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**The Cache Valley Atmospheric Mixing Project**

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Abstract

Cold air accumulates nearly every night of the year in the floor of mountain valleys. Persistent cold air pools (PCAPs) are common in winter months, especially when there is snow cover. The common assumption is that there is minimal atmospheric mixing during these PCAPs. We are preparing to better quantify atmospheric mixing in the unique geography of our mountain valley. Cache Valley, UT has a surface area of only about 800 km2 and is bordered by mountain ranges. This confined valley is ideal for studying atmospheric mixing. We are developing a network of weather stations at multiple elevations that use aspirated shields for precision measurements of air temperature, sonic anemometers for measurement of vertical and horizontal air movement, and infra-red gas analyzers to measure atmospheric CO2. Because we can accurately estimate the sources and location of wintertime CO2 emissions in our closed valley we are using CO2 as a tracer gas to study atmospheric mixing. Our initial data indicate that there is more atmospheric mixing during PCAPs than commonly thought.