Multi-scale Methane Analytic Framework (M2AF)

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Program: AIST-18

(please see the PowerPoint notes section below for some tips)
Problem to Solve

• Methane is #2 anthropogenic climate forcing agent and ozone precursor
• ~34-86x global warming potential of CO2 on 100 and 20 yr horizons
• Large uncertainties (50% to unknown) across many scales
• Growth rate incompatible with greenhouse gas goals and causes poorly understood
Tiered Observing Strategy and Need for Tiered Analysis Strategy

(1) Satellites: Global mappers and point source mappers

(2) Regional & local surface in-situ networks (towers)

(3) Airborne surveys: Local-regional net fluxes & point-source mappers

(4) On-site and on-road surveys
Solution: M2AF

Objectives:
• Improve component workflows to reduce methane data product (Levels 4 and 5) latency and integrate common core functions
• Create new tools for on-demand analytics including fusion across multiple products and spatial scales
• Improved data search, discovery and visualization capabilities of Methane data
Technical Details: Use Cases

- **User Interface**: Map Carbon Emissions, Download/Access data
- **On-Demand Analytics**: Grid Cell Emission Analytics, Regional Data Fusion
- **Processing**: Global Anomaly Detection, Local Plume Characterization, Local Source Analysis

**Legend**:
- M2AF
- External
- AWS

**External Data Sources**:
- Atmospheric Sounder (TROPOMI, OCO-2/3, CLARS)
- Gridded Flux (SoCab, NA, EPA)
- Imaging Spectrometer (AVIRIS, GAO, EMIT)
- Source Attribution (Planet, Landsat)
- Wind (HRRR/RTMA)
- Infrastructure GeoDatabase (VISTA)
Next Steps / Contributions

• We have begun development in AWS

• First System test is at the end of FY20

• Publication on multi-tiered observation approach used in M2AF