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Satellite-Based Offshore Wind Data Close to the Coast: Comparison With Onshore Meteorological Mast Records and Microscale CFD Simulations

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Abstract. Satellite observation of environmental phenomena is becoming increasingly accurate, complementing pre-existing measurement techniques. In this work, the offshore wind field recorded by Sentinel-1 on February 6th, 2021, close to the Southwestern Iceland coast is compared with the anemometric measurements provided by a relatively dense network of weather stations in the Reykjanes peninsula and microscale CFD simulations that use the Hvassahraun weather station data to approximate wind velocity and direction in offshore locations. The three methodologies show a good agreement in the 10-minute velocity magnitudes for the set of considered offshore locations, while the 10- minute mean wind direction shows certain scattering, although with a consistent prevalence of Eastern wind directions, in agreement with the anemometric data. The results show obvious complementarities among the three approaches, suggesting further studies to improve accuracy, especially for capturing local effects impacting wind magnitude and directionality.