ABSTRACT

Soil CO_2 emission doubles depending on soil type in New Zealand dairy grassland

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Soil respiration (Rs), the second-largest carbon flux, is the CO_2 released from plant roots and soil microbes. Soil respiration influences terrestrial carbon storage and cycling (i.e., how much carbon is released/stored), thus affecting atmospheric CO_2 concentration and global climate (Xu & Shang, 2016). In situ Rs measurements in the southern hemisphere are underrepresented, especially regarding the interaction between soil type and environmental factors on Rs in dairy grassland (Bond-Lamberty & Thomson, 2010). The main objective of my research is to investigate Rs on common soil types (i.e., Ultic, Organic/Gley, Pumice and Pallic) in dairy grassland under varying environmental factors (e.g., soil temperature and moisture). The study also considers seasonal trends across four sites in Aotearoa New Zealand. Soil respiration is measured by the closed static chamber technique (Pumpanen et al., 2004). The chamber is equipped with a CO_2 probe and a temperature/humidity probe. Surface vegetation was removed, and polyethylene collars were inserted into soil 24 hours prior to the first measurement. The chamber was then placed on the collars for the period of the measurement (c. 5 min). A generalised additive model approach was used to model Rs according to seasonality, soil type, and environmental factors. In this poster presentation, I aim to (1) summarise global and New Zealand Rs estimations, (2) evaluate the rate of Rs in New Zealand dairy grassland with four regionally representative soil types, and (3) investigate the effects of soil characteristics and environmental variables on Rs.

References

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