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Machine learning model of quasi-geostrophic dynamics KEVIN YAO, Cooper Union, ERIC FORGOSTON, Montclair State University, PHILIP YECKO, Cooper Union — We extend the machine learning technique of reservoir computing (RC) to two elementary fluid models of ocean circulation: the well-known double gyre stream function model with time-variable forcing and a one layer quasi-geostrophic (QG) basin model. In both cases, the models are used to generate flow data that sample a range of possible dynamical behavior in such flows for particular flow parameters. In the case of QG, a PDE system with 3 physically relevant dimensionless parameters is solved, including Munk and Stommel type solutions. We present results on the effectiveness of the RC approach in capturing the characteristics of these systems and assess the accuracy and usefulness of the RC models by comparisons to descriptive models, including FTLE and POD, and the role of both physical and numerical parameters on these results.

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