Trabalho Final de Conclusão de Curso
PGMET-2023

A partir das equações governantes do estado média da atmosfera.

$$\frac{\partial U}{\partial t}+\frac{1}{a\cos^2\theta}\left(U\frac{\partial U}{\partial \lambda}+V\cos\theta\frac{\partial U}{\partial \theta}\right)+\dot{\eta}\frac{\partial U}{\partial \eta}-fV+\frac{1}{a}\left(\frac{\partial \Phi}{\partial \lambda}+R_dT_v\frac{\partial \ln p}{\partial \lambda}\right)=F_u \quad (1)$$

$$\frac{\partial V}{\partial t}+\frac{1}{a\cos^2\theta}\left(U\frac{\partial V}{\partial \lambda}+V\cos\theta\frac{\partial V}{\partial \theta}\right)+\dot{\eta}\frac{\partial V}{\partial \eta}+fU+\frac{\cos\theta}{a}\left(\frac{\partial \Phi}{\partial \theta}+R_dT_v\frac{\partial \ln p}{\partial \theta}\right)+\frac{\sin\theta}{a\cos^2\theta}(U^2+V^2)=F_v \quad (2)$$

$$\frac{\partial T}{\partial t}+\frac{1}{a\cos^2\theta}\left(U\frac{\partial T}{\partial \lambda}+V\cos\theta\frac{\partial T}{\partial \theta}\right)+\dot{\eta}\frac{\partial T}{\partial \eta}-\frac{\kappa T_v\omega}{(1+(\delta-1)q)p}=F_T \quad (3)$$

$$\frac{\partial q}{\partial t}+\frac{1}{a\cos^2\theta}\left(U\frac{\partial q}{\partial \lambda}+V\cos\theta\frac{\partial q}{\partial \theta}\right)+\dot{\eta}\frac{\partial q}{\partial \eta}=F_q \quad (4)$$

$$\frac{\partial \ln p_s}{\partial t}+\frac{1}{p_s}\int_0^1 \nabla\cdot\left(\mathrm{v}_H\frac{\partial p}{\partial \eta}\right)d\eta=0 \quad (5)$$

$$\frac{\partial \phi}{\partial \eta}+\frac{R_dT_v}{p}\frac{\partial p}{\partial \eta}=0 \quad (6)$$

$\theta = latitude$
$\lambda = Longitude$
$U = Velocidade\ Zonal$

A partir das equações governantes do estado média da atmosfera.

Implemente utilizando o método de RangeKutta de 4 orden os cálculos de cada um dos termos das equações

$$\frac{\partial U}{\partial t}+\frac{1}{a\cos^2\theta}\left(U\frac{\partial U}{\partial \lambda}+V\cos\theta\frac{\partial U}{\partial \theta}\right)+\dot{\eta}\frac{\partial U}{\partial \eta}-fV+\frac{1}{a}\left(\frac{\partial \Phi}{\partial \lambda}+R_dT_v\frac{\partial \ln p}{\partial \lambda}\right)=F_u \quad (1)$$

Aceleração do momentum zonal

Advecção Horizontal