SEAWIFS PROJECT; NASA/GODDARD SFC; ORBIMAGE

Meteorology

Getting the wind up

Once research into global change took off on a large scale, few phenomena related to climate escaped measurement. Researchers have dragged unwieldy equipment up mountains in the tropics to drill into the glaciers found there. And the deep ocean has been probed by fleets of sophisticated floats. But wind speeds in the eyewall of hurricanes, where the storm is at its most intense, have long defied observation. On page 279 of this issue, however, Mark Powell and his colleagues present just such measurements (*Nature* **422,** 279–283; 2003).

The data — 331 vertical wind profiles from 15 tropical cyclones — were obtained by dropwind sondes from the Global Positioning System. The sondes are launched from research aircraft at altitudes of between 1.5 and 3 km; they relay their position and measure pressure, temperature and humidity as they fall through the atmosphere and drift with the wind. Tropical cyclones — such as Hurricane Alberto, which occurred in August 2000 and is shown in the satellite image here — derive much of their energy from sea–air exchange. For forecasting purposes it is essential to have accurate information about relevant parameters such as the exchange of momentum, which in part depends on the drag factor exerted by the state of the sea surface.

One of Powell and colleagues' findings is that maximum wind speeds occur at an altitude of about 500 m. More notably, however, they find that one assumption used in predicting the intensity and consequences of hurricanes is incorrect. Previously, in the absence of observations for wind speeds above 25 m s^{-1}, levels of increasing drag with increasing wind speed were extrapolated to high wind speeds. But now it seems that, above hurricane force, about 33 m s^{-1}, a layer of foam and bubbles from breaking waves seems to develop that reduces drag and effectively lets the hurricane glide over the sea. New thinking about how these storms behave will be needed to take this into account.

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