K(PAR) refers to the diffuse attenutaion coefficient for PAR (Photosynthetically Active [or Available] Radiation). Many researchers commonly use *K*(xxx), where xxx is a particular wavelength, to describe the rate of attenuation of irradiance in water, for example. If the water mass is uniform, then this attenuation coefficient will be almost constant with depth. Because overlapping groups of researchers commonly use PAR in biological studies (plant growth) the use of *K*(PAR) has crept into common use. This has a problem.

Because PAR is a spectral integral from 400–700 nm, as opposed to a single wavelength, the attenuation coefficient for perfectly mixed water (ranging from distilled or pure water to highly turbid) will be different at every depth. The reason for this is as light penetrates through water, the spectral distribution changes because the absorption coefficient differs greatly depending on what part of the spectrum you consider.

We see this when we look at a vertical profile to 10 meters as an example. In well-mixed water, *K*
(PAR) is large near the surface and rapidly declines as the red part of the spectrum is filtered out by water absorption, while the blue part is attenuated at a much slower rate. Thus, by 10 m, you have already lost most of the red, and the
K
that is calculated represents the attenuation of the blue part of the spectrum (lower attenuation coefficient).

The consequence of this is that you may see linear parts of the log profile at specific wavelengths, but you will not normally have a linear part for PAR, because of the changing spectral nature of PAR with depth.