# Under Water Sound

**Passage**

Sound travels through the ocean at a speed of approximately 4950 ft/sec. However this is not a constant value as the speed of sound in the ocean varies based upon many variables. Included within those variables are temperature, salinity and pressure.

Figure 1 shows a typical sound speed profile with depth on the y-axis and speed on the x-axis. There are three depth zones illustrated. The first layer is the surface or seasonal layer which extends to a depth of approximately 600ft. This layer can have an environmental, seasonal and daily variation in temperature. The second layer is the Main Thermocline which extends to approximately 3000 ft. The temperature in the Main Thermocline layer changes as the depth increases. The third layer is the Deep Isothermal Layer, within which the temperature is relatively constant and both salinity and pressure increase at constant rates.

**Figure 1**

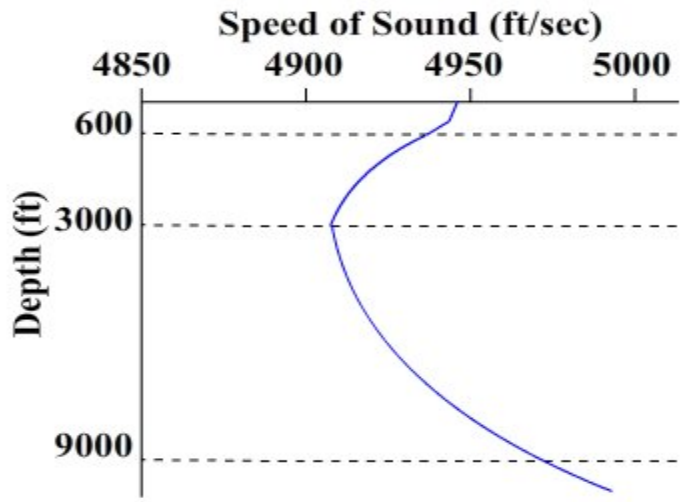


Figure 1 - Sound Speed Profile

Figure 2 illustrates the relationships of temperature, salinity and pressure to the speed of sound. Salinity (the amount of salt in the water) is measured in Parts Per Thousand (ppt) and Pressure is measured in Atmospheres (atm).

# Figure 2

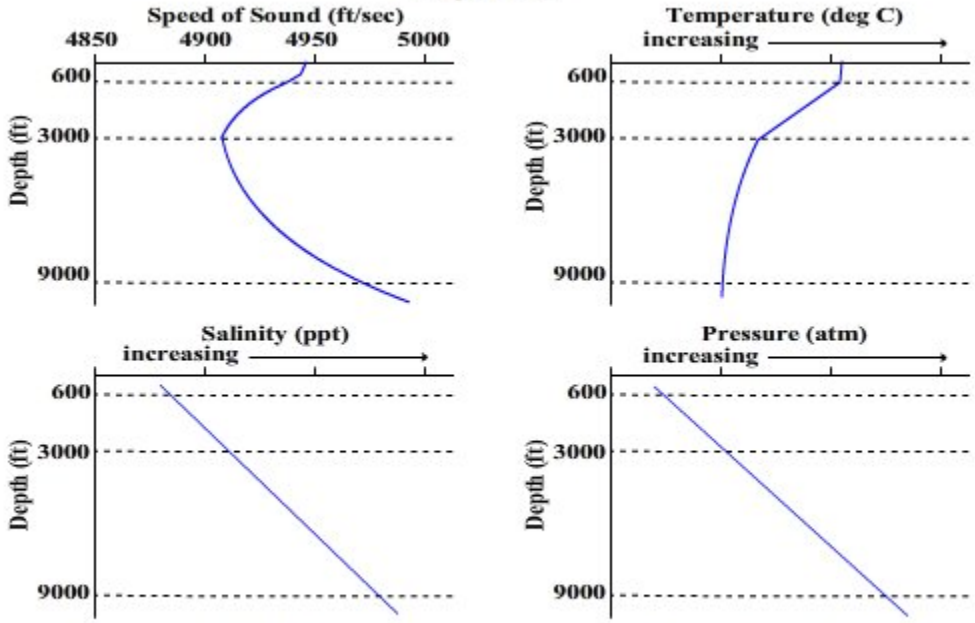


Figure 2 - Depth Profiles of Sound, Temperature, Salinity and Pressure