

# Hurricane-Drought Link Bodes Ill for U.S. Coast

*The sub-Saharan drought has eased, perhaps ended, but that may mean more killer storms like Hugo*

METEOROLOGIST WILLIAM GRAY has a penchant for finding connections between hurricanes and far distant weather—and his latest is a doozy. At one end of his linkage is Africa's sub-Sahara region, where subsistence farmers have been plagued by a nearly two-decades-long drought, the worst there in 150 years. At the other end is the southeastern United States, which, until last year, had enjoyed nearly two decades of relative freedom from devastating hurricanes.

A coincidence? Gray, who works at Colorado State University in Fort Collins, thinks not, and if he's right, people living along the coasts of the southeastern United States should brace for more severe storms in the decade ahead. Recent developments support a link between African rain and hurricane intensity, Gray says. The past 2 years' rains in the sub-Sahara were near normal and the heaviest since 1966–67, suggesting that the drought may be at an end. And Atlantic hurricane activity resurged in 1989.

"It's not an absolute certainty that the [sub-Saharan] drought is broken, but there is a good probability of it," says Gray. Therefore, "I think we're probably going to have more of these intense hurricanes in the next decade." Exceptionally destructive storms like last year's Hugo could be

battering the United States every few years.

And intense hurricanes in the 1990s would be even more dangerous because of all the new coastal development during the past two decades of relative quiet. Hugo certainly pointed up that problem. It did more than \$8-billion worth of damage, making it one of the most expensive disasters in U.S. history.

Gray made the African rain-hurricane intensity connection by reviewing some weather history. He found that nothing as intense as Hugo had hit the U.S. mainland since 1969, when the sub-Saharan drought was just getting started. In fact, the weather records showed, no storm that qualified for category 4 or 5, the most destructive types, made a U.S. landfall during the drought. Yet category 4 and 5 storms had hit every 4 to 5 years on average between 1947 and 1969, a time of heavy sub-Saharan rains.



**Which will it be?** A link between sub-Saharan drought and stronger hurricanes could mean more coastal damage in the 1990s.

Although Gray has won many converts to the view that more African rain can mean more intense U.S. hurricanes, he is on far less secure ground in his predictions of a return to a time of devastating U.S. storms. "I think it's a reasonable suggestion" that there is a link between rainfall in West Africa and hurricane intensity, says Kerry Emanuel of the Massachusetts Institute of Technology, although the details of the connection are obscure.

In broad outline, however, meteorologists know that hurricane formation in the subtropical Atlantic requires a trigger of

some kind, a primary one being the atmospheric disturbances provided by a wavy jet of wind that shoots out from West Africa. Apparently, something about increased West African rain makes the waves more effective triggers, Emanuel says, especially of the more intense storms, but what that something is remains a mystery.

To many climatologists with an interest in African drought, the weak link in Gray's reasoning is his prognosis for the sub-Sahara. "I don't have any quibble with what he's trying to do," says Peter Lamb of the Illinois State Water Survey in Champaign, "but what he says about hurricanes [in the next decade] depends on the drought having ended, and I wouldn't go that far. It's nothing like a recovery back to the '50s. I'm waiting for a really wet year."

Gray, for one, is not sitting back and waiting. He has no delusions about predicting climate years ahead, but he is working hard to find a way of predicting whether the coming summer's West African rains will be normal, light, or heavy. He expects that such a prediction will improve his forecast of the number of hurricanes in the coming season.

Gray has been making such forecasts for 6 years and doing quite well at it as climate forecasting goes. Until now, however, he has not been taking West African rain into account because he saw no obvious way to predict the rainfall there months ahead. Fortunately for Gray, during his first 5

years of hurricane forecasting sub-Saharan rain remained consistently sparse so that it was not a crucial factor.

But then came 1989. "This last year was my worst year ever," he says, "because of the African-spawned hurricanes." The increase in West African rainfall apparently overrode the influences of the four factors that he has been using to forecast hurricane frequency. Those factors suggested that the past season would be moderate, but instead Gray got one whose hurricanes had more than twice the predicted destructive potential. Such a

glaring failure only reinforced Gray's confidence in the rain-hurricane connection and prompted his bleak U.S. outlook now that the African drought may be ending.

Although Lamb and others may be rightfully leery of trying to second-guess the drought, the odds would seem to be on Gray's side. Records of sub-Saharan drought extending back at least 200 years show periods of predominantly wet weather alternating with drought roughly every 25 years. The present drought is 20 years old, so Africa—and Atlantic hurricanes—may be ripe for a change. ■ **RICHARD A. KERR**



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