Commenter C

Nitrogen Management Project Protocol
Minimum Data Standard Public Comment Period

Reserve Technical Questions 6:

The measurement of spring emissions can be challenging using chamber techniques as experimental operations are often difficult due to field conditions (i.e. freezing and flooding). Using a tower based system would alleviate this issue however there is a significant cost differential between chamber and tower setups and also significant expertise is required to set up, maintain and analyze. In regions where it is expected that non-growing season emissions would be sizeable the requirement for year-round measurements should, however, be strongly encouraged.

Is one full year of "typical" weather conditions sufficient to get a sense of the non-growing season flux?

All information is useful if the site is well characterized, however, I don't think we can extrapolate for a region/crop with any confidence from one year of data. Generally emissions can vary greatly from year to year. Even under years with average rainfall the frequency of precipitation events occurring after fertilizer addition or tillage events can greatly influence emissions, both the timing and magnitude. The previous year's management can also strongly influence soil N levels and emissions.

If so, how should "typical" be defined (e.g. average temperatures +/- a certain percent)?

Defining typical years is important even if we assess emissions from multiple years. To assess whether non-growing season climate is typical for a particular year one method would be to compare the precipitation and temperatures in this period to 30-year normal in the same period (i.e. within 25 & 75 percentiles).

For studies that did not take year-round data, can comparable experiments within the region (with similar climates and soil types) that did take non-growing season data be used to supplement the growing season data of the other study?

Using comparable studies within a region for studies that do not take year round data would provide a way to allocate spring melt emissions, however these emissions would need to be applied as a fraction and not as an absolute amount. In the Canadian N_2O inventory approach, they used a ratio (chamber growing season only/tower year round) to adjust growing season only measurements. The adjustment for growing season only measurements was a factor of 1.4.

Reserve Technical Questions 15:

It depends on the size of your initial data set that was used to determine the annual flux. As an example, for a measurement dataset of about 230 site-years in Canada, the standard deviation of the mean rate of annual (growing season only) N_2O emissions is 76% of the mean, and 119% of the mean for eastern and western Canada, respectively. So outliers are common. For eastern Canada (67 site years), to change the mean by +10% would require an observation that is roughly one order of magnitude greater than the mean, which does occur, but is rare. So for a dataset this large, 10% seems fair, but for smaller datasets, this threshold might be too conservative.

Reserve Technical Questions 17:

Precipitation frequency is important for driving N_2O emissions so monthly or at least seasonal could be useful. Wind speed, humidity, and solar radiation contribute to evapotranspiration (ET) which can be a very important driver for emissions at some locations. Higher ET can mean lower soil-water content which regulates de-nitrification rates. Potential evapotranspiration (PET) could be compared across sites.