



Convection cells alignment under the influence of internal waves

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Experiments involving IR imagery of internal waves in a laboratory tank have revealed an interesting phenomenon. Propagating internal waves and subsequent orbital velocities cause a blurring of surface thermal features, i.e. convection cells, as the wave passes underneath. The blurring then gives way to long thermal streaks with predominately regular spacing and spatial dimensions similar to the convection cells. The warm sections of the thermal streaks appear to expand which eventually causes the streaks to collide, collapse into two-dimensional shapes and re-form convection cells. It is believed that these features are caused by interactions between the circulation patterns due to convection and the periodic longitudinal velocities caused by the passing internal wave. The interaction favors vortices with axes parallel to the orbital velocities and inhibits all other orientations, producing longitudinal vortex tubes that appear as streaks. The nature of the resulting streaks bears resemblance to IR images of breaking and non-breaking surface waves from other studies, as well as to IR images of Langmuir cells, which suggests the possibility of a common mechanism.