Supplementary material

Supplementary Materials and Methods

The potential denitrification and anammox rates were estimated from the production of $^{29}N_2$ and $^{30}N_2$ using the equations described elsewhere (Holtappels et al., 2011;Yoshinaga et al., 2011). Briefly, when N-related substrates (including the ^{15}N-tracer) were supplied with the combination (1), the net N_2 production via anammox (N_{AMX}) was calculated from the amount of each N_2 isotopologue (^{28}N, ^{29}N, and ^{30}N), quantified with GC-MS according to the equation:

$$N_{AMX} = \left[{}^{29}N - 2\,{}^{28}N r_{15S}/(1 - r_{15S}) - 2\,{}^{30}N(1 - r_{15n})/r_{15n}\right]/[r_{15s}(1 - r_{15n}) + (1 - r_{15S})r_{15n}]$$

The ^{15}N-labeling ratio of the NO_2^- pool in each vial (r_{15n}) was assumed to be the same as the labeling ratio of the reagent added, and the natural abundance of ^{15}N in atmospheric N_2 gas (r_{15s}), 0.366%. The net N_2 production via denitrification (N_{DEN}) was determined with the following equation:

$$N_{DEN} = {}^{30}N/{r_{15n}}^2$$

When ^{15}N-labeled ammonium and unlabeled nitrite were added to the incubation vials, N_{AMX} was calculated by using the ^{15}N-labeling ratio of NH_4^+ pool in each vial (r_{15a}).

The measured $^{29}N_2$ must be calibrated under the presumption that the unlabeled nitrite reagent contained $^{15}NO_2^-$ at the natural abundance of ^{15}N and the denitrification produced $^{29}N_2$ from $^{15}NO_2^-$ and $^{14}NO_2^-$ of the reagent. This calibration is especially important when the denitrification activity in a sample is much higher than the anammox activity.

$$N_{AMX} = \left[{}^{29}N - 2\,{}^{28}N r_{15s}/(1 - r_{15s})\right]/[r_{15a}(1 - r_{15s}) - r_{15s}(1 - r_{15a})]$$

A detailed explanation about the calculation method for anammox and denitrification rates including the calibration method used here is described in Yoshinaga et al. (2011).

Fig. S1

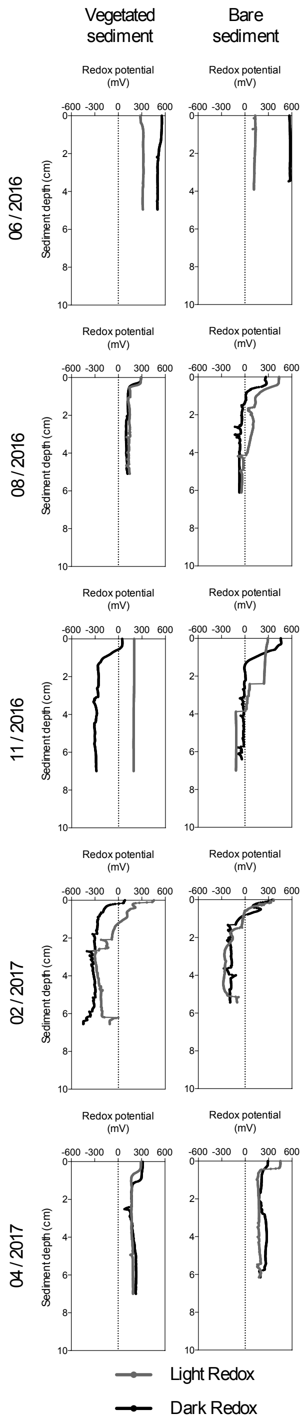

Fig. S1. Sediment redox potential in vegetated and bare sediments during light (gray) and dark (black) incubations along the year.

Fig. S2

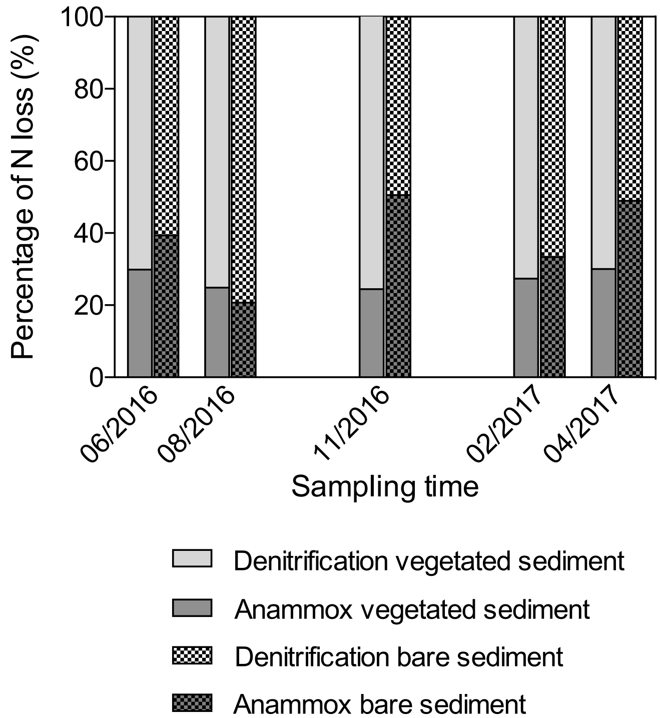

Fig. S2. Contribution of anammox (dark gray) and denitrification (light gray) to the total N loss on vegetated sediments (solid bars) and bare (square pattern bars) sediments along the year.

References in Supplementary Material

Holtappels, M., Lavik, G., Jensen, M. M., and Kuypers, M. M.: 15N-labeling experiments to dissect the contributions of heterotrophic denitrification and anammox to nitrogen removal in the OMZ waters of the ocean, in: Methods in enzymology, Elsevier, 223-251, 2011.

Yoshinaga, I., Amano, T., Yamagishi, T., Okada, K., Ueda, S., Sako, Y., and Suwa, Y.: Distribution and diversity of anaerobic ammonium oxidation (anammox) bacteria in the sediment of a eutrophic freshwater lake, Lake Kitaura, Japan, Microbes and environments, 26, 189-197, 2011.