Imaging of water masses SE of New Zealand using high-, medium-, and low-resolution seismic reflection data

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Water column reflectivity, primarily corresponding to finestructure variability in water masses, has been widely observed in petroleum industry seismic data sets. Southeast of New Zealand, where the Subtropical Front is constrained by the submarine landmass of Zealandia, seismic data have been used to examine the distribution and geometry of water masses and the boundaries between them. Additionally, such data can be used to gain a better understanding of the mixing processes that occur between adjacent water masses. The scale at which such observations can be made is partially dependent on the seismic frequencies present in the seismic data; the frequency range available in any data set is, in turn, partially dependent on the source signature and receiver capabilities of the equipment undertaking the survey. We present a series of data sets that show the relative usefulness, and appropriateness, of three different acquisition systems: conventional petroleum industry data, high-resolution generator-injector (GI) airgun data, and high-resolution electro-acoustic boomer data, for examining oceanographic water masses. These data have been acquired in the vicinity of the Subtropical Front which forms the boundary between warmer and more saline Subtropical Waters and cooler and less saline Subantarctic Waters.