(a) Original Scheme

WRF-Chem Main Program
Call vertical mixing in WRF-Chem
  WRF Main Program
  Get ACM2 scheme variables from WRF
  for i: *i*_start to *i*_end
    for k: *k*_start to *k*_end
      compute Richardson number (*Ri*)
      compute wind shear
      compute mixing length scale
      define Prandtl number (Pr = 0.8)
      define the minimum turbulent diffusion coefficient (K_{min}=0.01)
      if $Ri \geq 0$
        compute stability function of heat ($f_h(Ri)$)
        compute stability function of momentum $f_m(Ri)$ by Pr and $f_h(Ri)$
        compute turbulent diffusion coefficient of heat (K_h) and momentum (K_m)
      else $Ri<0$
        compute K_h
        compute K_m by Pr
      end
    end
  end
  Get K_h from WRF
Input K_h into vertical mixing in WRF-Chem (Dry deposition remains unchanged)
Continue vertical mixing

(b) New Scheme

WRF-Chem Main Program
Call vertical mixing in WRF-Chem
  WRF Main Program
  Get ACM2 scheme variables from WRF
  Add relevant variables of particles in ACM2 scheme
  for i: *i*_start to *i*_end
    for k: *k*_start to *k*_end
      compute Richardson number (*Ri*)
      compute wind shear
      compute mixing length scale
      define Prandtl number (Pr = 0.8)
      define the minimum turbulent diffusion coefficient (K_{min}=0.01)
      if $Ri \geq 0$
        compute stability function of heat ($f_h(Ri)$)
        compute stability function of momentum $f_m(Ri)$ by Pr and $f_h(Ri)$
        compute stability function of particles $f_c(Ri)$
        compute turbulent diffusion coefficient of heat (K_h), momentum (K_m) and particles (K_c)
      else $Ri<0$
        compute K_h
        compute K_m by Pr
        $K_h=K_c$
      end
    end
  end
  Get K_c from WRF
Input K_c into vertical mixing in WRF-Chem (Dry deposition remains unchanged)
Continue vertical mixing