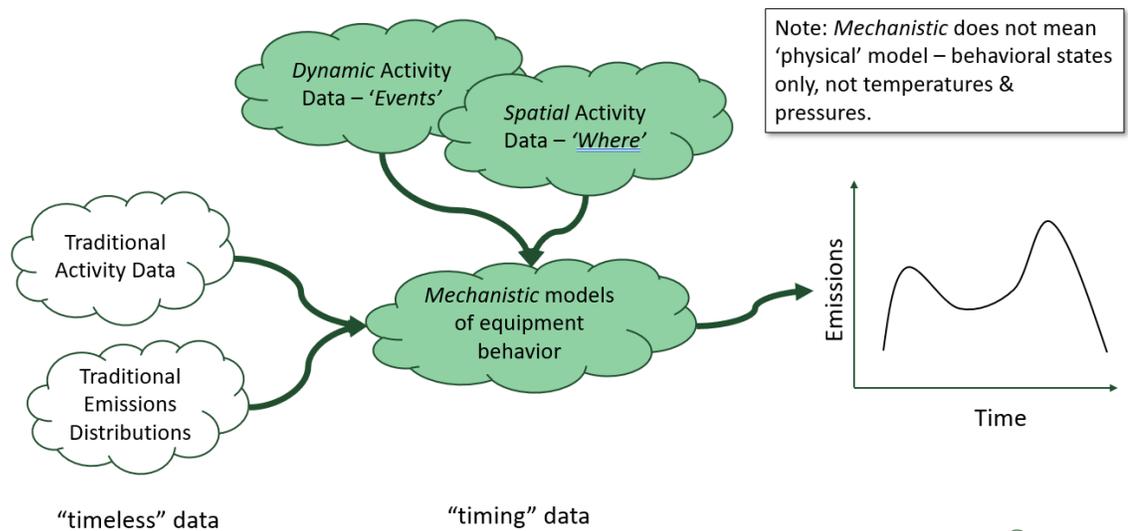


# How MEET Simulates Emissions



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## CURRENT PROJECT OVERVIEW

**PROJECT:** Mechanistic modeling of Methane emissions in the DJ basin using extensive data.

Methane is a greenhouse gas. Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use and by the decay of organic waste in municipal solid waste landfills. Methane has a Global Warming Potential (GWP) of 25-28 for a 100-year period. Methane's lifetime in the atmosphere is much shorter than carbon dioxide, but Methane is more efficient at trapping radiation than CO<sub>2</sub>. Production of natural gas results in Methane emissions.

The Methane Emissions Estimation Tool (MEET) is a computer model built to simulate methane and other hydrocarbon emissions from the natural gas industry over a specified period. Methane emissions on the DJ basin are modeled using MEET. The model can estimate emissions from either a single facility or multiple facilities in a geographic area. Emissions are estimated using data from published research. The MEET model uses Monte Carlo methods to determine a range of possible emissions values over the study period. This means that for a typical use case the model will run several Monte Carlo runs to determine the most likely emissions scenarios. Prototypical sites reflecting actual facilities in the DJ basin were created and methane emissions were simulated using MEET. The aim of this project is to estimate total emissions in the DJ basin. Further, simulate different methene reducing strategies and estimate their effectiveness in reducing the total methane emissions in the DJ basin.

## **RESEARCH PROGRESS**

Six prototypical sites were created and matched with actual facilities in the DJ basin. The results from the MEET model were validated using MATLAB. More prototypical sites are being created to reflection variations between different operators in the DJ basin. This will cover more facility in the DJ basin.

**Research Plans**

Finish creating and simulating the new prototypical sites

Validate the new prototypical sites

Write a publication

**Literature cited**

<https://www.sciencedirect.com/science/article/pii/S0048969722013699?via%3Dihub>

<https://www.sciencedirect.com/science/article/pii/S0048969722007458?via%3Dihub>

<https://pubs.acs.org/doi/pdf/10.1021/acs.est.0c05925>