Atmospheric Carbon and Transport – America: A NASA Earth Venture Mission Dedicated to Improving the Accuracy, Precision and Resolution of Atmospheric Inverse Estimates of CO_2 and CH_4 Sources and Sinks

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The Atmospheric Carbon and Transport-America (ACT-America) mission will demonstrate a new generation of atmospheric inversion systems for quantifying CO_2 and CH_4 sources and sinks at regional scales to 1) evaluate and improve terrestrial carbon cycle models, and 2) monitor carbon fluxes. ACT-America will deploy two instrumented aircraft to observe how mid-latitude weather systems interact with CO_2 and CH_4 sources and sinks to create atmospheric CO_2/CH_4 distributions on five 6-week campaigns across four different seasons and 3 years (2016-2019). A model ensemble will be used to predict CO_2 and CH_4 distributions. We will prune model ensemble to those members best able to simulate the measured CO_2 and CH_4 distributions. The pruned ensemble will form the basis of the next generation of atmospheric inversion systems.
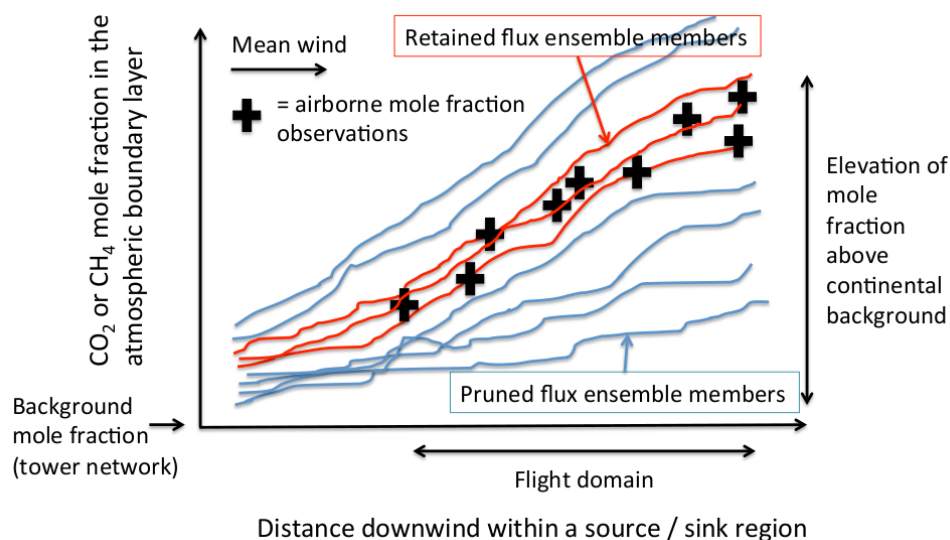
Figure 1. Conceptual model of how ACT-America airborne measurements will aid in refining atmospheric inversion modeling systems.