

Figure 1 displays three density plots (A, B, C) showing the frequency distribution of Root Mean Square Error (RMSE) for selectivity, comparing time-invariant (grey) and time-varying (red) selectivity models. The x-axis represents the Root mean square error (RMSE) from 0.0 to 1.0, and the y-axis represents Frequency.

A USA longline index for 1993–2016

The density plot for the USA shows the frequency distribution of RMSE. The time-invariant model (grey) has a peak frequency of approximately 7.5 at an RMSE of about 0.45. The time-varying model (red) has a peak frequency of approximately 7.0 at an RMSE of about 0.45. Both models show a sharp peak around 0.45 and a long tail extending towards 1.0. Vertical dashed lines indicate the mean RMSE for each model, with the time-varying model (red) having a slightly higher mean RMSE than the time-invariant model (grey).

B Japan longline index for 1993–2016

The density plot for Japan shows the frequency distribution of RMSE. The time-invariant model (grey) has a peak frequency of approximately 2.8 at an RMSE of about 0.8. The time-varying model (red) has a peak frequency of approximately 3.2 at an RMSE of about 0.8. Both models show a broad distribution centered around 0.8, with a long tail extending towards 1.0. Vertical dashed lines indicate the mean RMSE for each model, with the time-varying model (red) having a slightly higher mean RMSE than the time-invariant model (grey).

C Taiwan longline index for 2000–2016

The density plot for Taiwan shows the frequency distribution of RMSE. The time-invariant model (grey) has a peak frequency of approximately 4.0 at an RMSE of about 0.6. The time-varying model (red) has a peak frequency of approximately 3.5 at an RMSE of about 0.6. Both models show a broad distribution centered around 0.6, with a long tail extending towards 1.0. Vertical dashed lines indicate the mean RMSE for each model, with the time-varying model (red) having a slightly higher mean RMSE than the time-invariant model (grey).

The comparison of the root-mean-square errors (RMSE) estimated from the ASPM-R-FIX models which included recruitment indicated by the recruitment index from the Sea of Japan (vertical dash lines) with associated RMSEs estimated from the 500 ASPM-R-FIX models with these recruitment deviations fixed at random samples (distributions) for all recruitment levels for each index. (1) the fleets' selectivities were constant over time, and (2) the fleets' selectivities varied over time.