Appendix A.2 – Random walk current velocity variations

The particle transport is driven by input current fields. The accuracy of the particle trajectories is therefore dependent on the quality of these fields. Horizontal diffusion at different buoyancy levels (salinity classes) was taken proportional to the fluctuation velocities. These are based on the standard deviations of mean currents according to a specific drift period (release start of particles: 20th of April 1993), obtained from the hydrodynamic model (Fig. A.2.1). The latter release event is representative for periods of high egg survival. The fluctuating velocity components expressed by the above mentioned standard deviations were added randomly by gradually apportioning 10%-divisions to the drift velocities of individual particles.

Fig. A.2.1: Vertical means and standard deviations of current velocity profile experienced by cod eggs released at the 20th of April 1993. Vertical resolution is given by different salinity classes (buoyancy levels). Proportions of random walk current velocity variability have been equally added by 10% levels.

Compared to the reference run (particle transport without any addition of fluctuating velocity components), the relative impact of the random walk variations on cod egg survival is generally very low. The egg survival was still at levels between 86-87% (Fig. A.2.2.a) which is less than 1% change compared to the reference run (Fig. A.2.2.b).



Fig. A.2.2: Relative impact of random walk current velocity variability on a) cod egg survival at the end of drift period (released at 20th of April 1993) and b) change in cod egg survival proportion relative to the reference run.

Furthermore, the mean differences in the final end positions of the drifting particles (random walk runs minus reference run) are dependent on the maximum proportion of added random walk variability, but were not larger than 16 km (Fig, A.2.3). 

Fig. A.2.3: Mean distances of final particle distributions (random walk runs minus reference run)