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NCAR Scientists Participate in International Atmosphere-Ocean Experiments

The Atlantic Stratocumulus Transition Experiment (ASTEX), part of the International Satellite Cloud Climatology Project, takes place this month in the Azores, Madeira and Canary Islands near Portugal. ASTEX is a multinational field observation program to study the physical processes of cloud, ocean and atmosphere interactions over the eastern Atlantic Ocean. NCAR scientists Don Lenschow and Steve Siems are participating in ASTEX and a related project, the Marine and Aerosol Gas Exchange (MAGE) experiment. NCAR's primary contribution to these experiments is the NCAR Electra aircraft, which will be outfitted with instruments for measuring cloud physics.

The primary goal of ASTEX/MAGE is to further our understanding of cloud physics and cloud chemistry, including the effects of atmosphere-ocean fluxes on cloud chemistry and the physical transition of marine stratocumulus clouds to intermittent cumulus clouds. These low-level clouds have an important impact on global climate because they reflect more solar radiation than the underlying ocean, which absorbs it Thus, increasing the coverage of low-level cumulus clouds would produce a net cooling effect.

NCAR scientists Don Lenschow notes that some climate models predict that a 4% increase in the area covered by stratus clouds in the marine boundary layer (up to one kilometer, or 0.6 miles, above the earth's surface) could result in a 4–5° F (2-3° Celsius) cooling effect on global temperatures—an amount roughly equivalent to the estimated warming effect produced by a doubling of atmospheric carbon dioxide. Because of uncertainties about cloud feedback, it is very important to understand more about cloud processes and their role in climate change.

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