OBSERVING THE OCEAN: WHY AND HOW?

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The land, the atmosphere and the ocean constitute a single interacting Earth system. Changes in any one of the three parts will influence the other two parts. We know that the Earth system is undergoing rapid climate change, but we do not know what the end result will be for the land, the atmosphere or for the ocean. We know that global temperature rise is a consequence of increased flux of carbon dioxide to the atmosphere. We know that the ocean plays an important role in the planetary carbon cycle, but we cannot be sure how this role will be modified under global change: the underlying equations are complex and non-linear. We rely on the ocean for food and transport; it has a profound effect on our weather (as well as climate); hundreds of millions of people live on the coastal fringe of the ocean rendering it vulnerable to pollution; tourism in the coastal fringe is a major industry; moving of heavy goods by sea is at risk from storms; changing distribution of sea ice opens new possibilities for shipping routes; exploration for and extraction of non-renewable resources from the sea bed are also vulnerable to wind and waves; marine fisheries are at the mercy of ecosystem regime shifts driven by climate change; there is general agreement that stewardship of marine resources be placed in the context of ecosystem-based management. For so many reasons, society has a strong interest in knowing the present state of the ocean and how it might adjust under global change. In addressing this issue, our greatest resource is a suite of ocean observations, sustained over time, that would allow us to describe and understand the ocean as it is now, to detect any significant changes that occur, and to help predict the future states of the ocean. We seek a globally-complete and continuous observing system, at the same time cost-effective, informative and adequate to meet the societal needs that motivate it. The Partnership for the Observation of the Global Oceans is committed to this goal. In working to achieve it, a surprisingly wide array of methods will be applied, and a rich variety of scientific problems will be encountered.