



Measurements of solar spectral downwelling irradiance in the water column of a large reservoir in Portugal

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Periodic profiles of spectral downwelling irradiance were performed at Alqueva reservoir, southeast of Portugal, with a new apparatus developed by the team. The device presents a hemispherical tip (180° of FOV) allowing measurements to be independent of solar zenith angle. It is coupled to a portable spectroradiometer through a fiber bundle driven by a customized frame for protection and to keep the tip pointing to the zenith direction in underwater environment. The profiles obtained can be used to estimate the spectral and broadband light attenuation coefficients in the water column. The attenuation coefficients are relevant for the water surface layer energy budget, in particular, this coefficient is important in the computation of the water surface temperature, which is a key parameter for heat and moisture transfers between the reservoirs and the atmosphere, namely by the lake models.

A comparison measurement was performed with this new apparatus (180° of FOV) and the previous device (22° of FOV) in order to demonstrate the importance of using the hemispherical radiance. The comparison show resembling results between both devices, however the previous device tends to underestimate the attenuation coefficient and increase the degree of uncertainty.