the conference here.

Funding Opportunity

Wave Energy Scotland has launched a call for feasibility studies on Quick Connection Systems (QCS). The overall objective of the QCS programme is to reduce the duration, cost, and risk of offshore operations for early stage wave energy converters. This call focuses on the technology and operations used to make the connection between a wave energy device and its moorings and/or electrical system. Applications are due by 16 September 2019 at 12:00 GMT. More information on the application process can be found here.

APL-UW Video

The University of Washington's Applied Physics Laboratory (APL-UW) recently released a video showcasing the first demonstration of the Wave-powered Adaptable Monitoring Package (WAMP). While monitoring marine life in Hawaii, the WAMP was powered entirely by the BOLT Lifesaver, a commercial wave energy converter which was deployed at the U.S. Navy's Wave Energy Test Center. View the full video here.

New Documents on *Tethys*

New documents are regularly added to *Tethys*, hand-selected for their relevance to the environmental effects of wind and marine renewable energy. Short excerpts from new or popular documents are listed below, accessible by the accompanying *Tethys* links:

Effect of Pile-Driving Playback Sound Level on Fish-Catching Efficiency in Harbor Porpoises (Phocoena phocoena) – Kastelein et al. 2019

> The foundations of offshore wind turbine parks are often constructed by means of percussion pile driving. Broadband impulsive sounds generated by pile driving may disturb and distract marine mammals such as harbor porpoises (Phocoena phocoena); their concentration may be reduced, affecting the skills they need for foraging (e.g., timing and precision) or reducing their ability to catch prey and, thus, their foraging efficiency. Two captive harbor porpoises performed a fish-catching task while they were exposed to low ambient noise and impulsive pile-driving playback sounds.

Modelling Offshore Wave farms for Coastal Process Impact Assessment: Waves, Beach Morphology, and Water Users – Stokes & Conley 2018

> In this paper, modelling methods used in the scientific literature to study wave farm impacts on coastal processes are reviewed, with the aim of determining modelling guidance for impact assessments. Effects on wave climate, beach morphology, and the surfing resource for coastal water users are considered. A novel parameterisation for the WEC array transmission coefficient is presented that, for the first time, uses the permitted power rating of the wave farm, which is usually well defined at the impact assessment stage, to estimate the maximum likely absorption of a permitted WEC array.

Effect of wind turbines on bird abundance: A national scale analysis based on fixed effects models – Miao et al. 2019

> This study examines the impact of wind turbines on breeding bird abundance by using a fine scale, spatial longitudinal dataset for 1,670 wind turbines and 86 bird observation routes located in 36 states in the United States over 2008–2014. We find that the establishment of one additional wind turbine, on average, leads to disappearance of about three breeding birds. The aggregate effect of the U.S. on-shore wind turbines on breeding bird count is 151,630, a magnitude at the lower end of existing estimates that range between 20,000 and 573,000.

Analysing the potentials and effects of multi-use between tidal energy development and environmental protection and monitoring: A case study of the inner sound of the Pentland Firth – Sangiuliano 2018

> In order to further maximize the utility of marine space, the concept of co-location between economic sectors operating in the sea, and coexistence of such sectors with the ecosystem, has provided traction for the concept of multi-use (MU). This paper examines MU between tidal energy development and environmental protection, as well as tidal energy development and environmental monitoring. Results from the desk analysis were validated by key stakeholders, resulting in policy and technical recommendations informing the MUSES Action Plan.

Exploring technologically, temporally and geographically-sensitive life cycle inventories for wind turbines: A parameterized model for Denmark – Sacchi et al. 2019

> Most available studies present the environmental performance of generic wind turbines with assumed fixed values for sensitive parameters (e.g. electricity production) that often vary between studies and fail to reflect specificities of wind farm projects. This study presents an approach to build a comprehensive parameterized model that generates unique wind turbine life cycle inventories conditioned by technologically, temporally and geographically-sensitive parameters. This approach allows for the characterization of the carbon footprint of 5 sets of turbines in Denmark, where wind power is highly developed.

Addressing conflicting spatial demands in MSP: Considerations for MSP planners – Gee et al. 2018

> This report presents the key findings of a study that was carried out in 2018 to explore the range of spatial conflicts experienced in MSP in Europe. The aim was to provide an overview of common types of spatial conflicts and solutions that have been found in various EU Member States, with particular focus on spatial conflict prevention and mitigation. This report looks at the different conflict potential of sectors, conflicting issues and stakeholder contexts, as well as different types of solutions and conditions for applying them.

News and Current Events

Marine Renewable Energy

SIMEC Atlantis Completes SeaGen Tidal System Decommissioning – Subsea World News

> SIMEC Atlantis Energy has decommissioned the SeaGen tidal turbine support structure in Strangford Narrows, Northern Ireland. This marks the completion of the 1.2MW SeaGen tidal stream energy project lifecycle and is the first commercial scale tidal turbine development to be fully decommissioned. Specialist UK-based marine business Keynvor MorLift ltd. (KML) was appointed as the principal contractor to carry out the decommissioning engineering, planning and offshore works. The final major lift operations included the rigging, cutting and lifting of the over 500 tonne structure.

Stanford researchers develop technology to harness energy from mixing of freshwater and seawater – Stanford News

> Stanford researchers have developed an affordable, durable technology that could harness blue energy. Their paper, recently published in American Chemical Society's *ACS Omega*, describes the battery and suggests using it to make coastal wastewater treatment plants energy-independent. The Stanford group's battery isn't the first technology to succeed in capturing blue energy, but it's the first to use battery electrochemistry instead of pressure or membranes. Over 180 cycles, battery materials maintained 97 percent effectiveness in capturing the salinity gradient energy.

Scientist Studies Fish Behaviour at AUSTEn Tidal Energy Sites – Marine Energy

> AUSTEn (Australian Tidal Energy) project PhD student Constantin Scherelis is using hydroacoustics to help understand how fish behave in the strong currents of high-potential tidal energy sites. Understanding environmental impact of tidal energy is a crucial step towards gaining the necessary public support and regulatory approval for future commercial-scale tidal arrays. With this data, Scherelis hopes to demonstrate not just how much biomass is present and how it is distributed, but also how fish behaviour changes over natural cycles, such as day and night or season to season.

Carnegie hopes to reboot business with up to USD 8m from existing investors – Renewables Now

> Carnegie Clean Energyis inviting existing investors to participate in the recapitalisation of the wave energy company with the hope to raise up to AUD 11.5 million (USD 7.9m/EUR 7.1m) gross. Now that the Energy Made Clean (EMC) solar and microgrid business has been wound down, the company wants to reboot its core operations of wave energy development and intends to use the proceeds of the planned offering to finance activities over the next 12 months. Carnegie has come up with a two-year development pathway that focuses on the creation of a new and improved CETO unit design.

Liverpool: huge tidal power plant on the Mersey could make city a renewable energy hotspot – The Conversation

> Liverpool has declared a climate emergency. The mayors of both the city itself and the surrounding "city region" have recognised the emergency, and both have suggested that a tidal barrage on the River Mersey could form part of the solution. And on a recent visit to the city, Labour leader Jeremy Corbyn said his party would support the £3.5 billion project. If the environmental and financial issues can be resolved, a tidal barrage across the Mersey would provide a substantial amount of renewable electricity for many years to come, as well as a clear statement of the UK's progress to achieving zero carbon energy.

Wind Energy

Scientists say Vineyard Wind project poses little risk to endangered whales – Energy News

> Marine scientists say concerns expressed by opponents of a Massachusetts offshore wind project overstate the potential risk to endangered North Atlantic right whales. The Vineyard Wind project is a planned 84-turbine wind farm to be sited about 15 miles southwest of Nantucket. It is expected to be the first major offshore wind installation in the United States. Because of these ongoing concerns, Vineyard Wind struck a deal in January with three environmental groups, in which the developer promises to adhere to mitigation measures.

Kenya scores on wind energy front with help from AfDB (African Development Bank) – ESI Africa

> Africa's largest wind farm, a €620 million energy masterpiece boasting 365 turbines in northern Kenya, will help the East African nation stay on track to reach its target of 100% green energy by 2020. The Lake Turkana Wind Power project is a 40,000-acre wind farm, which will generate around 310MW of power to the national grid, enough to light up over 300,000 households. The wind farm will increase the country's electricity supply by 13% and is expected to reduce power shortages by 12.5% and cut the cost of electricity in Kenya by up to 10%.

Record US wind farm development activity in 2Q driven by Fortune 500 brands, utilities, and state calls for offshore projects – AWEA

> U.S. wind farm development activity rose to a new high point in the second quarter of 2019, according to new data released by the American Wind Energy Association (AWEA). The record 41,801 megawatts (MW) of U.S. wind capacity currently under construction or in advanced stages of development represents a 10 percent increase over the level of activity this time last year. Wind power is expanding rapidly in many regions of the U.S. Over 200 wind projects are underway across 33 states, and 15 of those states have over 1,000 MW of wind capacity that will come online in the near term.

Japan Identifies Eleven Offshore Wind Areas – Offshore Wind

> The areas have been identified jointly by the Ministry of Economy, Trade and Industry (METI), the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), and the Port Authority of Japan. Four of the areas, Noshiro (Mitane and Oga), Yurihonjo (north and south), Choshi, and Goto, will immediately undergo preparations for wind and geological surveys, the ministries said. Once the tendering procedure starts, the successful candidates will be granted a 30-year lease to develop and operate wind farms at the designated areas.

How robots may change wind O&M – Windpower Engineering

> Robots may soon change the way routine maintenance is conducted on wind turbines, leading to fewer up-tower climbs for wind technicians. Given the risks and high cost of conventional rope or aerial lift access for turbine O&M, this is promising news for the industry — and particularly for the offshore wind sector, which typically means harsher winds and riskier conditions at project sites. In one current research project, Sandia National Laboratories is equipping a crawling robot with a scanner that will search for hidden damages inside wind-turbine blades.