A vertically two-dimensional internal wave field is forced equally at the near-inertial frequency and the semidiurnal tidal frequency both at the lowest vertical wavenumber. These correspond to wind forcing and internal tide forcing, the main energy sources for the internal wave field. After 5 years of spin-up, a quasi-stationary internal wave field with characteristics of the Garrett-Munk-like spectrum is successfully reproduced. Furthermore, we carry out additional experiments by changing the strength of the semidiurnal tidal forcing relative to the near-inertial forcing. It is demonstrated that the Garrett-Munk-like spectrum is created and maintained only when energy is supplied both from the near-inertial forcing and the semidiurnal tidal forcing. So long as both energy sources are available, nonlinear interactions among internal waves occur such that the resulting internal wave spectrum becomes close to the Garrett-Munk-like spectrum irrespective of the ratio of the near-inertial forcing to the semidiurnal tidal forcing.