



Influence of fluid circulation on nitrate reducers' activity and microbial structure community

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A laboratory experiment is setup to model field conditions and more specifically nitrate reducers' activity and microbial structure community. The effects of redox conditions and nutrient fluxes on microbial community and activity are assessed. Changes in nitrates concentration is monitored for 240 hours. Analyses of nitrate reducer diversity and structure are performed using the specific *narG* gene and Terminal Restriction Fragment Length Polymorphism (T-RFLP) techniques. Results show that: (1) Peat samples from sites bearing different hydrologic regimes present different microbial activity independently of oxygenation conditions. (2) Unexpectedly, at the beginning of experiments nitrate reducer communities are always similar whatever the peatland soil is and whatever origin the sample has in terms of hydrology and location. (3) A strong structuration of the nitrate reducer community is highlighted after 76 hours of experiment. This divergence appears specific since this structuration was site-dependant. These modifications are interpreted as a consequence of distinct hydrologic regimes inducing different peat saturation at the sampling sites. (4) Oxygenation condition has a strong impact on communities' composition and microbial activity while addition of nitrate has an effect only on microbial activity during experiment. We highlighted that (i) nitrate reducers' community structure and denitrification function are not controlled by the similar factors and (ii) physical constraints such as hydrologic regime

are fundamental, during a short response time, to microbial community composition.