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North Africa drought linked to natural causes
Wednesday, December 1, 1999
By John Roach

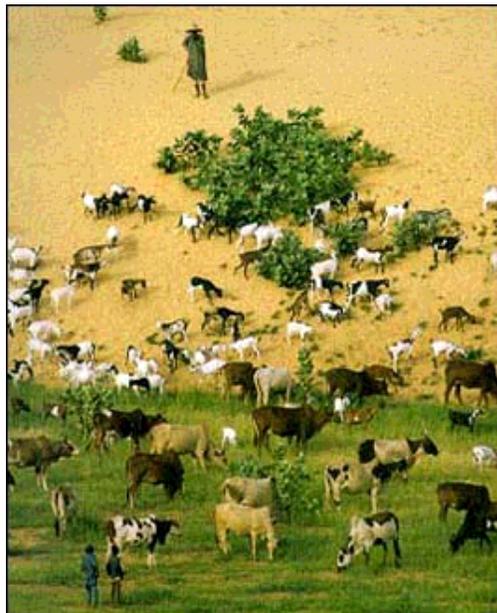
The drought that has plagued North Africa since the 1970s is fueled by natural phenomena instead of human-induced changes to the landscape, according to a computer climate model that takes natural vegetation into account.

Scientists have been trying to understand what caused the drought. Some studies suggest that by using the land for farming and livestock grazing, humans were responsible for bringing about the drought and keeping the land from recovering.

Other studies indicate the drought could be attributed to the lack of rainfall caused by changing temperatures of the ocean surface, said Ning Zeng, an atmospheric scientist at the University of California, Los Angeles.

In trying to determine the true cause of the drought, Zeng and his colleagues used a computer climate model to see how much of the drought could be attributed to cooler sea surface temperatures that suppress summer monsoons and bring less rain to the Sahel region.

The model showed that changing sea surface temperatures could not account for much of the drought at all. To find out what else might be causing the decades-long dry spell, the scientists added soil moisture to the model. They found that as the soil dried out, the air lost humidity, making the chance of rain decrease even more.



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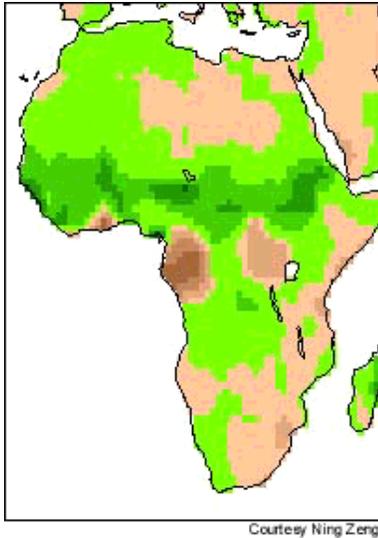
The research, conducted by Ning Zeng and colleagues, was published in the November issue of the journal *Science*.

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To round out the picture, the scientists added natural vegetation to the model and found that natural vegetation interacts with the climate and in the case of the Sahel region, caused enhanced drying.

Rising sea temperatures, monsoons linked



Variables, such as the amount of rainfall, were plugged into the computer model to determine the causes of the drought.

"The way it works is when it gets drier due to changes in sea surface temperatures, less vegetation grows. And less vegetation leads to higher surface albedo (greater amount of solar radiation)," said Zeng in a statement.

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A higher surface albedo leads to a drier, cooler climate. The cooling effect weakens the monsoon circulation, and less moisture comes in from the south and west, said Zeng.

Also, since plants transpire by losing water through their leaves, less vegetation decreases humidity. The loss of a direct moisture supply means less rainfall, which causes weaker circulation, dampening the monsoon season.

The computer model, however, does not exempt human-induced landscape changes,

Zeng added in an interview. According to the models, one-third of the drought lies in the initial ocean forcing, one-third from the soil and vegetation and one-third likely comes from human-induced changes.

More tests need to be done to determine just how much of an influence human-induced changes have. Nevertheless, the model shows without the addition of human-induced changes, the climate system is fully capable of generating this type of drought, said William Lau, a scientist at the Goddard Space Flight Center in Greenbelt, Md.

A paper on this research appeared in the Nov. 19 issue of the journal *Science*.
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