

## Climate Change Results in Increased Accessibility of Offshore Wind Farms for Installation and Maintenance

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**Abstract :** As the global pursuit of renewable energy intensifies, offshore wind farms have emerged as a promising solution to combat climate change. The global offshore wind installed capacity is projected to increase 56-fold by 2055. However, the impacts of climate change, particularly changes in wave climate, are not widely understood. Offshore wind installation and maintenance activities often require specific weather windows, characterized by calm seas and low wave heights, to ensure safe and efficient operations. However, climate change-induced alterations in wave characteristics can reduce the availability of suitable weather windows, leading to delays and disruptions in project timelines. It applied the operational limits of installation and maintenance vessels to past and future climate wave projections. This revealed changes in the annual and monthly accessibility of offshore wind farms at key global development locations. When accessibility is only defined by significant wave height, spatial patterns in the annual accessibility roughly follow changes in significant wave height, with increased availability where significant wave height is decreasing. This resulted in a 1-6% increase in Europe and North America and a similar decrease in South America, Australia and Asia. Monthly changes suggest unchanged or slightly decreased (1-2%) accessibility in summer months and increased (2-6%) in winter. Further assessment includes assessing the sensitivity of accessibility to operational limits defined by wave height combined with wave period and wave height combined with wind speed. Results of this assessment will be included in the presentation. These findings will help stakeholders inform climate change adaptations in installation and maintenance planning practices.

**Keywords :** climate change, offshore wind, offshore wind installation, operations and maintenance, wave climate, wind farm accessibility

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