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THE
UNIVERSITY
OF RHODE ISLAND



URI College of Engineering

Civil, Mechanical, Electrical, Industrial, System, Computer and Ocean Engineering: Expertise/Research:

- Ocean modeling and instrumentation
- Site characterization (macro- and micro-siting)
- Meteorological/oceanographic design loads
- Floating body hydrodynamics and wave mechanics (floating turbines); CFD
- Wind system control and health monitoring
- Underwater and aerial Robotics (monitoring)
- Marine Geomechanics
- Underwater acoustics (construction and operation noise)
- Energy Storage; Distributed Energy Resources
- Composite materials

Selected courses

- Ocean Renewable Energy
- Energy and Environment
- Renewable and Efficient Electric Power Systems

- Minor in Offshore Energy (in process)



Selected past and ongoing projects

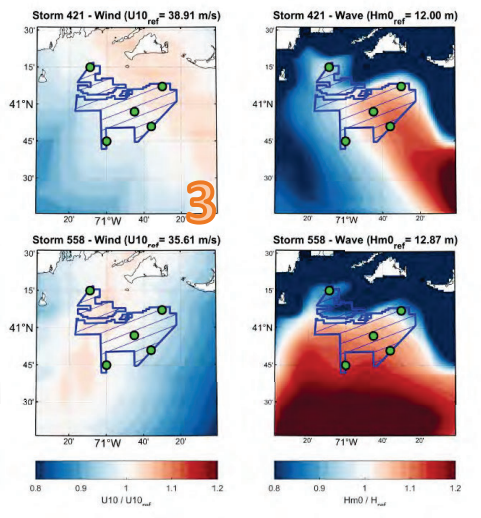
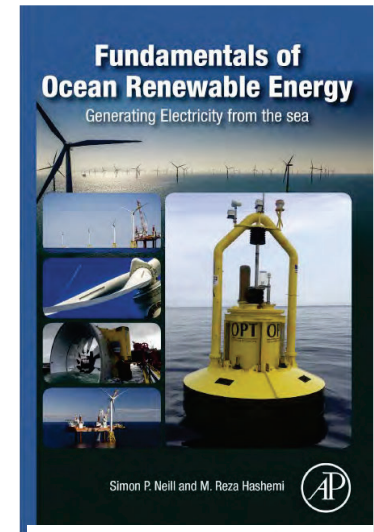
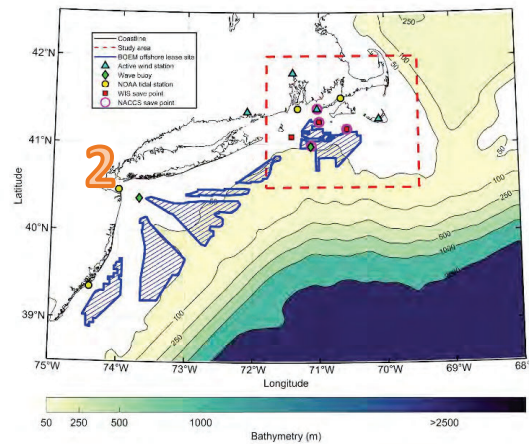
- MARine mammal Monitoring at Block Island using Acoustics (MARIMBA) (Miller et al.)
- Real-time Opportunity for Development of Environmental Observations (RODEO) ((Miller et al.)
- Block Island Structural Monitoring Project (Baxter et al.)
- Design and Evaluation of Wave Energy Conversion Devices (Grilli et al.)
- Ecological Service Value Index (ESVI) for the Rhode Ocean Special Area Management Plan (Grilli et al.); Rhode Island Ocean Special Area Management Plan (Ocean SAMP) Design of a Southern New England Offshore Wind Demonstration Site (Spaulding et al)
- Senior design projects in OCE (2 groups in 2019-2020 and 1 group in 2018-2019)



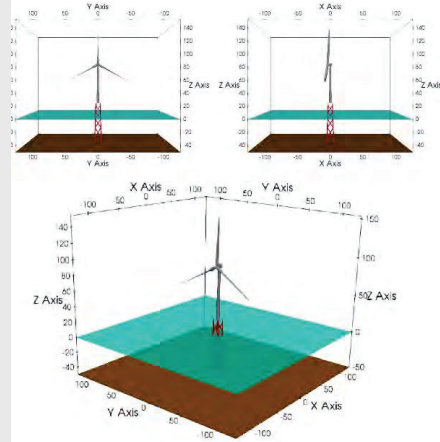
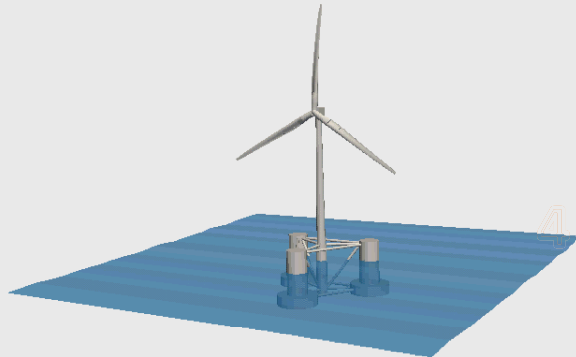
Research: Hurricane forces on proposed offshore wind farms

Teaching: Ocean Renewable Energy

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IEC-61400, DNV-OS-J101 standards?



Eq. (4.15), and using the properties of the Gamma function, we can write

$$E(u) = \int_0^\infty u f(u) du = \int_0^\infty u c^2 F(1 + 1/3) du = c^2 F(1 + 1/3) \quad (4.17)$$

Consequently, the expected value or mean power density is given by

$$E(P) = E\left(\frac{1}{2} \rho u^3\right) = \frac{1}{2} \rho c^3 F(1 + 3/8) \quad (4.18)$$

4.3.3 Block Island Wind Farm

In this section, the resource assessment for a real offshore wind farm in the United States is performed using the methodology that was described in the previous section. The Block Island Wind Farm (see Fig. 4.12) is the first offshore wind farm in the United States and was constructed in 2016 by Deepwater Wind as a demonstration project. The farm includes five turbines, each with a rated power of 6 MW (Haliade-150 6-MW), and therefore the total capacity of the project is 30 MW.

Long-time series (e.g. covering a decade) of hourly wind data should be used for wind resource assessment to capture interannual and seasonal variability of wind energy for a location. In some cases, wind data are collected at the project site, but if the period of data collection is not long, other datasets should be considered. For instance, collected data at a site can be used to find the correlation of wind speed with other nearby stations that have longer records. Thus, long-time series of wind data can be generated using these stations.

In order to conduct the resource assessment for the Block Island Wind Farm, the historical wind data provided by Wave Information Studies (WIS)

FIG. 4.12 An aerial photograph of Block Island, RI, United States, and the five wind turbines (each 6 MW) that have been installed about 1 km from the island. The turbine hub-height is about 100 m. (Photograph courtesy of Deepwater Wind.)