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Focusing of mode-2 internal solitary-like waves: an unexpected extreme internal wave

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We report on numerical simulations of stratified adjustment that yield radially propagating mode-2 waves. The initial inward propagating mode-2 wave increases in amplitude, but it does not lead to significant overturning even during the period of self-interaction near the origin. However, post-focusing, the pycnocline thins and secondary waves propagate into an environment that is very different from the undisturbed stratification. These resulting waves break, and create intrusions above and below the thinned pycnocline. While most experimental realizations of extreme internal solitary-like waves use a rectangular geometry, it should be possible to realize this situation experimentally. We discuss the resolution requirements of this situation, as well as irreversible mixing.