Hydrographic survey planning uncertainty from ocean model surface forcing

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The capability of autonomous survey systems has increased rapidly, both in ocean and terrestrial environments. They can reduce operational costs, crew size requirements, time to produce results, and enhance the capability of the survey by improving the responsiveness and data quality control, easing accessibility to shallow water areas and provide up to date information about dynamic marine environments. However, these autonomous platforms face many challenges, specifically in places where large tidal ranges and currents exist, and freshwater discharge has a considerable impact on the oceanographic conditions of the domain. The objective of this study is to provide an operational predictive map based on the navigational and survey capability of the autonomous platform for ocean mapping. Parameters such as sound speed variability, tidal current magnitude, and tidal water depth are combined to form an environmental hydrographic suitability prediction. A three-dimensional baroclinic ocean model is used with two different surface forcing conditions in the Bay of Fundy and Minas Basin to predict the variability in the hydrography suitability map based on the underlying ocean model. While the Bay of Fundy and Minas Basin are macro tidal environments, the results show that model surface forcing resolution impacts the accuracy of the survey suitability map, which guides its implementation in other regions.