

Recent Methodological Advancements to the AirCore Atmospheric Profiler

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The innovative AirCore atmospheric profiler remains one of the foremost tools for accurately measuring vertical profiles of CO₂, CH₄ and CO. The 100m-long passivated stainless steel tubing coil works as a sort of atmospheric “tape recorder”—it is launched on a balloon with one end open, allowing the tube to empty as it ascends, and fill back up with an atmospheric profile as it descends. The resulting “core” provides concentrations of the three gases from 30 km (~12 mbar) to the surface. Metadata and fluid dynamics models map the resulting core to the pressure altitude at which a given parcel of air was sampled. Here, we present recent developments and proposed methodological advancements of the platform, including a new Python code product that allows end users to process the cleaned up data themselves, and a proposed actively-pumped AirCore, “AirCore-Active”, designed to fly on small unmanned aerial system (UAS) platforms as a tool to measure fluxes from CH₄ point sources.

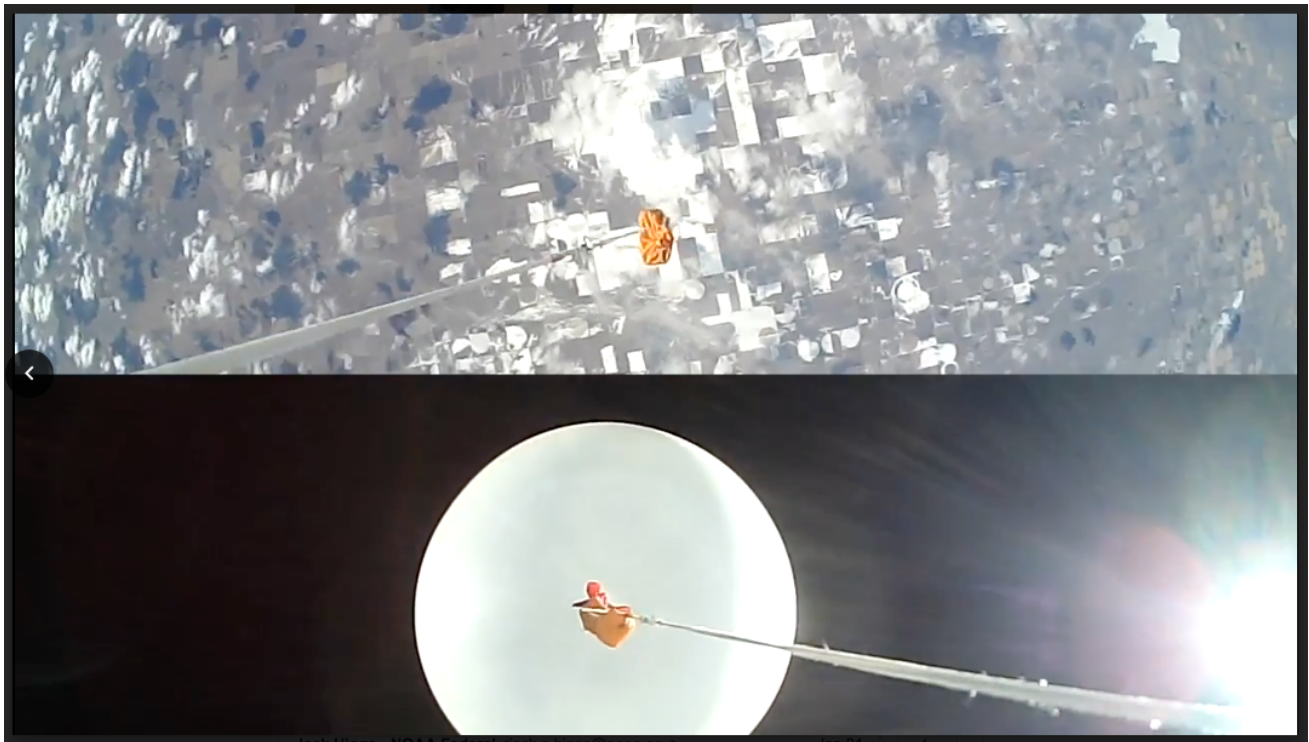


Figure 1. The AirCore profiler at its apex (30 km, ~100,000 ft) immediately before descent: downward and upward views.