Shevchenko, I. V.; **Berloff, P. S.**; **Guerrero-López, D.**; **Roman, J. E.**
On low-frequency variability of the midlatitude ocean gyres. (English) Zbl 1359.86014
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Summary: This paper studies the large-scale low-frequency variability of the wind-driven midlatitude ocean gyres and their western boundary currents, such as the Gulf Stream or Kuroshio, simulated with the eddy-resolving quasi-geostrophic model. We applied empirical orthogonal functions analysis to turbulent flow solutions and statistically extracted robust and significant large-scale decadal variability modes concentrated around the eastward jet extension of the western boundary currents. In order to interpret these statistical modes dynamically, we linearized the governing quasi-geostrophic equations around the time-mean circulation and solved for the corresponding full set of linear eigenmodes with their eigenfrequencies. We then projected the extracted decadal variability on the eigenmodes and found that this variability is a multimodal coherent pattern phenomenon rather than a single mode or a combination of several modes as in the flow regimes preceding developed turbulence.

MSC:

86A05 Hydrology, hydrography, oceanography

Keywords:

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