Figure 9. Streamwise vorticity isosurface plots at: $t = 40\ s$ (top left), $t = 80\ s$ (top right), $t = 120\ s$ (bottom left), and $t = 160\ s$ (bottom right). Forcing of the form $d_x = d_y \equiv 0$, $d_z = d_{z0}(y)\delta(x, z, t)$ is introduced, where $d_{z0}(y)$ is shown in figure 2. Yellow color represents regions of high vorticity, and blue color represents regions of low vorticity. Isosurfaces are taken at $\pm 10^{-2}$.

Figure 10. Pseudo-color plots of the streamwise velocity (left) and vorticity (right) perturbation profiles in a cross section of the channel at $x \approx 56$ and $t = 160\ s$. Forcing of the form $d_x = d_y \equiv 0$, $d_z = d_{z0}(y)\delta(x, z, t)$ is introduced, where $d_{z0}(y)$ is shown in figure 2.

structure, the streamwise variations dominate the perturbation development. From the left plot in figure 6, we recall that the peaks of the $H_2$-norm in the presence of an $x$-direction force take place at the locations where both spatial wave-numbers are of $O(1)$. This fact may serve as an explanation for fairly rich streamwise behavior when linearized dynamics are forced by $d_z$.

All results shown in this subsection illustrate the ability of the linearized model subject to external forces to