
Probabilistic Study of the subtropical North Atlantic variability

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Abstract

The Gulf of Mexico (GoM) is a basin with strong turbulent activity mainly associated with the Loop current and the eddies that separates from it. Some authors attribute the variability in the basin to the atmospheric forcing, but others affirm that the system is mainly chaotic. Determining whether the variability is intrinsic or forced is an important question for societal and economic reasons in this region, and is relevant for ocean forecasting. Our objective is to understand the interplay between the intrinsic variability in the GoM and the atmospheric forcing, using a 50-member ensemble simulation. The daily SSH 1997-2012 variability is analyzed probabilistically using ensemble PDFs and entropy-based metrics. We identify regions where the variability is mainly intrinsic, distinguishing between short timescales (weekly to monthly) and longer ones (seasonal cycle to interannual). The temporal modulation of the ensemble entropy in the ocean allow us to identify regions where the oceanic chaos is impacted by the atmospheric variability, such as hurricanes near to the coast, or slower anomalies in the open ocean.

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