



## **The feedback effect of the microbial community on SOM decomposition may obscure the true temperature response of heterotrophic soil respiration during incubation experiments**

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Our current understanding of the temperature dependence of soil organic matter (SOM) cycling is still limited. The topic is of practical relevance because there might exist a positive feedback to global warming. Many studies that investigate the temperature dependence of heterotrophic soil respiration are based on incubation experiments performed in the laboratory. During laboratory incubation, however, the more labile carbon pools are depleted rapidly, and as a consequence, the microbial activity is expected to decrease with time as well. This effect, however is not included in the models used to interpret the data obtained from laboratory incubations. In this modelling study, we demonstrate that the feedback effect of the size of the microbial community on the decomposition process may not be ignored when interpreting incubation experiments. We used a modified version of the RothC model that includes the feedback of the microbial community on SOM decomposition to simulate a typical incubation experiment. We then interpreted these data using a modified  $Q_{10}$  model. Moreover, we inversely estimated the posterior distributions of the underlying temperature response parameters using a Bayesian approach and visualized the correlation between them. The results indicate that the feedback of the microbial community on SOM decomposition may obscure the true temperature response and - if not included in data analysis - may lead to biased conclusions about the future behavior of warming soils.