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### Simultaneous acoustic observations of turbulence and zooplankton

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Models and laboratory experiments show that zooplankton may locate food more easily in turbulent waters, but whether plankton seek or avoid turbulence in the ocean is an open question. It is difficult to measure turbulence and plankton simultaneously and with the necessary spatial resolution using traditional methods (nets and airfoil shear sensors). Acoustics is commonly used to survey zooplankton abundance and recent studies have shown that stratified turbulence can also be a significant source of sound scatter. This may seem like more of a complication than a boon for those aiming to use acoustics to observe plankton in turbulence. We present acoustic data, however, that show that at least under certain circumstances, zooplankton and turbulence can be observed simultaneously with a single 307 kHz sounder. The different natures of the two targets (discrete targets versus a volume effect) allow them to be distinguished. The key is sampling the same targets at multiple ranges and having low enough concentrations that there is no more than one animal within the beam at the closest ranges.