The development of Semi-Lagrangian Semi-Implicit global forecast model of the Taiwan Central Weather Bureau

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The current Taiwan Central Weather Bureau operational Global Forecast System (CWBGFS) is T319L40 spectral model in which the horizontal resolution is about 37 km and the vertical 40 layers in sigma coordinate. From 2012 to 2014, the Central Weather Bureau installs a new *Peta-Scale high performance computer*, the Fujistu PFX10. Based on this new high performance computer, the CWBGFS is going to increase the horizontal and vertical resolution from current T319L40 to T511L60. Moreover, the vertical coordinate will use sigma-pressure hybrid coordinate instead of sigma coordinate, and the model top layer will be raised from 1 hPa to 0.1 hPa.

For the accommodation the computation of the increasing resolution, we are developing the *Semi-Lagrangian Semi-Implicit (SLSI) Scheme* in CWBGFS. The characteristics of this SLSI scheme are: (1) the virtual temperature is conserved in thermodynamic equation; (2) using the cascade method (Purser and Leslie, 1992) as the interpolation scheme in variables. The idealized test, the solid body rotation experiment, shows that the shape and amplitude of the mass field passing the North/South pole will be kept well.

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