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Community White Paper Proposal

Ocean Variability evaluated from an Ensemble of Ocean Syntheses

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Description:

There are emerging links between ocean variability and socio-economic impacts, including droughts and hurricane frequencies. Analyses of historical and ongoing global ocean analyses are essential both for understanding ocean variability and initializing climate models for predicting climate variability on seasonal to decadal timescales. There are several approaches for producing ocean analyses. One with large potential for future ocean services is that of an ocean synthesis, in which all available ocean observations are combined with the dynamics embedded in an ocean circulation model to obtain estimates of the changing ocean that are more accurate than either data or model alone can provide.

Several global ocean syntheses exist today (including purely statistical as well as model based approaches) and can be used to investigate key scientific questions, such as changes in sea level, changes in heat content or changes in transports. This paper will use all available ocean syntheses to investigate ocean variability as seen from all those different products, focusing on key scientific issues, including changes in sea level, heat content and heat and freshwater transports. Similarities and differences between the analyses will be highlighted. Furthermore, the ensemble spread and the deviation of individual solutions from observations will be used to assess uncertainties in individual solutions.

Implications of the existing solutions for climate research and applications will be discussed as well as advances required to improve ocean synthesis results for ocean services evolving over the next decade.