**Light attenuation in the ocean**

Light is easily absorbed by ocean water and this absorption is expressed in the following formula;

Where Iz=light intensity at a distance z from the source expressed as a per cent of the intensity

at the source.

Io= light intensity at the source. This is defined as 100%.

k= the attenuation coefficient for the water with units of m-1.

z= the distance between the light source and where the intensity is measured,

expressed in m.

We can manipulate this formula, and thereby get a formula where k can be calculated if Io is known and Iz is measured. Follow along with the manipulation below.

Notice that the units of k must be m-1.

The light intensity at the source, Io, is 100 %, so substitute that into the above equation. The transmissometer has a 0.25m path length. This value is z. Substitute that into the equation.

k is the attenuation coefficient for both the water and the included particles. The water both absorbs and scatters light resulting in a decrease in intensity. We are only interested in that part that is due to the particles so let’s split this term into two parts, that due to pure water kw and that due to the particles, PBAC. This is a simplification since organic particles and dissolved colored substances will also decrease the light intensity. Then k = kw + PBAC, and kw =0.364 m-1. Therefore,

Just rearranging the formula puts it in the same form as in the Excel spreadsheet.

Program the spreadsheet to calculate PBAC from the given Iz values.