

A MODEL COMMUNITY

This issue is almost entirely dedicated to models and modeling, a set of topics marked by dramatic change in the last couple of decades. There was a time in the history of oceanography when modelers were considered something of a caste unto themselves, comprised of the cyber-centrics with a propensity for seasickness. Back in the 1970s and early 1980s oceanographic models were viewed as a quirky means of extrapolating sparse data into meaningful hypotheses. Most models were cranked out on paper-tape-consuming prehistoric machines like the old PDP-11s. The output—usually an array of digits and number patterns requiring secondary and tertiary interpretations before their significance could be gleaned—although archaic, showed signs of the potential for modeling in terms of planning experiments, or assessing coarse oceanographic features (e.g. basin-scale gyres, and interannual trends). By the late 1980s a transformation began occurring. Model output was enhanced by more sophisticated graphical user interfaces, making the forecasting and nowcasting effectiveness of models even more evident. New applications of non-linear dynamics added levels of sophistication to the models, so that they were applicable to a much broader (and higher resolution) set of scales in space and time. And computational power meant that machines could handle parallel processing at rates of trillions or even quadrillions of operations per second. This meant that those historically 'intractable' oceanographic problems (e.g. air-sea coupling, turbulence, climate scale phenomena) might be addressable with the next generation of models. Within the last decade we've started down some new paths. Model output is referred to as 'data', inseparable from, integrated with, and assimilated into those parameters that are sensed and observed. More significant, perhaps, is the fact that models are now a tool of choice in a range of operational applications. Most First World navies use ocean models to support safe transits of their fleets. The reinsurance industry relies heavily on deterministic models to minimize the risk of their geographically distributed investments. And now we are seeing a growing number of resource managers who are integrating modeling efforts with their traditional monitoring programs, to ensure sustainability of a wide array of living and non-living marine resources.

As you read the articles in this issue keep thinking about where these capabilities are going, and where we will be in ten years. What will be the role of the seagoing oceanographic community, with respect to models? How will we—in the oceanographic community—take best advantage of the continued rapid growth in the information technology? What new theoretical concepts will we be best able to exploit with our models? In the meantime, you can probably throw away those old rolls of paper tape!



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