FRANCE ENERGIES MARINES

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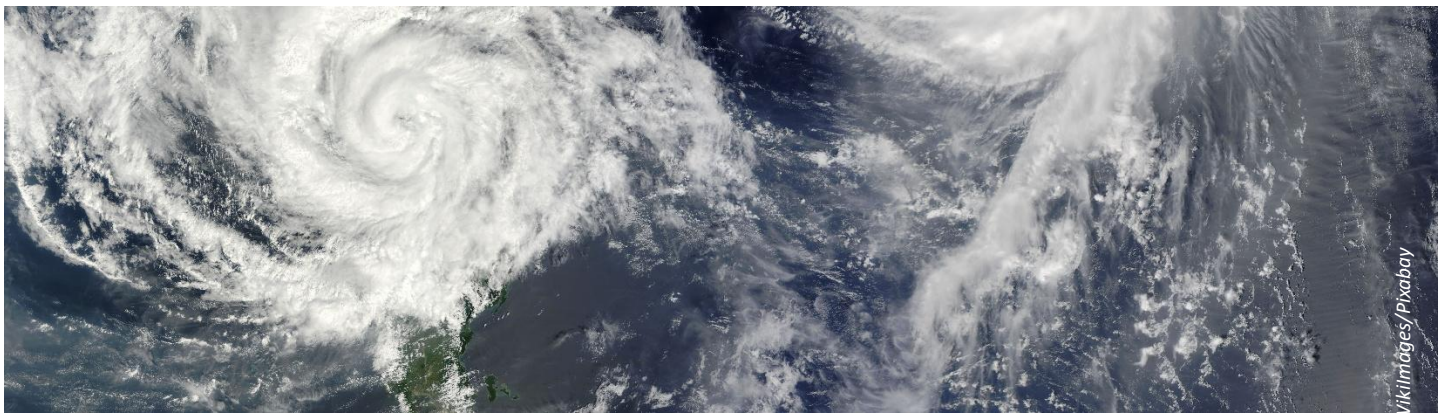
OFFSHORE WIND - Towards an evolution in international standards for the design of wind turbines exposed to tropical cyclones



Some of the future offshore wind farms will be located in areas exposed to tropical cyclones. It is crucial to accurately determine extreme wind and wave values to design machines that can withstand these conditions. The OROWSHI R&D project, which was completed on 12 November, has led to several progresses, including the development of the TAIFU-WindWaves© software and an associated methodology that provides a solid basis for defining new international standards in this field.

Unreliable estimates of extreme waves

Offshore wind power companies are targeting areas that are currently highly exposed to tropical cyclones (Asia-Pacific, French overseas territories) or that could become more exposed due to climate change. In these locations, it is crucial to accurately determine extreme wind and wave values to design turbines that can withstand these metocean conditions. While wind estimates appear to be reliable, the standard recommendation for extreme wave statistics is not, as it is based on a method generally used for farms deployed at mid-latitudes. Indeed, this high uncertainty on extreme waves can lead to turbines that are overdesigned (and therefore more expensive) or undersized (involving increased risks).

A solid foundation for setting new international standards

The OROWSHI R&D project, which was completed on 12 November, has led to a major improvement in wind and wave modelling under tropical cyclone conditions. The extreme wind and waves statistics were computed with the same Monte Carlo approach, providing consistent joint statistics. This has been validated using a comprehensive database of observations from a wide range of sensors (floating lidar, sail drones, satellite radar). Indeed, **The TAIFU-WindWaves© software, which incorporates this innovation**, was developed as a result. It enables rapid and accurate assessment of extreme wind and wave statistics for offshore wind farms design exposed to cyclone risk. **The associated methodology provides a solid basis for defining new international standards in this field.**

A **final webinar** to present the main results of the OROWSHI R&D project will be held on 3 February, from 9:30 to 11:00 am (CET). > Register now !

OROWSHI in a nutshell

This project was led by France Energies Marines.

⇨ See project web page

Duration: 3 years (2022-2025) | **Budget:** €1,700K

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