Contribution ID: **8** Type: **Short Talk**

Direct numerical simulations of turbulence produced by wave attractors in stratified and/or rotating systems

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The propagation of internal waves in continuously stratified or rotating fluids differs radically from those of more traditional wave flows. It is worth mentioning that the dispersion relation connects the frequency only with the direction relative to gravity or rotation and does not determine the wavelength. Additionally, wave packets propagate perpendicular to the phase velocity. The billiard-like behavior of such wave packets in closed systems results in attracting trajectories. On these trajectories, the wave amplitude increases significantly, making them the origins of the onset of instabilities and turbulence. For such trajectories in the case of internal waves, boundaries inclined relative to the vertical are necessary.
Previously, we investigated the onset of initial instabilities and the development of turbulence against the background of wave attractors when the vertical and horizontal scales of the flow are approximately equal.
This model constitutes one important case of natural flows, the other case is the large aspect ratio domains, where the horizontal scale is much larger than the vertical, and still the buoyancy effects in momentum balance can't be neglected.
For viscous fluids such an evolution of geometry results in significant changes in dynamics including the concentration of total kinetic energy, temporal and spatial spectra.

Relevance for Nek [100 words max]

nek5000 was used for the spectral-element DNS of the internal/inertial wave interaction

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