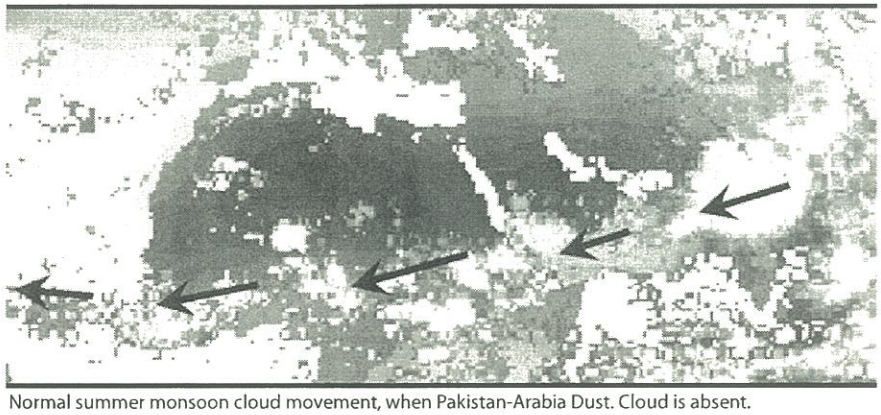
The Dust Cloud That Eats Cyclones and Causes Droughts and Floods

by Craig Dremann © 2012

If you ask a person on the street, "What is the most powerful single weather phenomenon on the planet?" some might say a swarm of tornadoes or a Category 5 hurricane spinning at 150 miles an hour.

But the most powerful actor on the world's climate stage appears to be the relative unknown phenomenon of atmospheric dust. Until recently scientists had limited technologies to study dust, as differentiated from smoke, sulfur dioxide, ocean spray and other particulate matter.

This dust, which originates from barren landscapes and is largely caused by overgrazing and man-made desertification, appears to have profound effects on the world's climate. Large amounts of dust coming from vast barren regions such as from western India to Arabia, have formed dust clouds large enough to modify the world's weather and rainfall patterns.



Normal summer monsoon cloud movement, when Pakistan-Arabia Dust. Cloud is absent.

Floods were occurring in Pakistan on September 11, 2012, after the Dust Cloud moved away from Pakistan and retreated to Arabia.

Researchers from the Monterey, California Naval Research Laboratory, using the Navy Aerosol Analysis and Prediction System (NAAPS) can now separate four major atmospheric components that could have an effect on global climate: water vapor, atmospheric dust, atmospheric smoke (caused mostly by agricultural burning of fields), and sulfates from coal burning and gas flaring in oil-production fields.

Atmospheric smoke garnered much research interest because it was thought that the black carbon of the soot could have a major impact on absorption of heat from the sun or have other consequences.

Most climatologists or meteorologists have considered atmospheric dust, dust storms and dust clouds as nuisances and not as significant weather modifiers. Consequently, not much measurement has been made regarding its contribution to worldwide weather. And there has been little understanding of the power of this phenomenon's impact on global weather patterns.

As an amateur climatologist with a particular interest in the effects of desertification on weather patterns, I wrote (in *How Revegetation Can Reduce Global Warming,* PD PULSE, Winter,'02) that the movement of summer monsoon clouds going westward from India towards Arabia were hitting a wall in the middle of the Arabian Sea. The clouds seemed to disappear between India and Arabia on satellite cloud images, such as those from the University of Wisconsin.

The western Pacific Ocean north of Australia is the birthplace of summer-monsoon moisture for the northern hemisphere. Moisture moves west to Asia and India, then over Arabia to the Sahel in northern Africa. The rain clouds that pass over the Arabian Peninsula usually disappear as invisible water vapor, then reappeared as clouds that move westward over equatorial Africa. After moving across Africa, the monsoon clouds then move across the Atlantic where they end up raining on U.S. crops and move south to keep the Amazon forest alive.

I suspected that the heat radiating from Arabia was dissipating the clouds. But since technologies such as NAAPS have sorted out the atmospheric dust, there is new evidence that massive dust clouds could be the culprits.

Meanwhile, dust clouds that are swept up over North Africa's Sahara Desert, the Arabian Peninsula and the Gobi Desert are major contributors to the world's atmospheric dust. Two large clouds—one over Arabia and the other over Pakistan—act in such a way as to

be one giant cloud in terms of their effects on climate. Naming them the Pakistan-Arabia Dust Cloud, one can see a startling effect on rain patterns by comparing the daily movement of the monsoon moisture and the daily images of the dust.

The dust cloud takes one step back, and simultaneously the monsoon rain takes a step forward and floods that spot. Internet webpage links at the end of this article show images of that meteorological dance.

Daily dust cloud-monsoonal interaction indicated that whatever land the dust cloud covered in a particular week, that area was almost guaranteed to not have rainfall. During almost all of 2012, a powerfully dense dust cloud shut off the monsoonal flow to all countries down from the expected stream of moisture: in Saudi Arabia, the Horn of Africa, the North African Sahel, North America and the Amazon. For example, in June 2007, the dust cloud stopped the Category 5 Super Cyclone Gonu dead in its tracks, dissipating the moisture as if eating an oatmeal cookie.

But the Pakistan-Arabia dust cloud has also proven to be a double-edged sword, as evidenced by recent flood events. In 2012, for example, the eastern edge of the Pakistan-Arabia dust cloud is located at the India-Pakistan border. When the monsoon clouds hit the leading edge of the dust cloud, it stalls the rains over India or Pakistan, thereby causing floods.

Torrential rains and flood events prior to 1985 were extremely rare on Arabian Peninsula, according to Michael O. Walter in his 1989 paper "A unique flood event in an arid zone," published in Hydrological Processes, Volume 3. Walter estimated that flood events in Arabia were only expected to happen approximately every 200 years.

In April 23, 1985, a flood event in southwest Saudi Arabia killed 32 people. Prior to 1992, monsoonal moisture from India formed tropical storms and cyclones west of India and in the Arabian Sea, but those usually dissipated before making landfall and causing any deaths or damage in Pakistan or Arabia. Tropical storms in 1992, 1994, 1995, and 1998 followed that pattern, according to weather reports.

But the tipping point came on June 10 to 12, 1996, when the Sultanate of Oman was hit by Tropical Storm 02A. That event dumped a total rainfall of 300 mm (12 inches) in two days, according to newspaper reports.

In 2002, four flood events recorded that year set a pattern of annual floods in Arabia that has continued to date. Beginning in 2010, Pakistan started experiencing annual floods on a massive scale that has not been seen for 100-300 years in that country.

But the dust clouds do have a positive character to consider; they are man-made. Judicious land management, including native-plant restoration and reducing overgrazing, wholesale plowing and deforestation, could help keep soils in place and reduce dust clouds.

Throughout human history, people have largely believed that we were at the mercy of whatever weather occurred—

Super tropical Category-5 cyclone Gonu in June 2007, being trapped, engulfed and dissipated by the Arabian portion of the Pakistan-Arabia Dust Cloud. The atmospheric dust cloud that is hovering over Pakistan and Arabia each summer is the most powerful of all of dust clouds so far.

droughts, floods and dust storms. But perhaps by understanding the power of the dust, we can modify weather in a positive way

This work cannot be achieved in wealthy countries alone, however. Chaos Theory describes the Butterfly-effect, where the flapping of a butterfly's wings could cause a hurricane somewhere else on the planet. So too, actions at one end of the world can cause record drought half the planet away. This could only be altered by investment and understanding of our global workings in the places of the dust's origin.

One aspect of this mind shift might occur through establishment of ecological restoration preserves in lands where the dust clouds originate. But local people must receive an economic incentive to protect the native grasses, wildflowers and local trees, instead of using them for animal feed.

Perhaps land restoration should be paid for by the countries burning the most carbon. Replanting the vegetation in these barren lands would also create carbon credits from the sequestered soil carbon.

Internet Links

2007 Super Category 5 Cyclone Gonu being eaten by the Dust Cloud
www.ecoseeds.com/GONU.html

GIF movie of Super Cyclone Gonu being eaten by the Dust Cloud
www.ecoseeds.com/GONU_movie_world.gif

2010 Pakistan flood and the daily dance with the Dust Cloud
www.ecoseeds.com/floods

2011 Pakistan floods and the daily dance with the Dust Cloud
www.ecoseeds.com/floods2.html

2012 drought in Pakistan and USA being caused by Dust Cloud
www.ecoseeds.com/2012drought.html

Pakistan floods being caused by Dust Cloud movement away from the country.
www.ecoseeds.com/2012floods.html2012

2010 Pakistan floods
www.wikipedia.com/en.wikipedia.org/wiki/2010_Pakistan_floods

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