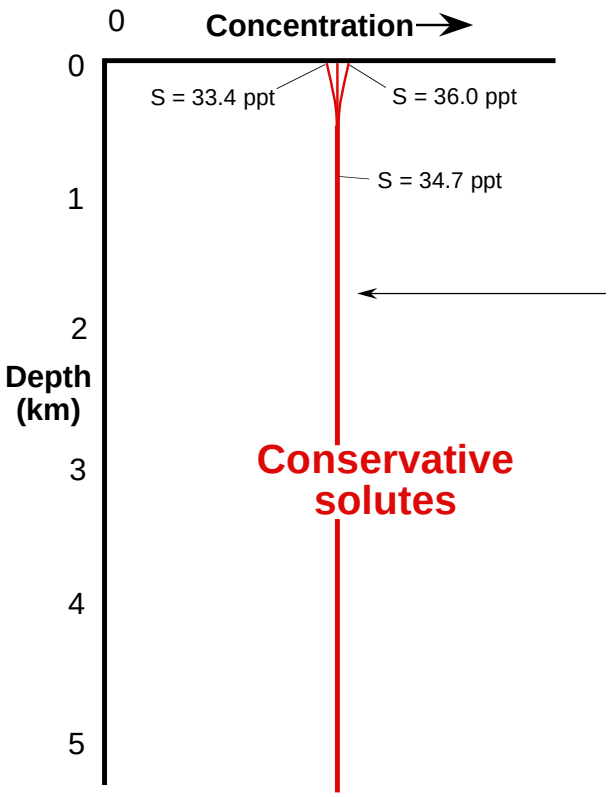
Variation in concentration of solutes in the oceans VI: The conservative solutes



Parts I to V of this series have shown vertical and lateral variations of concentration of seawater solutes, for the solutes that vary in interesting ways. This page, in contrast, deals with the boring solutes, the ones that show almost no variation in concentration.

These solutes are called the "conservative" solutes, because the relative proportions of their concentrations do not change. Concentration via evaporation or freezing of sea ice may increase their overall concentrations, or dilution by freshwater may decrease their overall concentrations, but the ratios among their concentrations remain constant. They might therefore be called the "consistent" solutes. As the plot at left shows, even the range of salinities in open ocean water do not cause much vertical or horizontal variation in the concentrations of these solutes.

The conservative solutes include the following:

1. Cl^-	5. Ca^{2+}	9. Sr^{2+}	16. Rb^+
2. Na^+	6. K^+	10. H_3BO_3	18. MoO_4^{2-}
3. Mg^{2+}	7. HCO_3^-	11. F^-	19. Ba^{2+}
4. SO_4^{2-}	8. Br^-	15. Li^+	

They thus . . .

- are all cations of small charge, or anions, so that they aren't subject to strong electrostatic attractions that might remove them in the way that scavenged solutes are.
- are ions little affected by biological processes, at least in comparison to their overall abundance in seawater.
- include the eleven most abundant solutes in seawater, so that . . .
- collectively they make up more than 99% of the dissolved solids in the oceans.