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Interactive comment on "Direct and indirect effects of vertical mixing, nutrients and ultraviolet radiation on the bacterioplankton metabolism in high-mountain lakes from southern Europe" *by* C. Durán et al.

Anonymous Referee #2

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This is an interesting work on the effect of UVR on bacterial production in mixing layers, carried out through experiments in three different mountain lakes in the Iberian Peninsula. The idea of carrying out incubations in moving devices is not new, but still has quite a lot of new information we can get from that kind of experiments. Although in a general view the work is well designed and organized, I have some major concerns. The first one is that each lake showed different physical features (temperature gradient, mixing layer depth, transparency to PAR and to UVR, etc) but all the experiments were set up equally, that is the mixing device moved from 0 to 3 m depth independent of the

lake and its characteristics. Another one is that all three lakes are oligotrophic, so the generalization to eutrophic one is not straightforward. For example, Helbling et al (cited in the text) showed that UV protected cell (in opaque waters) are more sensitive to UV exposures. This means that in a eutrophic lake, the effect of mixing can have more negative effect than for an oligotrophic system. This could happend because in an eutrophic lake the water column will protect most of the time from UVR, and when the cells are dragged to the upper layers, this short time exposed to UV may be much more damaging. It is surprising that authors did not use 0.2 μm pore size (or at least 0.45) for estimating dissolved compounds (DOC, EOC, etc) but used 0.7 or 1 μm, since in 1 μm poro size many particles (including bacteria) may pass through the filter. Finally, and probably my major concern, respiration experiments were carried out as bulk respiration, and bacterial respiration was calculated as a constant fraction of it. Although this estimation is not wrong as a general aproach, considering that the manuscript deals specifically with bacteria production is a very weak point. Authors should have carried out the respiration experiments in 2 μm filtered water following Del Giorgio (many papers of Del Giorgio deals with respiration experiments) so authors should reduce the emphasis and analyses on BR. There are several works were authors estimate Bacterial respiration rates, without applying this kind of approximations.

Minor comments

Symbols in Figure 1 should be more clearly presented; it is very difficult to recognize each component of the figure with such small and clumped symbols.

Interactive comment on Biogeosciences Discuss., 11, 7291, 2014.