Sea state estimation using multiple ships simultaneously as sailing wave buoys

The article presents initial ideas towards a network-based approach for sea state estimation used for marine operations and other maritime applications. In principle, all available means, ranging from in situ buoys, eet of ships to remote sensing by satellite and aircraft, could be considered, emphasising that each means and any combinations among may act simultaneously. This study focuses on just one of the means; the use of ships as sailing wave buoys. The article introduces the wave buoy analogy, i.e. ship as-a-wave-buoy, and it makes a proposal on how to impose (different) weights to the single ship-specific wave spectrum estimates obtained from multiple ships. Moreover, the work includes a discussion about the importance to associate a measure to reflect the (un)certainty of the wave spectrum estimate. The article presents a numerical case study, where multiple ships act simultaneously as wave spectrum-estimators. The casestudy relies on numerical motion simulations, as appropriate full-scale data is not yet available. In the analysis, it is shown that the use of simultaneous data from multiple ships leads to more accurate wave spectrum estimations.

General information
Publication status: Published
Organisations: Fluid Mechanics, Coastal and Maritime Engineering, Department of Mechanical Engineering, Norwegian University of Science and Technology
Corresponding author: Nielsen, U. D.
Contributors: Nielsen, U. D., H. Brodkorb, A., J. Sørensen, A.
Pages: 65-76
Publication date: 2019
Peer-reviewed: Yes

Publication information
Journal: Applied Ocean Research
Volume: 83
ISSN (Print): 0141-1187
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
Original language: English
Keywords: Sea state estimation, Wave buoy analogy, Multiple ships, RAO-based weighting, Uncertainty measure
DOIs:
10.1016/j.apor.2018.12.004
Research output: Contribution to journal › Journal article – Annual report year: 2019 › Research › peer-review