

Abstract Submitted
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Metriplectic simulated annealing for quasigeostrophic flow¹ P.J. MORRISON, The University of Texas at Austin, G.R. FLIERL, MIT — Metriplectic dynamics [1,2] is a general form for dynamical systems that embodies the first and second laws of thermodynamics, energy conservation and entropy production. The formalism provides an H -theorem for relaxation to nontrivial equilibrium states. Upon choosing enstrophy as entropy and potential vorticity of the form $q = \nabla^2\psi + T(x)$, recent results of computations, akin to those of [3], will be described for various topography functions $T(x)$, including ridge ($T = \exp(-x^2/2)$) and random functions. Interpretation of the results, in particular their sensitivity to the chosen entropy function will be discussed.

[1] P.J. Morrison, *Physica D* **18**, 410 (1986).

[2] A.M. Bloch, P.J. Morrison, and T.S. Ratiu, in *Recent Trends in Dynamical Systems* **35**, 371 (2013).

[3] G.R. Flierl and P.J. Morrison, *Physica D* **240**, 212 (2011).

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