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An estimate of Lorenz energy cycle for the world ocean based on the 1/10 degree STORM simulation

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The Lorenz energy cycle (LEC) provides a concise description of the general circulation and the related meso-scale eddies. So far it has not been possible to derive the complete LEC for the ocean. Apart from the fact that an exact definition of available potential energy is difficult to obtain so that approximations are required, an estimate of global LEC is prohibited due to lack of data, not only from observations but also from numerical simulations, in particular those that describe second moment eddy statistics on a global basis. Within the German consortium effort STORM, a simulation with the Max-Planck Institute Ocean Model (MPIOM) at 1/10 degree horizontal resolution forced with 6-hourly NCEP/NCAR reanalysis is carried out. Different from other high-resolution efforts, second moment statistics are accumulated and stored during the STORM simulation. This allowsan estimate of Lorenz energy cycle for the global ocean, including the global conversion rate between kinetic and available potential energy.