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Fall 2002 Intensive Operation Periods: Single Column Model and Unmanned Aerospace Vehicle

In an Intensive Operation Period (IOP) on November 3-23, 2002, researchers at the SGP CART site are collecting a detailed data set for use in improving the Single Column Model (SCM), a scaled-down climate model. The SCM represents one vertical column of air above Earth's surface and requires less computation time than a full-scale global climate model. Researchers first use the SCM to efficiently improve submodels of clouds, solar radiation transfer, and atmosphere-surface interactions, then implement the results in large-scale global models.

With measured values for a starting point, the SCM predicts atmospheric variables during prescribed time periods. A computer calculates values for such quantities as the amount of solar radiation reaching the surface and predicts how clouds will evolve and interact with incoming light from the sun. Researchers compare the SCM's predictions with actual measurements made during the IOP, then adjust the submodels to make predictions more reliable.

A second IOP conducted concurrently with the SCM IOP involves high-altitude, long-duration aircraft flights. The original plan was to use an unmanned aerospace vehicle (UAV), but the National Aeronautics and Space Administration (NASA) aircraft

Figure 1. The Proteus aircraft being deployed in November to make measurements over the SGP CART site (NASA photo).

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Proteus will be substituted because all UAVs have been deployed elsewhere.

The UAV is a small, instrument-equipped, remote-control plane that is operated from the ground by a computer. The Proteus is a manned aircraft, originally designed to carry telecommunications relay equipment, that can be reconfigured for uses such as reconnaissance and surveillance, commercial imaging, launching of small space satellites, and atmospheric research. The plane is designed for two on-board pilots in a pressurized cabin, flying to altitudes up to 65,000 feet for as long as 18 hours. The Proteus has a variable wingspan of 77-92 feet and is 56 feet long. The plane can carry up to 7,260 pounds of equipment, making it a versatile research tool.

The Proteus is making measurements at the very top of the cirrus cloud layer to characterize structures of these clouds. These new measurements will provide more accurate, more abundant data for use in improving the representation of clouds in the SCM.

2002-2003 Winter Weather Forecast

Top climate forecasters at the National Oceanic and Atmospheric Administration's (NOAA's) Climate Prediction Center say that an El Niño condition in the tropical Pacific Ocean will influence our winter weather this year. Although this El Niño is not as strong as the event of the 1997-1998 winter season, the United States will nevertheless experience some atypical weather. Strong impacts could be felt in several areas.

Nationally, forecasters are predicting warmer-than-average temperatures over the northern tier of states and wetter-than-average conditions in the southern tier of states during the 2002-2003 winter season. Kansas residents should expect warmer and wetter conditions, while Oklahoma will be wetter than average.

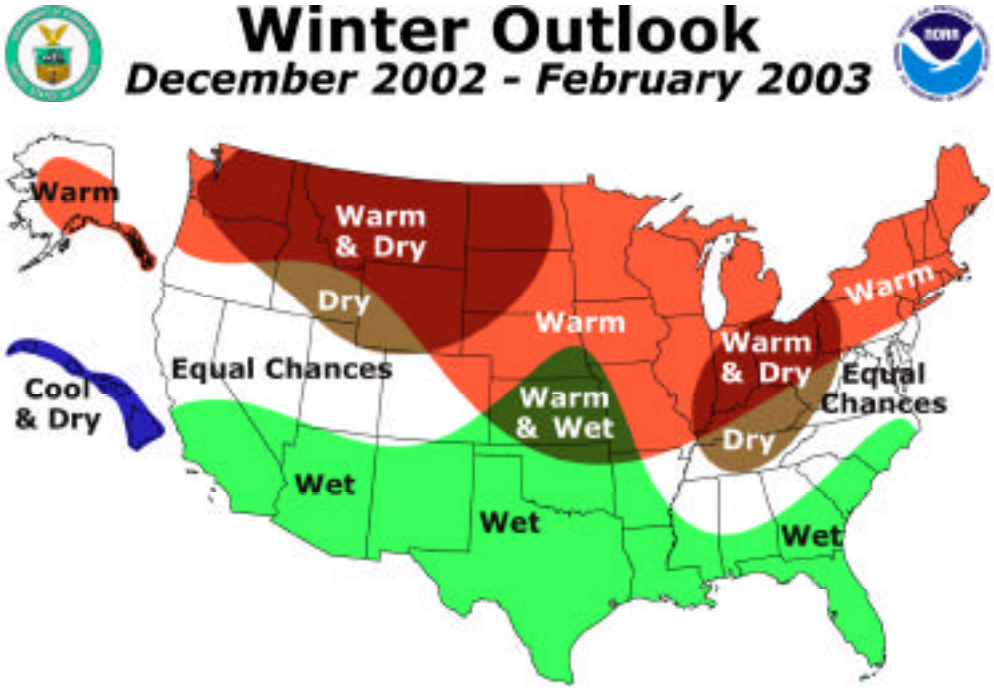

Figure 2. The 2002-2003 winter weather outlook as forecast by the Climate Prediction Center (NOAA).