

## 2.17 Sound speed

The speed of sound in seawater  $c$  is given by

$$c = c(S_A, t, p) = \sqrt{\partial P / \partial \rho|_{S_A, \eta}} = \sqrt{(\rho \kappa)^{-1}} = g_P \sqrt{g_{TT} / (g_{TP}^2 - g_{TT} g_{PP})}. \quad (2.17.1)$$

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