2.13 Helmholtz energy

The specific Helmholtz energy of seawater f is given by

$$f = f(S_{\rm A}, t, p) = g - (p + P_0)v = g - (p + P_0)\frac{\partial g}{\partial P}\Big|_{S_{\rm A}, T}.$$
(2.13.1)

This expression is another example where the use of non-basic SI units presents a problem, because in the product $-(p+P_0)v$, p must be in Pa if specific volume has its regular units of $m^3 kg^{-1}$. The specific Helmholtz energy f has units of J kg⁻¹ in both the SIA and GSW computer software libraries.