Evaluating Dispersion Modeling Options to Estimate Methane Emissions from Grazing Beef Cattle

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Abstract
Enteric methane (CH) emission from cattle is a source of greenhouse gas and is an energy loss that contributes to production inefficiency for cattle. Direct measurements of enteric CH emissions are useful to quantify the magnitude and variation and to evaluate mitigation of this important greenhouse gas source. The objectives of this study were to evaluate the impact of stocking density of cattle and source configuration (i.e., point source vs. area source and elevation of area source) on CH emissions from grazing beef cattle in Queensland, Australia. This was accomplished using nonintrusive atmospheric measurements and a gas dispersion model. The average measured CH emission for the point and area source was between 240 and 250 g animal d over the entire study. There was no difference ( > 0.05) in emission when using an elevated area source (0.5 m) or a ground area source (0 m). For the point-source configuration, there was a difference in CH emission due to stocking density; likewise, some differences existed for the area-source emissions. This study demonstrates the flexibility of the area-source configuration of the dispersion model to estimate CH emissions even at a low stocking density.


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