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# Estimating the predictability of an oceanic time series using linear and nonlinear methods

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## Abstract

This study establishes a series of tests to examine the relative utility of nonlinear time series analysis for oceanic data. The performance of linear autoregressive models and nonlinear delay coordinate embedding methods are compared for three numerical and two observational data sets. The two observational data sets are (1) an hourly near-bottom pressure time series from the South Atlantic Bight and (2) an hourly current-meter time series from the Middle Atlantic Bight (MAB). The nonlinear methods give significantly better predictions than the linear methods when the underlying dynamics have low dimensionality. When the dimensionality is high, the utility of nonlinear methods is limited by the length and quality of the time series. On the application side we mainly focus on the MAB data set. We find that the slope velocities are much less predictable than shelf velocities. Predictability on the slope after several hours is no better than the statistical mean. On the other hand, significant predictability of shelf velocities can be obtained for up to at least 12 hours.

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Keywords: predictability; delay coordinate embedding; shelf break.

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