

Interactive comment on “VISIR-I.b: waves and ocean currents for energy efficient navigation” by Gianandrea Mannarini and Lorenzo Carelli

Anonymous Referee #1

Received and published: 19 March 2019

This is a reasonably good paper that describes a new version of a ship-routing model. The original model was published in GMD, so the subject matter has already been judged to fall within the scope of the journal. The manuscript assesses the impact of waves and currents on transatlantic crossings, and calculates energy efficiency savings that seem impressive.

Major comments:

1) The term "waves" is used throughout the manuscript, but it is never properly defined. The ocean supports a wide variety of wave motions, both internal and at the surface, including gravity waves, Rossby waves, Kelvin waves, Poincare waves, acoustic waves, etc. I believe the manuscript is referring exclusively to surface gravity waves, but this needs to be stated. In the equivalent atmospheric problem of aircraft routing, "waves"

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usually refers to Rossby waves in the jet stream, and the wave structure (in other words, the $u(x,y,t)$ and $v(x,y,t)$ velocity field associated with the wave) is used in the calculation of the fastest route. I presume that the flow perturbation associated with the surface gravity waves in the current manuscript is not being used like this, but rather that the waves are being treated as areas of turbulence to be avoided. However, this wasn't entirely clear to me and deserves to be clarified.

2) The manuscript is missing a discussion on whether the ship-routing model is intended for operational use or just for research purposes. More generally, it is missing a discussion on how ships are currently routed operationally: are the tracks optimal in some sense? If so, who calculates the optimal routes, and using what model? This is particularly relevant to interpret the energy efficiency gains calculated in the manuscript.

3) I generally found the manuscript difficult to read and understand, mostly because of the poor quality of English usage throughout. This problem could and should be fixed by calling on a native English speaker or professional proof-reading service.

Minor comments:

Page 1, line 20: "which capacity" -> "whose capacity".

Page 2, line 2: please define "dead reckoning".

Page 4, lines 15-16: what are the manoeuvrability and actuation issues that arise, and what are the consequences of not considering them?

Page 7, line 17: "preliminary" -> "preliminarily".

Page 7, line 29: the final sentence makes no sense.

Page 10, line 14: "anthropic" -> "anthropogenic".

Page 26, line 25: please specify which version of Matlab.

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Page 37, Figure 5: the geodetic curves look piecewise linear (i.e. local geodetics between waypoints) rather than continuous - why?

Page 39, Figure 7: the captions refer us to an external website for the animations. I think they should probably refer us to the supplementary material instead.

Page 39, Figure 7: "oncean" -> "ocean" in the ordinate label.

Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2018-292>, 2019.

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