Small-scale Numerical Weather Forecast Model

Yan Liu *

September 23, 2022

*email:yliu.yb@qq.com

config module

&time control
start date time, end date time, run hours, time interval(unit:seconds)
&grid control
center_point_lon, center_point_lat, center_bottom_height(unit:m), x-direction grid num, y-direction grid num, z-direction grid num, x, y, z interval distance(unit:m)

input data module

&common data
surface pressure, height
&initial data variable
density, temperature, x-component velocity, y-component velocity, vertical velocity, specific humidity. (3 dimension)
&force data variable
density, temperature, x-component velocity, y-component velocity, vertical velocity, and specific humidity at west, east, south, north, bottom and top boundary, separately.

dynamic solver module

r_old = r_initial
time loop:
begin t
  explicit R-K loop:
  begin R-K
    r*=r_old-FVM(r_old, boundary_t) for R-K1
    r**=r_old-FVM(r*, boundary_t) for R-K2
    r_new=r_old-FVM(r**, boundary_t) for R-K3
  end R-k
  output(r_new)
  r_old = r_new
end t

Fortran module

customType.f90