Key Metocean Data and data collection methods for Offshore Wind Farm Development in Atlantic Canada

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Metocean data plays a critical role in evaluating potential sites for offshore wind farms, from resource assessment to foundation engineering design. This paper presents a comprehensive list of metocean datasets required to support offshore wind development in Atlantic Canada, aligned with established international standards (e.g., IEC 61400-3, ISO 19901-1). Key data sources for metocean parameters are identified, assessed for gaps, and used to inform recommendations for efficient data collection in priority areas across the region. A regional gap analysis provides broader context for future data collection initiatives, emphasizing collaboration among industry, government, academic, NGO, and Indigenous organizations to expand existing observation platforms and programs and integrate existing datasets across governmental agencies.

The paper outlines essential metocean variables for offshore wind development, including atmospheric, wave, ocean current, water level and tide, temperature, sea ice and ice accretion, extreme environmental parameters, and bathymetry. For each variable, requirements are summarized in accordance with relevant standards and best-practice guidelines, along with examples illustrating their application in engineering analyses.

Several parameters are identified as primary variables for advancing the prioritization of offshore wind lease areas: wind speed and direction, ocean current speed and direction, significant wave height, peak wave period, mean wave direction, water levels, water depth (bathymetry), sea-ice concentration, ice thickness, freezing spray and iceberg data. The paper also discusses approaches for obtaining historical metocean data and hindcast models and highlights the importance of weather downtime assessments through a representative site example.