

May 17 Mission Scientist Report

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Mission Scientist Report

A mission was planned to sample light precipitation over the Central Facility in northern Oklahoma with an ER-2 takeoff at 18/0510 UTC and Citation takeoff later (earliest 06 UTC), depending on precipitation conditions. A land surface mission (LSM) in N. Oklahoma ahead of developing precipitation and/or convection in KS and NE were secondary options, again depending on conditions.

Because of patchy cloudiness over northern Oklahoma region just after takeoff, we decided to forgo the LSM and instead go directly to ongoing convection along the northern KS/CO just south of NE triple point. We set up some race car tracks along intense convection and patchy stratiform precipitation along the KS/CO border up into western NE. No precipitation had developed over SGP-CF yet, although there were widely isolated convective cells starting to develop in central OK.

Meanwhile, a thin line of convection began to develop roughly where forecasted by the models from western NE southeastward into KS. This line began to fill in toward northern Oklahoma as small convective cells began to fire over N. OK. As a result, we had the pilot follow the intense convection and lightning southeastward through KS over the top of this very thin, pencil line of convection all the way to Northern Oklahoma. At the same time, we had the Citation take-off (around 0215) to sample light anvil precipitation eastward (forward) of a handful of cells that developed over the SGP-CF, quickly filled in and joined the large line over KS that the ER-2 was over-flying.

While airborne, we were informed by ER-2 pilot that CoSMIR was not working from takeoff and after a couple of attempts to recycle power. CoSMIR appeared to be down for this flight. We opted to continue ER2 operations with the remaining instruments.

Once airborne east of the developing line, we had the Citation ascend to 240' to execute a downward spiral from 24,000 ft to 12,000 ft (just below melting level) in the forward anvil (northeast of the thin convective line) within range of NPOL and other CF radars in N. OK (around 0730 UTC). The forward anvil had both precipitating (further west toward convective line) and non-precipitating parts (further east away from convective line). NPOL was placed in a sector from 340 to 100 degrees. The ER-2 was setup on a bowtie with the same central point over the forward anvil. Initial descent rate of first spiral was a little fast (our bad). Since the convective line was moving eastward, we shifted Citation's spiral 20 km to the east to insure that it stayed outside of the convection during its ascending and descending spirals. Descent/ascent rates were slowed to 750 ft/min. The ER-2's bowtie was shifted over top of the Citation's spiral. As the convective line and forward anvil moved eastward, the Citation executed three spirals over the new point in the forward precipitation anvil (1. Upward 12,000 ft to 24,000 ft: 0800-0824 UTC, 2. Downward 24,000 ft to 12,000 ft: 0824-0840 UTC, 3. Upward 12,000 ft to 24,000 ft: 0840 – 0855 UTC. The ER-2 continued to execute bowties over the Citation while it spiraled up and down through the light precipitation of the forward anvil. The ER-2's bowtie covered components of the convective line and the forward precipitating (and non-precipitating) anvil. At about 0855 UTC, both ER2 and Citation were returned to base (RTB).

Instrument status:

ER-2: COSMIR was down/red the entire flight; HIWRAP was green; AMPR was about the same as

past missions (yellow - losing 37/85 channels early in the mission).

Citation: CIP was onboard. CIP and 2DC performed beautifully.

Ground radars: CSAPR went down during event. All 3 X-band were working (NW X-band had a pointing issue but can be realigned) in VCP mode. All profilers were running. SACR was doing cross-wind RHI's in K-band. NPOL was green and sampled in sectors during aircraft.

Larry C/Mike J