EDITORIAL

Atlantic Stratocumulus Transition Experiment

This special issue of the *Journal of the Atmospheric Sciences* is devoted to papers dealing with ASTEX, the Atlantic Stratocumulus Transition Experiment, which was a component of FIRE (the First ISCCP Regional Experiment; ISCCP is the International Satellite Cloud Climatology Experiment), and related modeling studies. The papers deal with virtually all aspects of boundary-layer cloud physics, which is the real topic of this special issue.

A FIRE field experiment conducted off the coast of California in 1987 provided a wealth of data on solid cloud cases but relatively few broken cloud cases. It was not feasible to conduct aircraft missions far enough to the southwest to encounter stratocumulus breakup conditions on a regular basis, and there are no suitable islands to the southwest that could serve as a base of operations. For this reason, it was decided that FIRE Phase II should conduct a boundary-layer cloud experiment specifically targeted at broken cloud cases, choosing a part of the world where such clouds would be readily observable.

This was the impetus for ASTEX, which involved coordinated measurements from aircraft, satellites, ships, and islands in the area of the Azores and Madeira Islands, in the North Atlantic. This region is characterized by broken low cloudiness and strong gradients of low-level cloud amount, with cloud conditions ranging from solid stratocumulus decks to broken trade cumulus. The ASTEX region is not directly influenced by continental effects, and islands provided suitable sites for surface observations and aircraft operations. ASTEX was thus able to address issues related to stratocumulus to trade cumulus transition and cloud-mode selection.

ASTEX involved intensive measurements from several platforms and was designed in particular to investigate 1) cloud-top entrainment instability, 2) diurnal decoupling and clearing due to solar absorption, 3) patchy drizzle and a transition to horizontally inhomogeneous clouds through decoupling, 4) mesoscale variability in cloud thickness and associated mesoscale circulations, and 5) episodic strong subsidence lowering the inversion below the lifting condensation level. ASTEX was designed to provide improved dynamical, radiative, and microphysical models and an improved understanding of the impact of aerosols, cloud microphysics, and chemistry on large-scale cloud properties.

It is my hope and belief that the papers presented in this issue represent a useful snapshot of boundary-layer cloud research in the mid-1990s.

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Guest Editor