

2.17 Sound speed

The speed of sound in seawater c is given by

$$c = c(S_A, t, p) = \left(\frac{\partial P}{\partial \rho} \Big|_{S_A, \eta} \right)^{0.5} = (\rho \kappa)^{-0.5} = g_P \left(g_{TT} / \left[g_{TP}^2 - g_{TT} g_{PP} \right] \right)^{0.5}. \quad (2.17.1)$$

Note that in these expressions in Eqn. (2.17.1), since sound speed is in m s^{-1} and density has units of kg m^{-3} it follows that the pressure of the partial derivatives must be in Pa and the isentropic compressibility κ must have units of Pa^{-1} . The sound speed c produced by both the SIA and the GSW software libraries (appendices M and N) has units of m s^{-1} .