



Digital Twins for Ocean Robots

DTOR is a framework to access and simulate the global fleet of ocean observing devices (or ocean robots) that monitor climate change. It brings these observations to Julia and let's us pair ocean robots with virtual counterparts (or twins). Digital twins provide a bridge to predictive models that enables machine learning. In turn, simulating observations in a virtual environment can help evaluate observational strategies a priori, during deployment, or afterwards. In this talk, I will introduce the model hierarchy which integrates fast climate model emulators, ECCO reanalysis products, high-resolution MITgcm simulations, large eddy simulations, a suite of Lagrangian tools, and marine ecosystem models. Examples will be provided that focus on 1. emulating observations with DTOR to enable machine learning, 2. predicting the performance of our global climate monitoring system, and 3. providing a context to regional field campaigns that target mixing and biology using DTOR. Benefits of using the Julia language as DTOR's core language will be highlighted.

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