

May 2023

Special Seminar
Effects of Elevated CO₂ Concentrations of Yields of Agricultural Crops
Dr. Bruce Kimball, USDA-ARS (Ret.)



Friday, May 12, 2023
8:00 am
UCCE – Kern County
Office
1031 S. Mt. Vernon Ave.



“That elevated concentrations of CO₂ can increase plant growth has been known since at least 1804, when a scientist named De Saussure reported that peas exposed to high CO₂ concentrations grew better than control plants in ambient air (about 300 ppm at that time). Since then, thousands of experiments with elevated concentrations have been conducted, mostly in greenhouses and other types of enclosures, and almost all of them similarly showed increases in growth and/or yield. We also did a long-term (17 years) experiment on orange trees in open-top chambers and yields increased by about 70%. However, we wondered if the chamber experiments really represented open fields, so, therefore, about 30 years ago, free-air CO₂ enrichment (FACE) technology was developed that enabled the air above open-field plots to be enriched with CO₂ for entire growing seasons. Since then, FACE experiments have been conducted around the world on cotton, wheat, ryegrass, clover, potato, grape, rice, barley, sugar beet, soybean, cassava, rape, mustard, coffee (C₃ crops), and sorghum and maize (C₄ crops). Elevated CO₂ (550 ppm from an ambient concentration of about 353 ppm in 1990) decreased evapotranspiration about 10% on average and increased canopy temperatures about 0.7°C.” Bruce Kimball

Demonstration of commercial application following presentation.

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