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Cold Air Funnel Sighted at SGP Central Facility

In early May, SGP central facility personnel observed a cold air funnel near the site (Figure 1). The term *cold air funnel* was introduced into the meteorology vocabulary in 1973. Although much research has focused on tornadoes and funnel clouds in general, the information on cold air funnels is relatively sparse.

Cold air funnels develop at the base of convective clouds in association with a shower or thunderstorm where the air aloft is unusually cold. They are often mistaken for funnel clouds associated with tornadoes, but the two are quite different. Cold air funnels are small, short-lived, and generally weak; they rarely touch down.

Cold air funnel clouds generally appear in partly cloudy skies in the wake of cold fronts, where atmospheric instability and moisture are sufficient to support towering cumulus clouds but not necessarily precipitation. Cold air funnels typically form when a cold air mass overlies a warmer air mass at the surface. They are not linked with true tornadic weather, which forms under distinct synoptic conditions.

Figure 1. The cold air funnel near the SGP Central Facility, as photographed by site personnel (ARM photo).

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CLASIC Experiments Under Way at SGP Central Facility

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The land support effort for the Cloud and Land Surface Interaction Campaign (CLASIC) began with a flux tower intercomparison experiment at the SGP central facility. Instrument setup began on April 2 and was completed on May 21. Three participating groups brought a total of nine surface flux towers to the site (Figures 2 and 3). Each system uses

- the eddy covariance technique for flux measurements;
- an open-path infrared gas analyzer to measure water vapor density and carbon dioxide concentration; and
- a fast-response, three-dimensional sonic anemometer to measure wind speed through comparison with the speed of sound.

The primary goal of this portion of CLASIC was to compare the key fluxes of carbon dioxide, water vapor (latent heat), sensible heat, momentum, and shortwave and longwave radiation components. In addition, carbon dioxide and water vapor densities, wind speeds, and temperatures were also compared.

Figure 2. Multiple surface flux towers installed at the SGP central facility during CLASIC (ARM Photo).

Eventually, all CLASIC data will be compiled in a database for use in later scientific studies. Other large, multi-participant experiments have shown that intercomparisons like CLASIC are essential for describing and comparing data for individual sites, as well as for enlarging the focus from the site scale to the regional scale. Furthermore, simply having several independent flux measurements at a single site can reveal significant details.

Significant cooperation from instrument mentors and extreme effort from SGP staff helped to make the CLASIC experiment possible.

Figure 3. Measurement instruments atop the surface flux towers include the infrared gas analyzers, sonic anemometers, and temperature probes shown (ARM photo).