EEMDL

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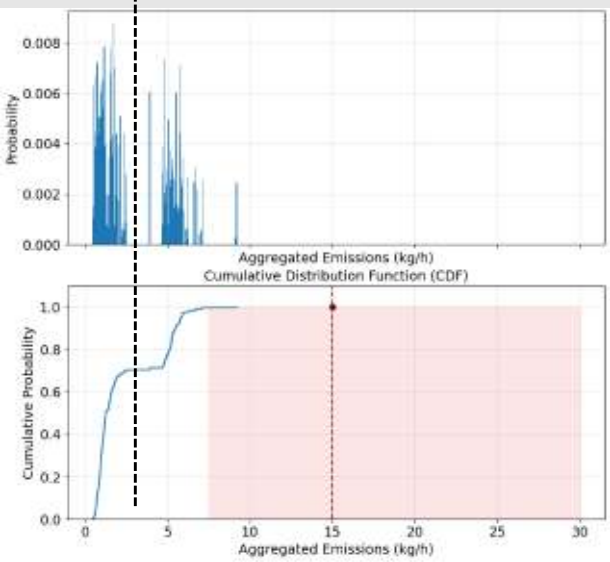
ENERGY EMISSIONS MODELING AND DATA LAB

Mechanistic Air Emissions Simulator (MAES)

Air emissions from oil and gas operations originate from diverse sources and causes including venting, combustion processes, and varying fugitive sources (leaks). Gas and liquids flowing through onsite processes cause emissions to vary and couple emission rates from multiple emitters. Typically, multiple chemical species are co-emitted, and many applications require multiple species to attribute emissions. MAES captures this diverse emissions behavior in a next-generation, multi-species, inventory tool.

Classic inventory methods produce average emissions over extended periods. In contrast, MAES inventory-style translates inputs into time-domain inventory simulations. Time resolution solves problems. It provides a probability distribution of emission rates that can be compared to other emission estimates while still producing the average emission rate of a classic inventory (black line, top plot). Additionally, that distribution can be compared to other emissions estimates at far different time scales than classic inventories. The bottom plots compares a MAES simulation (blue line) to a near-instantaneous aerial detection on the same site, the aerial method's mean and uncertainty (red).



Objectives & Functionality

Objective:

Generate accurate high-resolution emissions distributions for multiple gas species for a wide range of equipment and source types.

Functionality:

- **Site modeling:** Ingest site equipment and coupling between equipment to model sites.
- **Composition**: Specify composition of gas releases, including combustion processes and combustion slip.

Status

- MAES is in active use in multiple projects, and is generally used as an 'engine' for larger research questions. Contact CSU (metec@colostate.edu).

Use Cases

Integrate diverse data into inventories:

- Compare and join information from inventory, survey, and continuous monitoring to produce advanced inventories for OGMP Level 5, RSG reporting, and internal programs.

Plan emission surveys:

- Simulate field survey campaigns to improve campaign effectiveness.

Asset base analysis:

- Simulate highly variable emission scenarios for full suites of assets, up to regional scale.

EEMDL is a joint research initiative of the **University of Texas at Austin**, **Colorado State University**, and the **Colorado School of Mines**.