The Comparision of Semi-Lagrangian Method to Positive Definite Schemes

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ABSTRACT

Using Guassian cone 、cosine cone and slotted cyclinder three different passive bodies ,we compared semi-Lagrangian method 、the Smolarkiewicz method and the Hsu-Arakawa method. Research results shown the Δt choice of semi-Lagrangian method are limited by accuracy and the order of wind shear on trajectory, not limited by stability. The larger Δt of semi-Lagrangian method the more phase errors, but the smaller Δt need the more interpolation times it reduces accuracy. So for the accuracy, use semi-Lagrangian method it need choice suitably Δt. The maintenance of amplitudes to semi-Lagrangian method is better than the Smolarkiewicz method 、the Hsu-Arakawa method and FD4. But to the advection of slotted cyclinder, the overshoot and undershoot to semi-Lagrangion method are more than 10%.

Key words : Semi-Lagrangian scheme, Positive definite scheme, Slotted cylinder.