



Wave-current interaction in the northern Agulhas Current and shipping safety

Louw Uys

Stellenbosch University, Faculty of Military Science, Nautical Science, South Africa (louw@ma2.sun.ac.za)

ABSTRACT

WAVE-CURRENT INTERACTION IN THE NORTHERN AGULHAS CURRENT AND SHIPPING SAFETY

By R.L. Uys

Stellenbosch University, South Africa

The Agulhas Current along the south east coast of South Africa is well known for severe wave conditions and the occurrence of rogue waves. The statistical probability of rogue wave occurrence is a well-known topic, but the occurrence of rogue waves cannot be predicted. Similarly, interaction between the Agulhas Current and wave fields emanating from the south west is a known phenomenon, which results in the creation of modified waves that could be different from those predicted by standard models. Although this modelled interaction can contribute much to the research on rogue waves, the enhancement or attenuation of wave fields due to wave-current interaction, is seen as a stand-alone phenomenon. Currently, standard models generating wave field prediction do not make provision for the interaction between waves and currents.

Modelling the wave-current interaction in a main shipping route and providing the results thereof for use in the shipping industry, is a necessity not widely available yet. This area spans a grid of 800 km by 240 km between Richards Bay in the north and Port Elizabeth in the south. Using a conventional model in an area that it was not necessarily intended for, can contribute significantly towards knowledge expansion in this field. The SWAN model is a near shore wave model that is widely used in the field of coastal engineering. This readily available model provides for wave-current interaction and its limited resource requirements makes it ideal to supply information on wave interaction to the shipping community. Although this may not be seen to be the best model to provide a final accurate product of wave interaction prediction to the shipping community, it does serve to provide a very good baseline for the provision of safety information. This safety information can be produced and used for the safe routing of ships as well as in the ship design process during the determination of Response Amplitude Operators (RAO).