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Organization: Kyushu University

Category: Interdisciplinary Working Groups

Paper ID: 57-IWG-A689

Title: Statistics of a vortex street formed by instability of a jet

Abstract:

Session Number: IWG6 (Entropy Production in BioGeophysical Syste Kuroshio current after leaving the coast of Japan, which is called Kurc Extension, usually meanders strongly and generates many eddies on sides. Similar vortices are also found in the atmosphere: in the lee sic mountain, a weak wind region is made and a vortex street called Karr vortex is often generated. In this way, jet or weak flow region often meanders because of its instability and forms a vortex street, in the atmosphere and oceans. To investigate the general features of the for process and statistics of vortex streets formed by the instability of jet simple model described by barotropic quasi-geostrophic equation is numerically time-integrated, and the vorticity distribution in the matu steady state is investigated. To describe this steady state, the statistic for vorticity, which was proposed by Robert and Sommeria (1991), ca applied. According to their theory, the final steady state is determinec simple principle familiar in statistical physics: in the final equibrium st `mixing entropy' must be maximum under the conservation restrictio several quantities such as energy, momentum and so on. They consid situations where the initial state consists of uniform vorticity `patches finite kinds of vorticity values, and derived the relation which the vort and the stream-function must satisfy. As an example of the applicatio theory, Sommeria et al. (1991) calculated the simplest situation consi two kinds of uniform vorticity patches, which describes a shear flow, a showed the validity of their theory. A jet current situation demands at three kinds of uniform vorticity patches. This situation was investigate Thess and Sommeria (1994) and they showed that this `maximum m entropy principle' is also applicable for a jet situation. The vortex pair be separated to the borders of the region, and it is confirmed by the numerical calculation. The numerical calculation in the study here also situation whose initial state is a `jet'. However, the vortex pair formed instability remains near the original jet current with a moderate distar separated to the borders of the region. The scatter plotting of stream function vs vorticity in this calculation shows that the relation betwee two quantities still obey the relation derived by Thess and Sommeria Nevertheless, the relation is not described by only one set of paramet it separates to two distinct `branches'. One of these two branches correspond to the region near the initial jet where the mixing fully occ and the other to the both sides of the jet which the mixing does not r