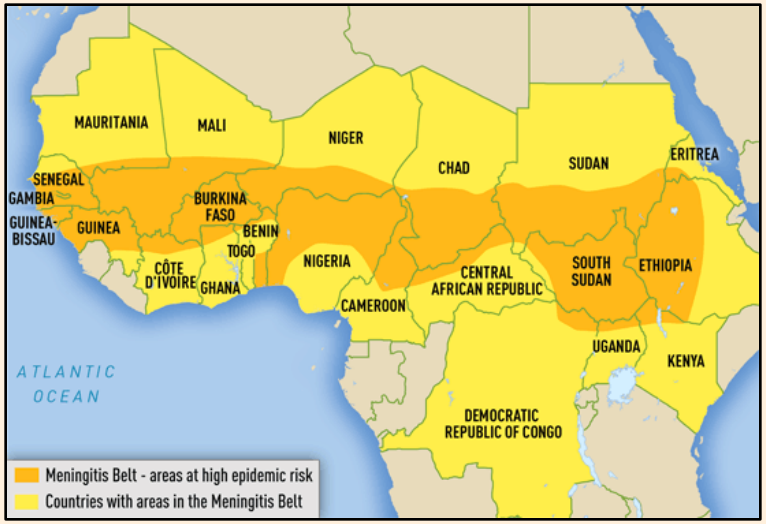
Human Health

Jesse E. Bell, PhD
Research Scholar
Cooperative Institute for Climate and Satellites – NC
NOAA's National Centers for Environmental Information
Asheville, NC

Public Health Issues

Inspire. Advance. Engage.



Air Pollution

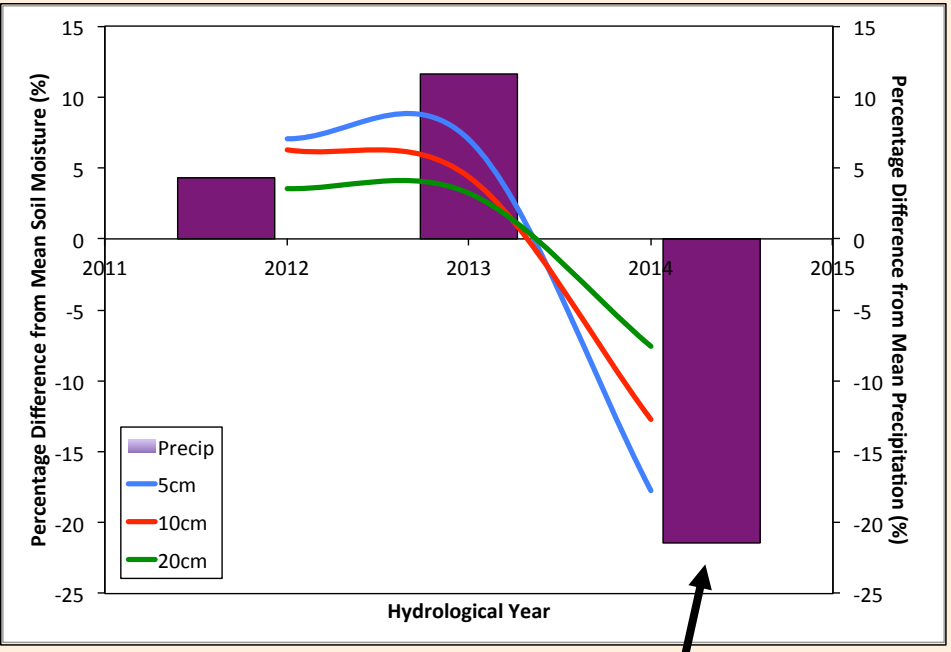
Smoke from Fire
Cannon Fire 2002

Haboob (Dust Storm) Phoenix, AZ
July 21, 2012

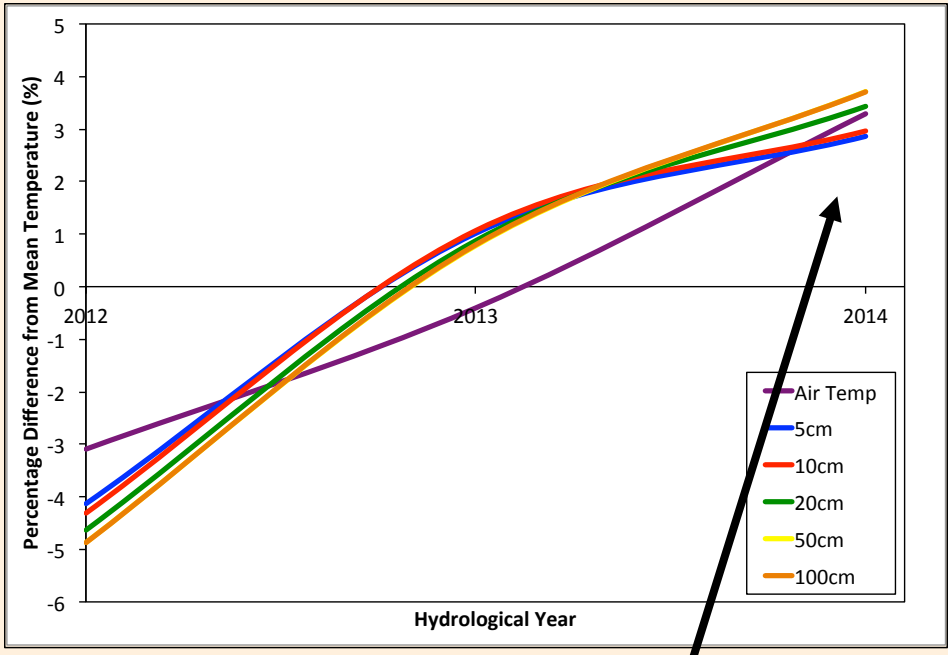
Soil Moisture and Extreme Temperature

Inspire. Advance. Engage.

California Drought of 2014



Low Soil Moisture 2014

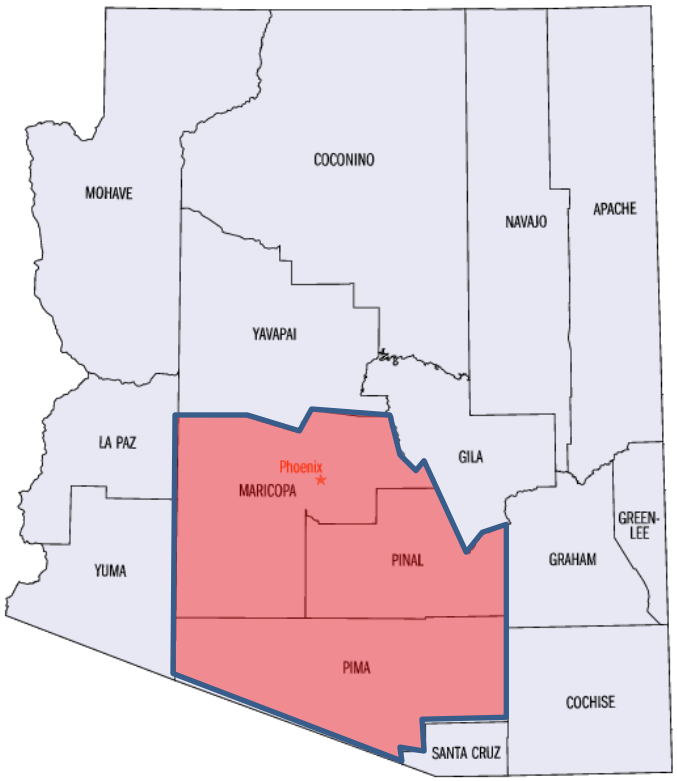


High Temperature 2014

Coccidioidomycosis

Inspire. Advance. Engage.

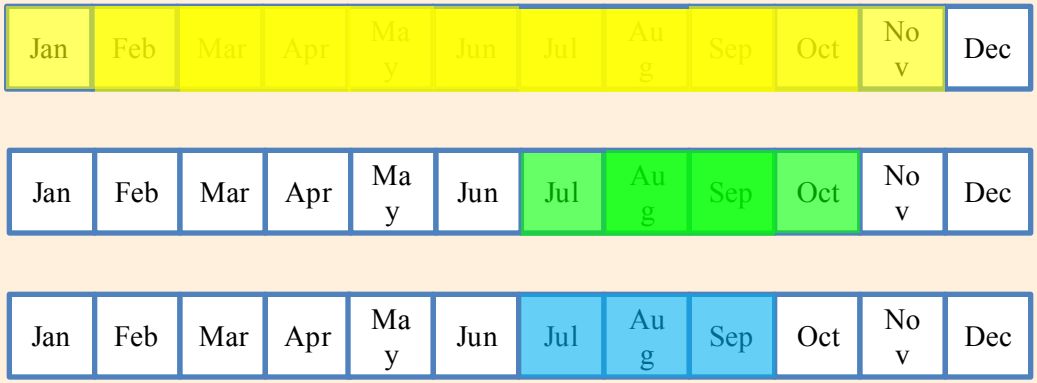
An application:
Utilizing soil moisture to predict valley fever…



…and we match up each county with its nearest USCRN or SCAN gauge to obtain soil moisture estimates…

…preparing a model estimate alongside the *in situ* estimates at each sensor location.

New Information:
Gaining insight in California



Cases of valley fever in year X…

…are inversely correlated with hours above 10% in year X-1

…and inversely correlated with hours above 10% in year X-2

We analyze statistically significant relationships, and the following patterns emerge/recur.

THE IMPACTS OF CLIMATE CHANGE ON

HUMAN HEALTH

IN THE UNITED STATES:

A SCIENTIFIC ASSESSMENT

Health2016.globalchange.gov

U.S. Global Change Research Program

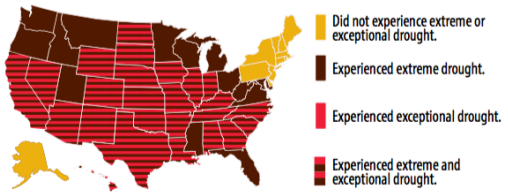
Inspire. Advance. Engage.

DROUGHT AND PUBLIC HEALTH IN THE U.S.

Why drought matters

When drought affects a community, its devastating consequences can include decreased food production, decreased water quantity and quality, and increased risk to human health. These effects can be far-reaching, complex, and costly.

States that experienced extreme or exceptional drought, 2005–2015



- Droughts are one of the most costly climate-related events. From 1980-2014, there were 22 droughts in the United States that each cost over $1 billion.
- Droughts continue to impact the United States:
  - In 2012, the most geographically extensive drought to affect the U.S. since the 1930s covered over 50% of the country and cost $31 billion.
  - For the state of California alone, the current western drought has cost thus far over $4.9 billion and has contributed to the loss of more than 21,000 jobs.

How drought can affect health

Drought can have many harsh effects on plants, animals, and the environment. This can contribute to increased risk to human health. Here are only a few examples of what drought can do:

Cause stress, anxiety, and depression. Drought causes economic losses to businesses that rely on water (for example, farms and landscape companies) and job loss for people who work in these areas.

Change the amount and patterns of certain diseases. For example, mosquitoes carrying West Nile virus can move into new areas when stagnant bodies of water create new breeding grounds. Also, dry and dusty soil conditions can increase the risk of Valley Fever, a lung infection caused by a fungus in the soil.

Intensify wildfires and dust storms, thus increasing the number of particulates in the air. This can worsen asthma and other heart and lung diseases.

Intensify heatwaves causing increased risk of injury and death from heat exhaustion or heat stroke.

Stress city- or county-wide water systems that supply water not only to households but also at-risk populations such as people in hospitals and nursing homes.

What is NCEH doing?

Drought is a recurring event. Planning and preparation can help reduce the impact of drought on communities. Here are a few examples of National Center for Environmental Health's (NCEH's) current drought-related activities:

- Collaborating with organizations like the National Oceanic and Atmospheric Administration (NOAA) and National Integrated Drought Information System (NIDIS) to identify ways to better clarify the effect of drought on human health.
- Supporting public health partners to better understand health effects and to increase drought resiliency.
- Providing a guidance document for public health: When Every Drop Counts: Protecting Public Health During Drought Conditions—A Guide for Public Health Professionals (See http://www.cdc.gov/nceh/ehs/publications/drought.htm).
- Providing technical assistance to communities on private well water issues and algal bloom outbreaks.
- Creating a drought resource guide for public health professionals that will include information on best practices, lessons learned, gaps, data sources, and tools regarding public health preparedness and response for drought.

For more information on CDC's National Center for Environmental Health work with drought, visit our website at http://www.cdc.gov/nceh/drought/.

National Center for Environmental Health
Division of Environmental Hazards and Health Effects

CDC ATSDR

CS263437