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Atmospheric Measurement Techniques
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Supplement of

A high-altitude balloon platform for determining exchange of carbon dioxide over agricultural landscapes

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1 HYSPLIT

To assess if there were significant differences in source regions between the two flights, the NOAA Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT, version 4) model was run for each date. The off-line Windows version was run (http://ready.arl.noaa.gov/HYSPLIT_hytrial.php). Back trajectories for the launch location at Pontiac were run hourly from 18:00 to 21:00 UTC (13:00 – 16:00 CDT). Since the model time frame was 17:00 – 21:00, all back trajectories ended at 17:00. By comparing the first and last back trajectories (18:00 and 21:00, both indicated in red) in each plot, the changes in the source region can be assessed. The trajectories were calculated using an altitude of 1000 m, which was 789 m above ground level using the the digital elevation model embedded in HYSPLIT. The Eta Data Assimilation System (EDAS from the NWS) archived files (40km resolution) were used as the input meteorology.

Visually assessing the differences in the one-hour back trajectories started at 18:00 and 21:00 (indicated by red triangles closest to the trajectory start) for each of the dates, there are relatively small changes due to changes in wind speed and direction.

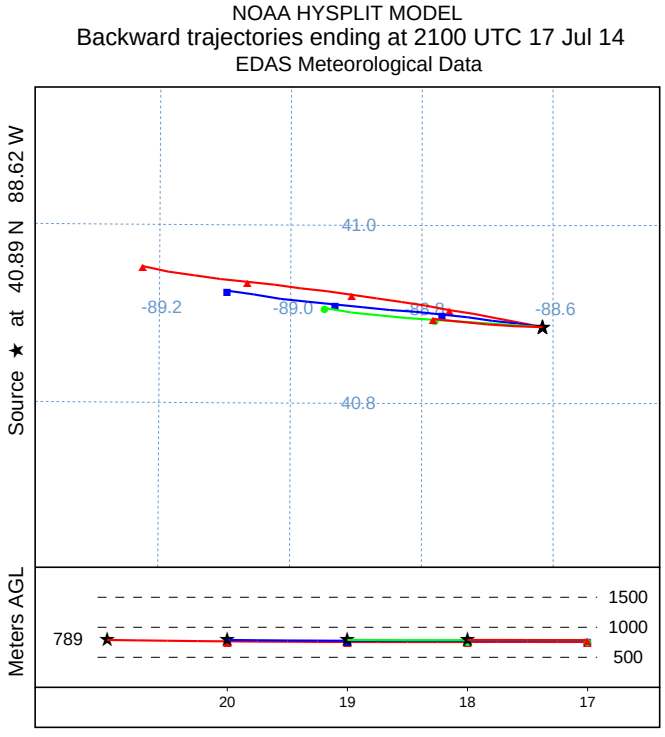

Figure 1. 17 Jul 2014.

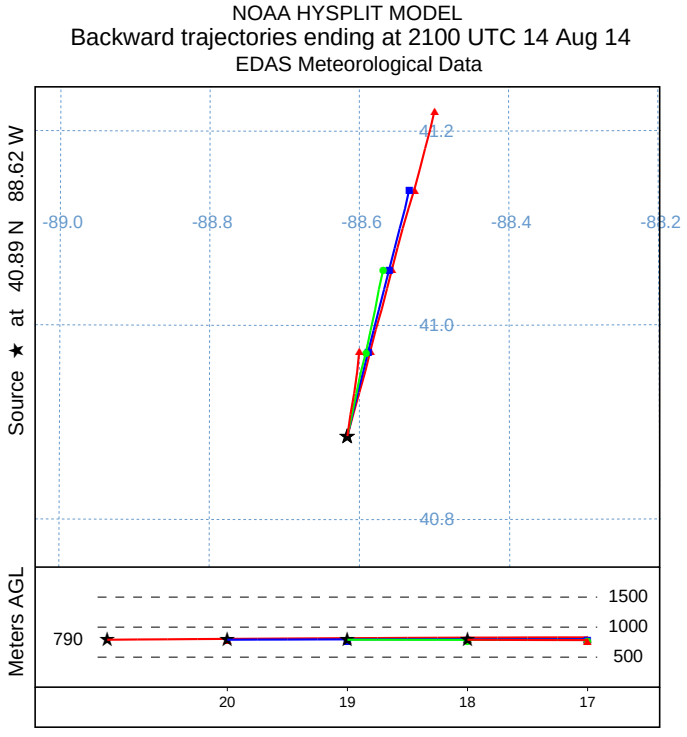

Figure 2. 14 Aug 2014.

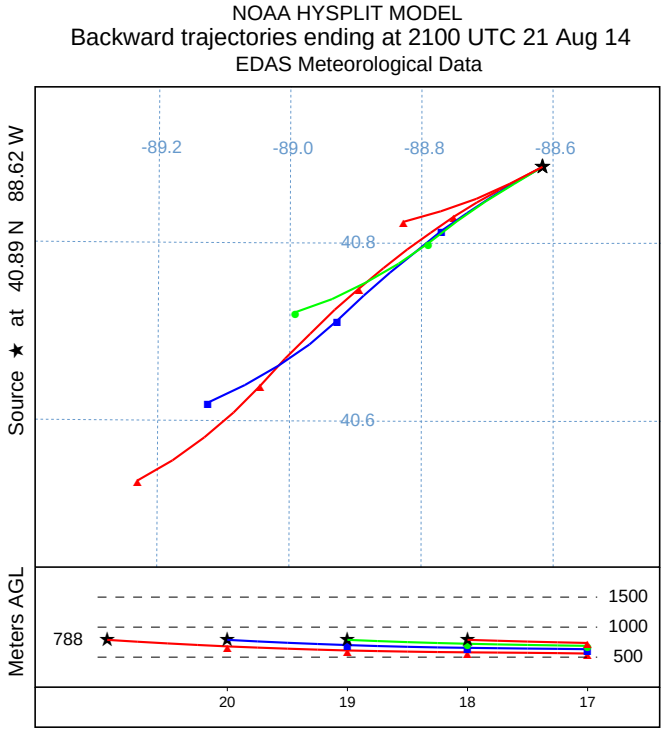

Figure 3. 21 Aug 2014.

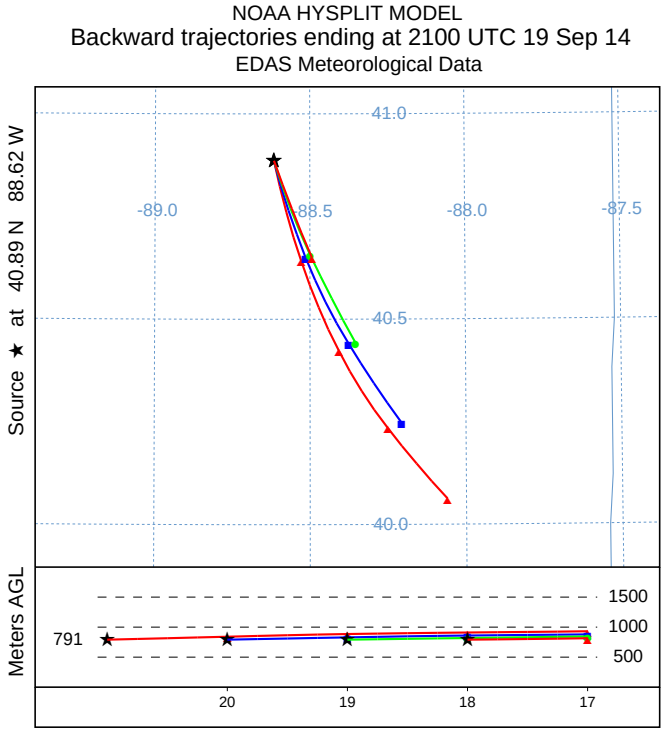

Figure 4. 19 Sep 2014.

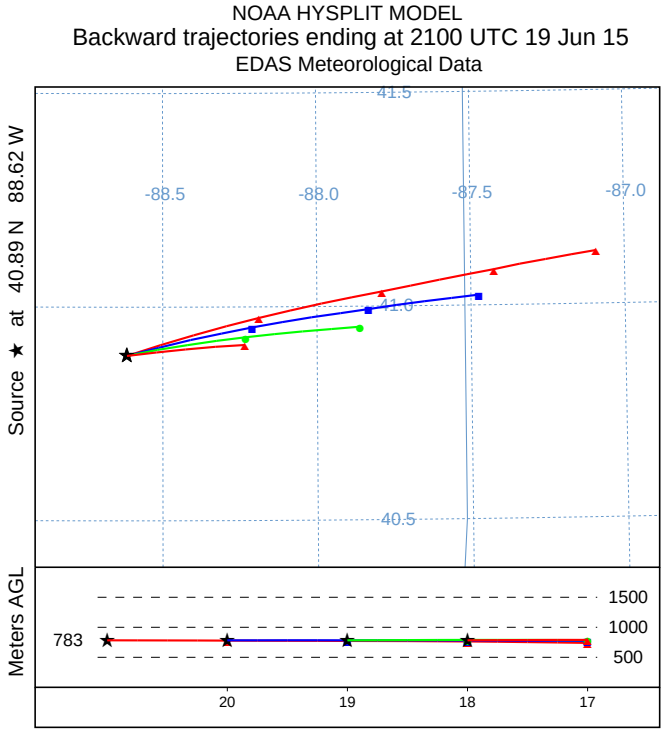

Figure 5. 19 Jun 2015.

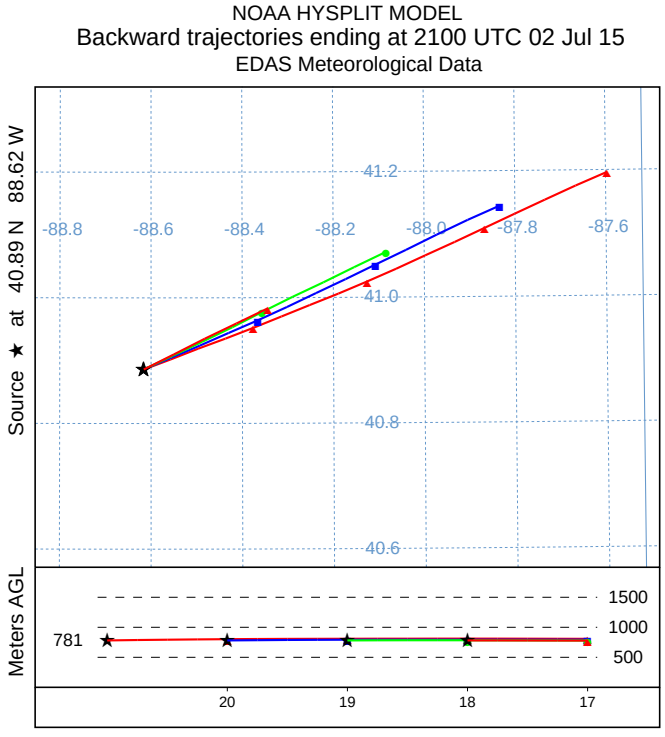

Figure 6. 02 Jul 2015.

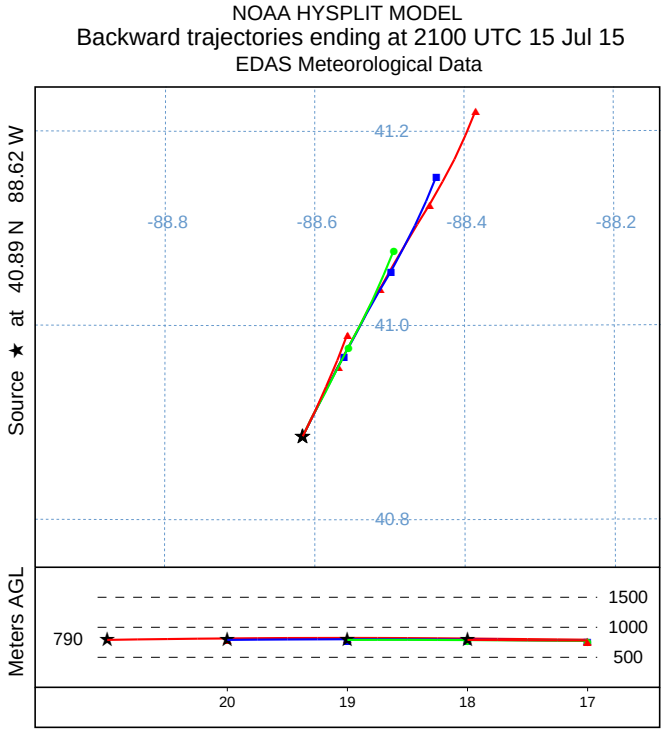

Figure 7. 15 Jul 2015.

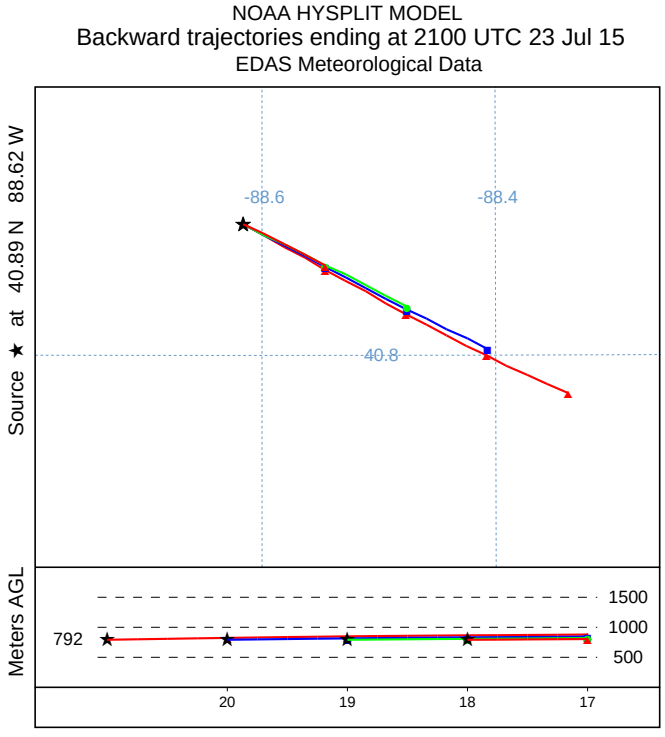

Figure 8. 23 Jul 2015.

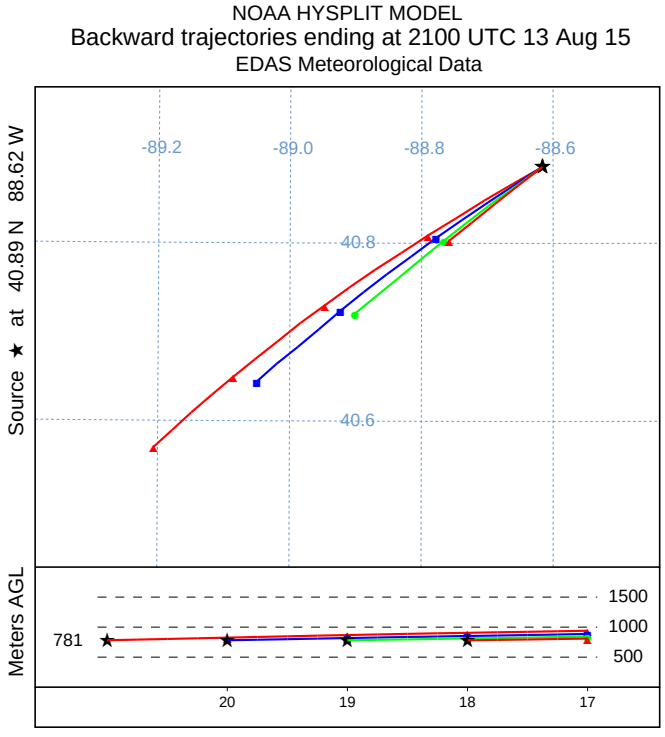

Figure 9. 13 Aug 2015.

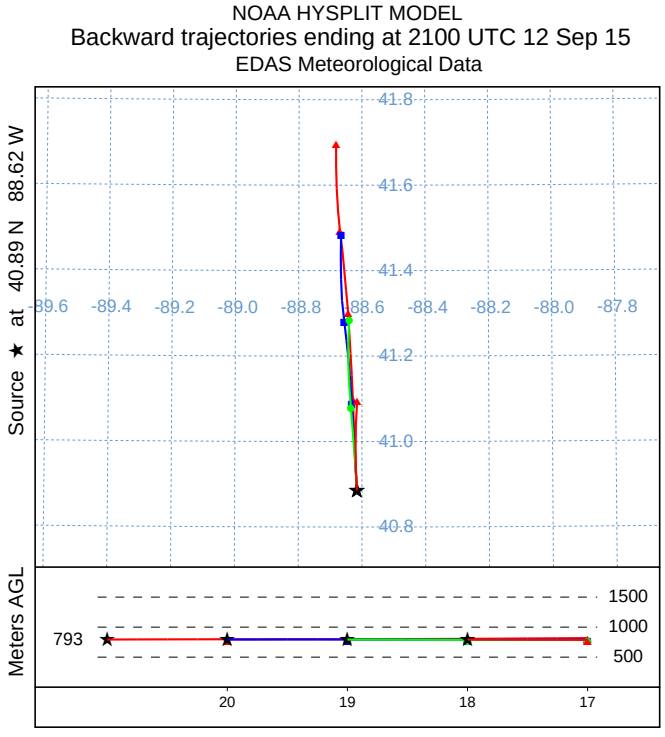

Figure 10. 12 Sep 2015.