

论文

雅可比椭圆函数在大气和海洋动力学中的应用: 二维非线性Rossby波研究

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摘要 提出了扩展雅可比椭圆函数方法, 来求得Petviashvili方程的精确解析解. Petviashvili方程被视为正压准地转位涡度方程的非地转扩展, 应用该方法可以得到很多二维非线性Rossby波的周期波解, 在取极限情况下, 也可以得到二维Rossby孤立子解.

关键词 [Petviashvili方程](#) [雅可比椭圆函数](#) [Rossby波](#)

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Application of Jacobi elliptic functions in the atmospheric and oceanic dynamics: studies on two dimensional nonlinear Rossby waves

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Abstract The two dimensional (2_D) nonlinear Rossby waves described by the Petviashvili equation, which has been invoked as an ageostrophic extension of the barotropic quasi-geostrophic potential vorticity equation, can be studied by the exact periodic wave solutions for the Petviashvili equation. The exact analytical periodic wave solutions to the Petviashvili equation are obtained by using our extended generalization of Jacobi elliptic function expansion method. It is shown that more periodic wave 2_D Rossby solutions can be obtained by this method. In the limit case, the 2_D Rossby soliton solutions can also be obtained.

Key words [Petviashvili equation](#); [Jacobi elliptic function](#); [Rossby wave](#)

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