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## ***Interactive comment on “Seasonal, daily and diel N<sub>2</sub> effluxes in permeable carbonate sediments” by B. D. Eyre et al.***

**B. D. Eyre et al.**

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This manuscript is clear and well written and presents interesting material that is suitable for Biogeosciences. I only have some minor comments: -Abstract: I find the slope for the few “outliers” in Fig 7 not to be the strongest part of this paper. The extrapolation of these results to the potential implications for the global N<sub>2</sub> budget is interesting for the discussion, but to me it is not robust enough to elaborate on this in the abstract.

Reply: We feel that this discussion is sufficiently robust to include in the abstract.

-Introduction. The introduction rather quickly focuses on details (analytical methods, specific studies, etc) while my feeling is that some more general introduction/context can be added (especially on the potential importance of permeable/carbonate sedi-

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ments in global denitrification).

Reply: There are so few studies of denitrification in permeable carbonate sands there no other background information to include, such as the importance of carbonate sands in global denitrification to include in the introduction.

-line 27: Insert “in” between “increase” and “N<sub>2</sub>”?

Reply: Done.

-Section 2.1: Maybe include coordinates of sampling location?

Reply: Added

-Page 17441, line 10: Should “induces” be “induced”?

Reply: Corrected

-Page 17442, line 26: “light fluxes rates” should be “light flux rates”

Reply: Corrected

-Section 2.3: explain “ve” in formulas

Reply: Removed as they were confusing

-Section 3.1: In this first section of the Results I would expect some general introduction of the main results and trends. Instead, this section now starts directly with statistical results. This involves a lot of “x was significantly greater or smaller than y” while the quantitative aspects of these results (how much greater or smaller?) seem to be missing.

Reply: Section 3.1 contains a mixture of statistical results as well as a description of the trends (i.e. smaller etc).

-Page 17445, line 22: “p/r ratios : : : were the only benthic fluxes : : : ” > ratios are not fluxes?

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Reply: Corrected

-Section 4.2. I was not entirely clear to me what kind of response of the sediment biogeochemistry/N-cycling to the coral spawning was expected and by which mechanisms/ pathways. Maybe add 1-2 sentences about what exactly was observed in the previous studies mentioned in line 27 (page 17447).

Reply: Examples of observed changes following spawning were added “(e.g. enhanced respiration, GPP, NPP, and  $\text{NH}_4^+$  effluxes)”

-Page 18448, lines 5 and 23: Is “uptakes” a correct word?

Reply: It is correct

-line 10: “ $\text{NH}_4^-$ ” should be “ $\text{NH}_4^+$ ”.

Reply: Corrected

-Page 17449, line 1: “be” should be “have been”

Reply: Corrected

Line 1: “turf algae” may not be a familiar term for all readers (I had to Google it).

Reply: Comment

Lines 4-7: Why is the steeper slope for winter not indicated in Fig. 6?

Winter data is included in Fig 6. It's a regression through data from all seasons.

-Page 17454, line 1: “psuedo” should be “pseudo”.

Reply: Corrected

-Figure 5: I did not find this figure very helpful. It may be more interesting to show a correlation plot with light versus denitrification rates and/or other fluxes.

Reply: We agree and have removed this figure and added some of the data into the

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results text.

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