**JPL Los Angeles Air & Health Quality Team**

**DEVELOP Video Script**

**Scene 1: Opening**

**Scene 2: Introduction**

*Voice over by Valerie*

More than half of the world’s population is concentrated in urban areas. Cities produce roughly 70% of anthropogenic greenhouse gas emissions contributing significantly to climate change. A significant source of anthropogenic methane is also found in cities, within a small fraction of the Earth’s land surface. As policies in California push for a reduction of greenhouse gases by the year 2020, policymakers want to better understand sources of greenhouse gases such as carbon dioxide and methane. Methane is the second most prevalent greenhouse gas emitted in the United States, and although it has a shorter lifespan in the atmosphere, it is efficient at trapping radiation, making it a more potent greenhouse gas than carbon dioxide in terms of global warming potential. However, methane is one of the least understood greenhouse gases in megacities. The Los Angeles Health and Air Quality DEVELOP team at NASA’s Jet Propulsion Laboratory worked with the Los Angeles Megacities Carbon Project and California Air Resources Board to reach a clearer understanding of methane sources in the South Coast Air Basin.

**Scene 3: Partner**

*Voice over by Isis*

Our research goal this summer was to demonstrate how emissions factors that were collected by the California Air Resources Board and studied by our science advisors at JPL could be combined with spatial data for higher level analysis. This project attempted to prove that these spatial maps can be a viable and accurate solution to their existing methods of analysis. We focused on locating and spatially representing methane emissions in the South Coast Air Basin which consists of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties.

**Scene 4: Maps created with data sets from methane sources in SoCAB**

*Voice over by Talha*

Developing a sector-by-sector spatial understanding is necessary to assess the methane dynamics in the South Coast Air Basin. Sectors comprise of any residential, commercial, and industrial infrastructures that are known emitters of methane. The four sectors located within the South Coast Air Basin that emitted the most methane in 2012 were Landfills, Oil and Natural Gas, Livestock Dairies, and Wastewater Treatment Plants.Methane from landfills is generated from anaerobic digestion of the biodegradable waste by microbes. For landfills, methane emissions are formulated using information about the type and amount of waste disposed at a certain landfill site along with the duration of its decay.Oil and natural gas requires information on the location of storage tanks and transmission pipelines across the South Coast Air Basin. These infrastructures usually emit methane through leaks and other fugitive emissions. Methane emissions from Livestock dairies originate from the processes taken to maintain cattle. These are dependent on the amount of cattle at a dairy and comprise of enteric fermentation, dry manure and the location of nearby lagoons. Finally, wastewater treatment plants produce methane as a product of the processes used to scrub water waste. Methane emissions are formulated to encompass two types of plants, domestic and industrial. Emissions for domestic plants focus on the amount of organics in wastewater, while methane emissions for industrial plants focus on the type of system being utilized to clean the water.

**Scene 5: HyTES example & field study**

*Voice over by Valerie*

HyTES, one of NASA Earth Observations, is an airborne imaging spectrometer that detects greenhouse gases. These observations can be used with our spatial maps to validate methane emitters. For example, at this dairy farm, HyTES detected a methane plume, shown in green. From our field study, we discovered that this methane plume is most likely from the pipe discharging effluent into the manure lagoon.

**Scene 5: Conclusion & future work**

*Voice over by Talha*

This research helps evaluate previous local and regional scale emissions estimates and atmospheric observations. For example, combining these maps will help understand the spatial and temporal variability of the in situ methane measurements from the tower sites in the LA Megacity. This study improves bottom-up emissions estimates for methane and validates satellite measurements. Future research will entail utilizing other NASA top-down datasets to measure methane emissions in the South Coast Air Basin. These datasets include measurements collected by the in situ network in the Los Angeles Basin, the OCO-2 satellite dataset, the TCCONetwork, and the GOSAT.