

Where in TCs do SVs appear?

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Previous Studies

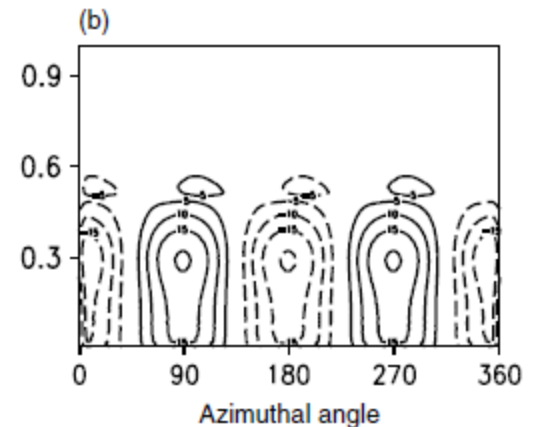
Nolan and Farrell (1999):

SVs appear in the region where the radial gradient of tangential wind is max. They added that the SV region becomes a little away from the TC center when considering radial inflows.

$$\frac{dE}{dt} = - \int_0^\infty \left[\overline{u^2} \frac{\partial U}{\partial r} + \overline{v^2} \frac{U}{r} + \overline{uv} \left(\frac{\partial V}{\partial r} - \frac{V}{r} \right) \right] 2\pi r dr, \quad (7.2)$$

Peng et al. (2008):

SVs appear in the region where the radial gradient of tangential wind is max.



What I think

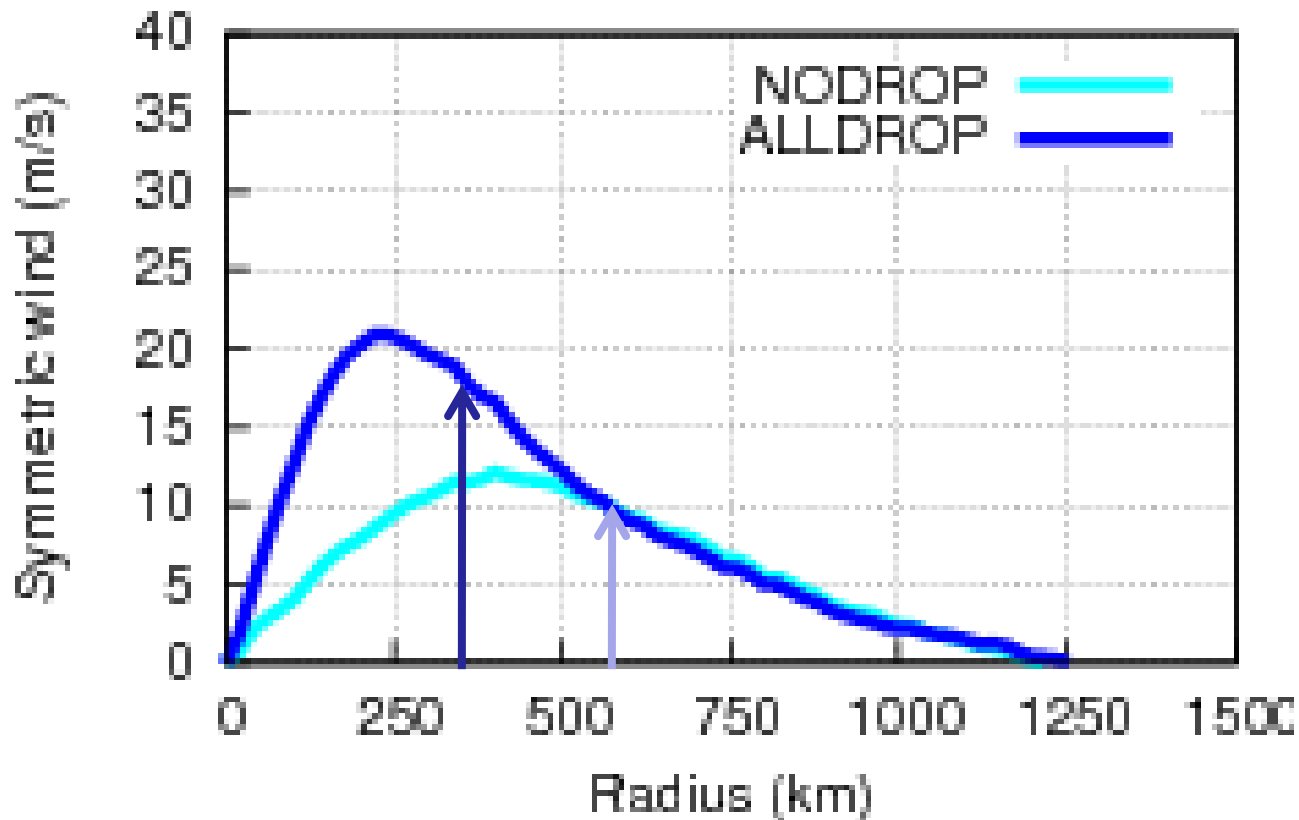
I think that the reason why SVs of ECMWF, NOGAPS and JMA appear about 500km away from TC center is related to the horizontal resolution of tangent-linear model.

It could happen that the region where the radial gradient of tangential wind is max is 500km away from the center in the horizontally low resolution model such as T42, T79, T63 ($\sim 200\text{km}$)

Given the effect of inflows on the energy growth, the SV region might be little away from the area where the radial gradient of tangential wind is max.

Example

2008.09.10. 00UTC FT-00



Both are GFS
Blue is T319
Water is T159

Though the difference of RMS (radial max shear) also comes from the observations used in ALLDROP, the resolution could change the location of RMS significantly.

Suggestion

It might be interesting to investigate the correlation between NOGAPS SV regions and the regions of RSM and inflows in the initial conditions for SV calculations, whose resolution is T79.