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Abstract: In an effort to minimize the costs of offshore wind parks, the present research deals with optimizing a certain aspect of the support structure, namely the approach to scour. Scour is the phenomenon of seabed changes in the vicinity of the support structure that arises when the support structure disturbs the local flow sufficiently much. Scour is particularly evasive because in case of current, the flow disturbance can be intense and dig a hole comparable to the horizontal extent of the support structure. This usually implies a considerable loss of stiffness, ultimate strength or lifetime of the support and super structure. In case of waves, however, the flow disturbance can be much weaker and even backfill the hole with soil. The ability to accurately forecast this development of the geometry of the scour hole becomes central for obtaining both a safe and cost-effective solution. In practice, scour forecasts facilitate the comparison between a scour design based on either deployment of scour-protection or enhanced structural design. The broad goal is to develop a method that produces accurate scour forecasts for offshore wind parks. The present research investigates more specifically which parameters are suitable for characterizing the scour geometry during both scouring and backfilling and how the parameters develop in time for a given sea state. The present research is restricted to treat a monopile in sand since this is a common and potentially cost-saving case.

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Defended: 12.12.2011