

# A numerical modelling study of the winds, waves and currents in False Bay

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## Abstract

Past research in False Bay has revealed significant differences in the overall spatial patterns of both currents and waves across the bay under different wind and swell conditions. However, our present knowledge of the circulation is based on temporally and spatially inconsistent datasets, whilst wave conditions and related transports have been intensively studied only along the northern shoreline of the bay. Furthermore, the few numerical modelling studies conducted to date have been highly idealised excluding, for example, wave- and tidally-driven flows, and applying non-validated, climatologically averaged wind forcing. The present study is intended to enhance our understanding of the sea state and circulation in False Bay through the development of a realistic simulation of winds, waves and flows in the bay over a selected time period. A temporally and spatially varying surface wind field will be obtained using a WRF atmospheric model nudged by observations from local weather stations. The wind field will be applied to a Delft3D coupled wave-flow model which will be calibrated using local wave observations. Model outputs will be examined for significant features and recurrent patterns in the winds, waves and flows, and conditions and characteristics of any wind→wave, wind→flow, and wave→flow relationships will be identified where possible. The study will additionally quantify the accuracy of model predictions by assessing their skill in reproducing observed events.