

subroutine compute\_caldyn\_horiz(u,rhodz,qu,theta,pk,geopot, hflux,convm, dtheta\_rhodz, du)

section 1

l = ll\_begin, ll\_end

(Compute mass and theta fluxes)

(caldyn\_conserv==energy)

test\_message(req\_qu)

ij=ij\_begin\_ext,ij\_end\_ext

hflux(ij+u\_right,l)  
=0.5\*(rhodz(ij,l)+rhodz(ij+t\_right,l))\*u(ij+u\_right,l)\*le(ij+u\_right)

hflux(ij+u\_lup,l)  
=0.5\*(rhodz(ij,l)+rhodz(ij+t\_lup,l))\*u(ij+u\_lup,l)\*le(ij+u\_lup)

hflux(ij+u\_ldown,l)  
=0.5\*(rhodz(ij,l)+rhodz(ij+t\_ldown,l))\*u(ij+u\_ldown,l)\*le(ij+u\_ldown)

Ftheta(ij+u\_right,l)  
=0.5\*(theta(ij,l)+theta(ij+t\_right,l))\*hflux(ij+u\_right,l)

Ftheta(ij+u\_lup,l)  
=0.5\*(theta(ij,l)+theta(ij+t\_lup,l))\*hflux(ij+u\_lup,l)

Ftheta(ij+u\_ldown,l)  
=0.5\*(theta(ij,l)+theta(ij+t\_ldown,l))\*hflux(ij+u\_ldown,l)

(compute horizontal divergence of fluxes)

ij=ij\_begin,ij\_end

(convm = -div(mass flux), sign convention as in Ringler et al. 2012, eq. 21)

convm(ij,l)= -1./Ai(ij)\*(ne\_right\*hflux(ij+u\_right,l) + &  
ne\_rup\*hflux(ij+u\_rup,l) + &  
ne\_lup\*hflux(ij+u\_lup,l) + &  
ne\_left\*hflux(ij+u\_left,l) + &  
ne\_ldown\*hflux(ij+u\_ldown,l) + &  
ne\_rdown\*hflux(ij+u\_rdown,l))

(signe ? attention d (rho theta dz))

(dtheta\_rhodz = -div(flux.theta))

dtheta\_rhodz(ij,l)=-1./Ai(ij)\*(ne\_right\*Ftheta(ij+u\_right,l) + &  
ne\_rup\*Ftheta(ij+u\_rup,l) + &  
ne\_lup\*Ftheta(ij+u\_lup,l) + &  
ne\_left\*Ftheta(ij+u\_left,l) + &  
ne\_ldown\*Ftheta(ij+u\_ldown,l) + &  
ne\_rdown\*Ftheta(ij+u\_rdown,l))

cont. to section 2