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TITLE: Collaborative Science to Enhance Coastal Resilience and Adaptation

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ABSTRACT:

Impacts from natural and anthropogenic coastal hazards are substantial and increasing significantly with climate change. Coasts and coastal communities are increasingly at risk. In addition to short-term events, long-term changes, including rising sea levels, increasing storm intensity and consequent severe compound flooding events are degrading coastal ecosystems and threatening coastal dwellers. Human impacts exacerbate degradation. Consequently, people living near the coast require environmental intelligence and reliable short-term and long-term predictions in order to anticipate, prepare, adapt, resist, and recover from hazards. Risk-informed decision making is crucial but for the resulting information to be actionable, it must be effectively and promptly communicated to planners, decision makers and emergency managers in readily understood terms and formats. The information, critical to forecasts of extreme weather and flooding, as well as long-term projections of future risks, must involve synergistic interplay between observations and models. Essential information includes winds, sea surface temperatures, water level fluctuations, currents and waves as well as ecosystem and socioeconomic factors. Programs that begin with stakeholder input and integrate engineering, environmental, and community resilience have the greatest probability of success in planning for potential coastal changes on a long-term basis. Observations and projections of human and physical factors that affect community vulnerability are essential to evaluate pre- and post-event conditions, to update baselines, and to establish objective model validations. In contrast to most deep-sea phenomena, coastal vulnerabilities are locally and regionally specific and prioritization of the most important observational data and model predictions must rely heavily on input from local and regional communities and decision makers. Innovative technologies and nature-based solutions are already helping to reduce vulnerability from coastal hazards in some localities but more focus on local circumstances, as opposed to global solutions, is needed. Agile and spatially distributed response capabilities will reduce negative impacts and assist operational organizations prevent long-term community-wide disasters. This white paper outlines the rationale and summarizes several approaches, from Australia, France and the US, that link models and observations and communicate results to those who need them most in order to enhance coastal resilience.

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