

**Title:** The North Dakota Citation Research Aircraft: A Scientific Application Example

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**Abstract:** The North Dakota Citation Research Aircraft is a Cessna Citation II twin-engine fan-jet aircraft modified to be an atmospheric research platform. The typical sampling speed of the modified Citation II is 160 knots indicated air speed (IAS), with sampling at altitudes up to 12.1 km (40,000 ft). The Citation Research Aircraft is a unique platform capable of deploying a wide range of instrumentation, including a full set of cloud physics probes. Robust, open-source software tested for over 15 years provides the ability to quickly process data to enable analysis to begin right after an aircraft flight. Visualization software allows efficient quality assurance of data to be conducted so a final data set can be created quickly. Past and ongoing projects include the study of thunderstorms. The CAPE2015 field project obtained concurrent aircraft and radar observations with in anvils that agree within the measurement uncertainty; however, there are periods have systematic differences that need to be explained. The CapeEx19 field project will expand on past projects to include electric field mill measurements, along with a full set of cloud physics observations. The CapeEx19 project will have additional ground-base instrumentation, which includes a Ka-band radar. A well planned, systematic approach is required to obtain the observations required to relate radar reflectivity to total water content. Additionally, obtaining the required aircraft observations is made more difficult with the busy aircraft traffic in Northern Florida; therefore, an experienced team is very important.