Error cascade in off-line modeling of atmospheric transport

Comparing $^{22}$Rn-$^{210}$Pb-$^7$Be simulations on-line (GEOS-5) and off-line (GEOS-Chem) in a wide range of configurations and from $360^\circ$ to $2^\circ 	imes 2.5^\circ$ resolution

- Significant loss of vertical transport in off-line model from missing transient grid-resolved convection and grid coarsening; fix by re-diagnosing convection off-line
- Off-line averaging of mixing depths must give more weight to deeper values to properly represent boundary layer mixing