

## **Influence of water mixing on the inhibitory effect of UV radiation on primary and bacterial production in Mediterranean coastal water.**

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The scaling of the solar ultraviolet radiation (UVR, 280–400 nm) effect on phyto- and bacterio-plankton at the ecosystem level is difficult since its estimate is often based on short-time incubation experiments performed at fixed depths, neglecting the previous days' radiation history and the variable radiation caused by vertical mixing. To examine this issue, we measured primary (PP) and bacterial (BP) production in samples from coastal water in the Northwest Mediterranean Sea incubated at fixed depths or moving vertically within the water column (0–8 m) with a periodicity of 22 min, exposed to full sun, PAR or maintained in dark. Three experiments were carried out on consecutive days to measure day-to-day variations in planktonic response. In surface waters, PP was inhibited by ~32 to 42% by UVR, and BP was inhibited by ~50 to 70% by solar radiation (UVR + PAR). We observed a general decrease in the integrated inhibition of PP due to UVR for both fixed and moving incubations over the 3 days from ~27% of inhibition to non-significant inhibition. In contrast, large discrepancies were observed in the integrated inhibition of BP due to solar radiation (UVR + PAR) between fixed and moving incubations. Whereas both type of incubations gave similar estimation of solar radiation inhibition on day 1 (~25%), inhibition became much higher for fixed incubation compared to moving incubation on days 2 and 3. Differences in responses between days suggest that light history, spectral quality, photoadaptation or acclimation may be important factors in daily observed responses. Our results also underline, for the first time, the importance of the vertical mixing in the BP inhibition by solar radiation.