

## Periodic Structure of Equatorial Envelope Rossby Wave Under Influence of Diabatic Heating

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**Abstract:** A simple shallow-water model with influence of diabatic heating on a  $\beta$ -plane is applied to investigate the nonlinear equatorial Rossby waves in a shear flow. By the asymptotic method of multiple scales, the cubic nonlinear Schrodinger (NLS for short) equation with an external heating source is derived for large amplitude equatorial envelope Rossby wave in a shear flow. And then various periodic structures for these equatorial envelope Rossby waves are obtained with the help of Jacobi elliptic functions and elliptic equation. It is shown that phase-locked diabatic heating plays an important role in periodic structures of rational form.

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**Key words:** nonlinear Schrodinger equation, periodic structure, diabatic heating, Jacobi elliptic function

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