



Dependence of tracer injection on the horizontal resolution in a numerical model

Y.-G. Park

Korea Ocean Research & Development Institute, Climate Change and Coastal Disaster Research Division, ANSAN, Republic Of Korea (ypark@kordi.re.kr)

Previous studies show that models could differ substantially in high latitude where air-sea heat and gas exchange occur actively. As we increase the horizontal resolution of the models, the difference becomes smaller since unrealistic convection or convective adjustment is weakened. To better understand the effects of horizontal resolution on convection and subsequent tracer injection, we conducted a suite of idealized numerical modeling experiments in which the horizontal resolution is varied from 2 degrees to 1/4 degree. As the horizontal resolution increases, the stratification of high latitude area becomes higher especially over the north eastern corner. The convection that mainly occurs over the north eastern corner is then suppressed so that convection occurs away from the wall. Interestingly the amount of tracer injected into the interior is reduced substantially while the area of convection stays about the same. In lower resolution tracer is transported to the bottom without significant mixing and the tracer concentration becomes minimum in the middle depth. In higher resolution the tracer is gradually mixed down so that the concentration monotonically decreases with depth. These suggest that the strength of overturning and tracer injection is not tightly linked, and to simulate tracer better we need to resolve convective mixing properly.