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Temperature and salinity time-series derived from acoustic travel times measured with PIES in the ACC.

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(I)Title:
Temperature and salinity time-series derived from acoustic travel times measured with PIES in the ACC.
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Since 2003 the AWI operates an array of 6 pressure inverted echo sounders (PIES) across the Antarctic Circumpolar Current (ACC) south of Africa along the GoodHope line. The instruments where deployed repeatedly for durations of 2-3 year providing up to 5 years time-series of bottom pressure and acoustic travel time. Based on acoustic travel times, time-series of hydrographic profiles may be extruded using the Gravest Empirical Mode (GEM) method as described by Meinen and Watts (1998). Using over 200 CTD profiles recorded between 1988 and 2008 in the area around the PIES positions, a GEM was generated relative to a depth of 2000m. The GEM reveals that unambiguous 2000m travel times may be assigned to the Polar Front (PF), the Subantarctic Front (SAF) and the Subtropic Front (STF). Using a linear correction to calculate PIES travel times relative to 2000m, the temporal evolution of water masses at the PIES position may be obtained from the GEM and revealing whether a particular front is north or south of the PIES' position. The temperature and salinity time-series of the northernmost PIES contains information about the passing by of Agulhas rings.