

Interactive comment on “Use of argon to measure gas exchange in turbulent mountain streams” by Robert O. Hall Jr. and Hilary L. Madinger

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“Use of argon to measure gas exchange in turbulent mountain streams”, by Robert O. Hall and Hilary L. Madinger. In their manuscript, the authors use Argon and SF₆ to determine the gas exchange rate in streams of varying slopes. The manuscript is straight forward, concise and convincing, and the topic is certainly timely. The manuscript is a very nice contribution.

My only concern is the effect of the introduced bubbles on the dissolved N₂ concentrations. Since the authors use the Ar/N₂ ratio, this may have consequences for their calculations. I performed some bubble simulations on shallow streams using various bubbles (pure Ar, O₂, etc) and according to the results, a 1 mm diameter Ar bubble will

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strip as much N₂ out of the water as the Ar that is dissolved. If this has a relevant impact on dissolved N₂ concentrations, then it would translate to artificially high K values using the Ar/N₂ ratio and might explain their higher reported ratio of gas exchange of Ar to SF₆. Perhaps the authors can provide additional information if the N₂ stripping by bubble addition is truly negligible for their k calculations? A simple test with measuring N₂ (or even O₂ as it should scale) immediately upstream and downstream of their bubble addition would be compelling.

Minor comment: Pg 4, line 25. Last sentence of that paragraph is a bit unclear.

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