



# Climate change and conflict in Darfur

*Presentation material for educators and activists*

developed by: **UnderstandingSudan.org**

latest version: April 25, 2008

# Geography

Darfur<sup>1</sup>

Sudan in the Region<sup>2</sup>



Sudan in the World

1. <http://rightsmaps.com/html/sudmap1.html> and
2. <http://www.alertnet.org/thenews/newsdesk/L03772791.htm>

# An influential view on Darfur



- “You take Darfur, the worst crisis right now on the planet. Darfur, at its core, is a conflict of insufficient rainfall.”
  - Jeffrey Sachs , Director, Earth Institute at Columbia University, author of The End of Poverty: Economic Possibilities for Our Time

# More Sachs quotes on the Darfur crisis

- “Two things have happened. First, the population has doubled in the last generation, and second, *the rainfall has gone down sharply*. These are very hungry, crowded people, and now they are killing each other.”

<http://www.carnegiecouncil.org/viewMedia.php/prmTemplateID/9/prmID/5132>

- “Several studies have shown that a *temporary decline in rainfall* has generally been associated throughout sub-Saharan Africa with a marked rise in the likelihood of violent conflict in the following months.”

Scientific American, July 2006

- This is a place without enough rainfall, *right now*, to keep the population alive.

<http://www.results.org/website/article.asp?id=1473>



# More Sachs

“When the rains faltered in the 1980s, violence ensued. Communities fought to survive by raiding others and attempting to seize or protect scarce water and food supplies. A drought-induced famine is much more likely to trigger conflict in a place that is already impoverished and bereft of any cushion of physical or financial resources. Darfur was also pushed over the edge by ethnic and political conflict, with ambitious, violent and unscrupulous leaders preying on the ethnic divisions.”

*Scientific American*, July 2006

So, drought “triggered” conflict, but ethnic and political conflict also “pushed”

# Proponents of “Darfur as a Resource Conflict”

- Al Gore’s movie “An Inconvenient Truth”
  - Expect more events like this with global climate change
- Groups such as WWF, Brookings Institute and UNEP have espoused this view
- Omar Al Bashir, President of Sudan

# Darfur as an environmental crisis

- Short-term rainfall decline
  - Reductions in rainfall in 2002 led to 2003 conflict?
- Long-term rainfall decline
  - Darfur has never really rebounded from the droughts of the 1974-75, 1984-85 and 1990?
- Population Growth
  - Increase in both human and animal population leads to fighting?

# Violent Environments?

- Environmental Determinist Model (Kaplan 1994; Homer-Dixon 1999)
  - Resource induced scarcity → population growth → environmental conflict
- Political Ecology Model (Peluso and Watts 2001; Hartmann 2001)
  - structural elements determine how resources are allocated
  - abundance of resources is equally likely to cause violence.
  - Need to look at place-specific, spatially oriented interactions among relations of production, environmental process and discourse

# Resource Conflict Scenario

- Pasture and land crisis
  - Nomadic groups have been prevented from gaining access to pasture for their animals
  - Desertification has reduced the productivity of land, leading to increased conflict and increased poverty
- Water Crisis
  - Insufficient water has led to conflicts over natural resources

# More on the pastoralist-farmer conflict

## version

### Livelihoods Under Siege report

- “The traditional symbiosis between herder and farmer has been eroded in recent decades as people’s livelihoods have converged, shifting the moral geography of herder and farmer and bringing them into conflict with one another.”
- “Declining rainfall and encroaching desertification have contributed to North–South migration which, combined with increasing population pressures, has created more direct competition for access to natural resources.”

p. 109, Darfur - Livelihoods Under Siege, Young, H., Osman, A.M., Aklilu, Y., Dale, R., Badri, B. and Fuddle, A.J.A. (June 2005) Feinstein International Famine Center, Tufts University, Medford, MA USA



# The pastoralist-farmer conflict version

## Environmental degradation as a cause of conflict in Darfur conference proceedings

- “There is an essential need to address the root cause of the problem – competition over dwindling natural resources.”
- “Deterioration in both rainfall and land fertility has led to a sharp decline in the production of rain-fed crops. Competition between settled pastoralist farmers and nomads is a feature of the natural resources-based conflicts in Darfur.”
- “The increased population has pressed its need for a livelihood upon the natural resources and has thus resulted in great pressure upon, overuse and misuse of these resources. In turn the ecological conditions have changed through declining rainfall, drought and desertification etc.”

p. 7, 15 and p. 35, Environmental degradation as a cause of conflict in Darfur, University for Peace Africa Programme, 2005.

# Following graphs illuminate a subset of relevant hypotheses

- Was there a short-term decline in rainfall?
- Was there a long-term decline in rainfall?
- Was there a structural break in rainfall?
- Do structural breaks in rainfall cause conflict decades later?

See source paper: Michael Kevane and Leslie Gray, "Darfur: Conflict and Rainfall" Santa Clara University, 2008.

Shamāl Dārfūr (Northern Darfur)



Sudan

GPCP node 13.75N 26.25E

GPCP node 13.75N 23.75E

El Geneina

El Fasher

Hulme node 12.5x22.5

Hulme 12.5x26.25

En Nahud

Nyala

GPCP node 11.25 N 23.75E

GPCP node 11.25N 26.25E

Janūb Kurdufān (So

Janūb Dārfūr (Southern Darfur)

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Pointer 12°30'52.67" N

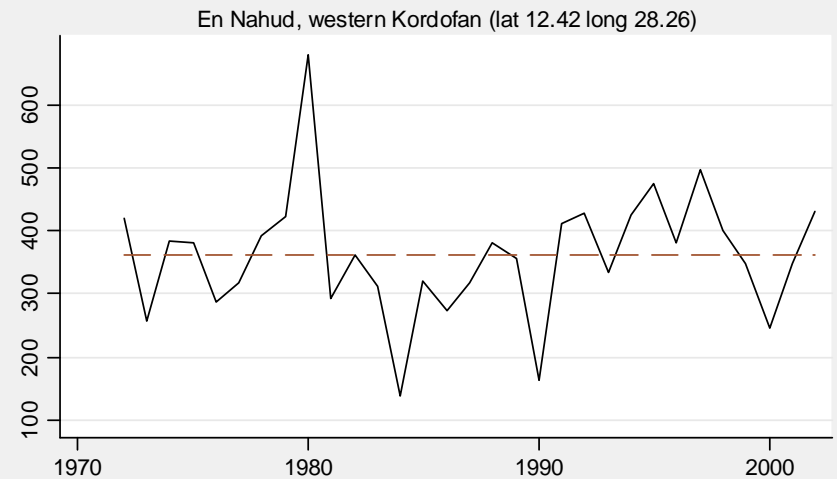
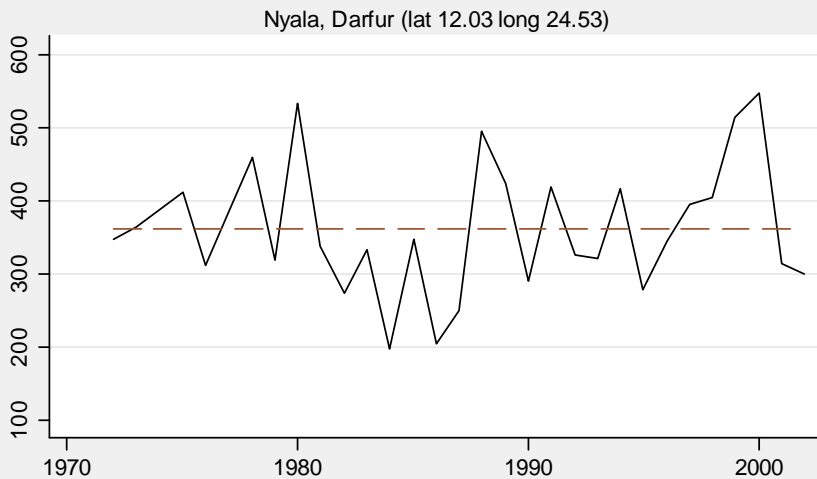
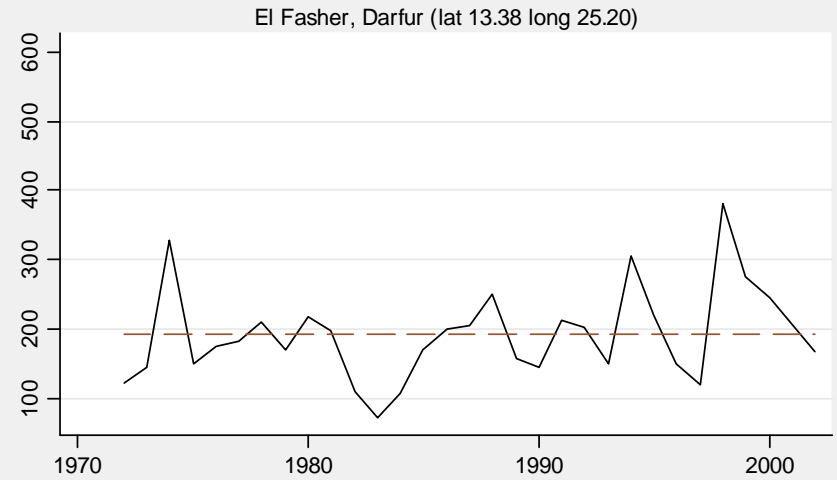
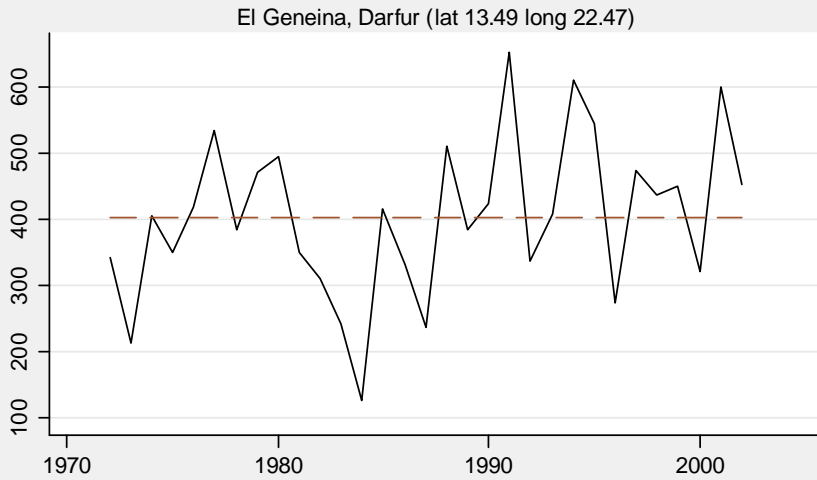
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Streaming ||||| 100%

Eye alt 548.43 mi



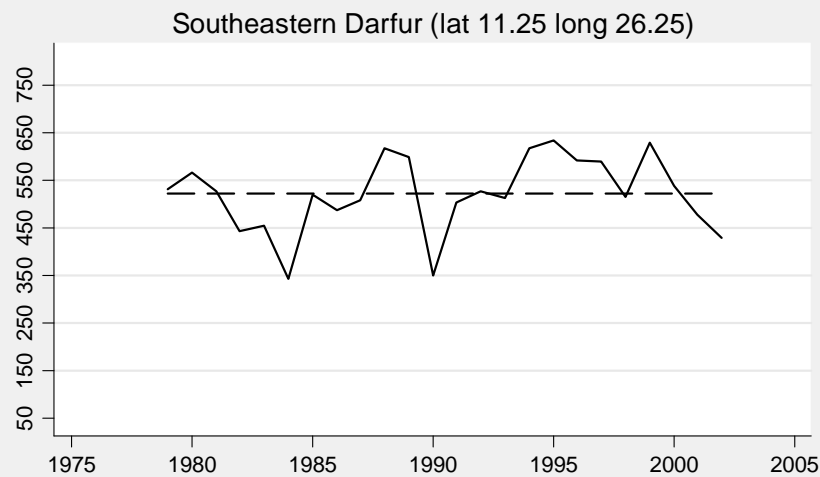
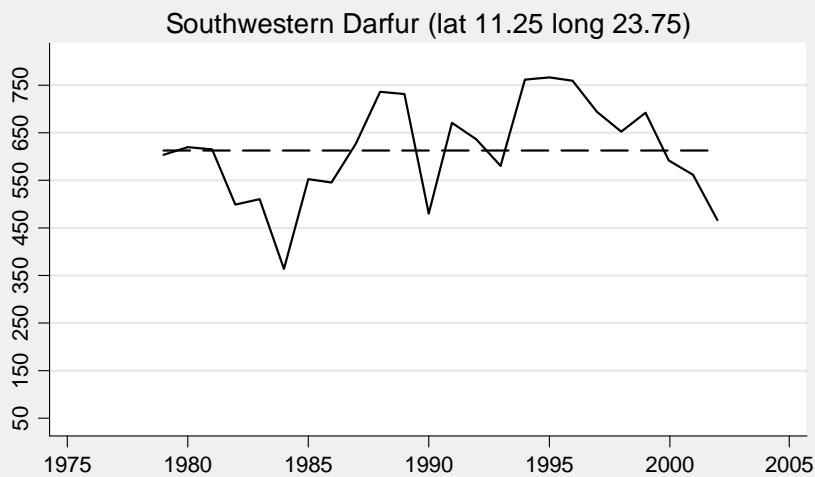
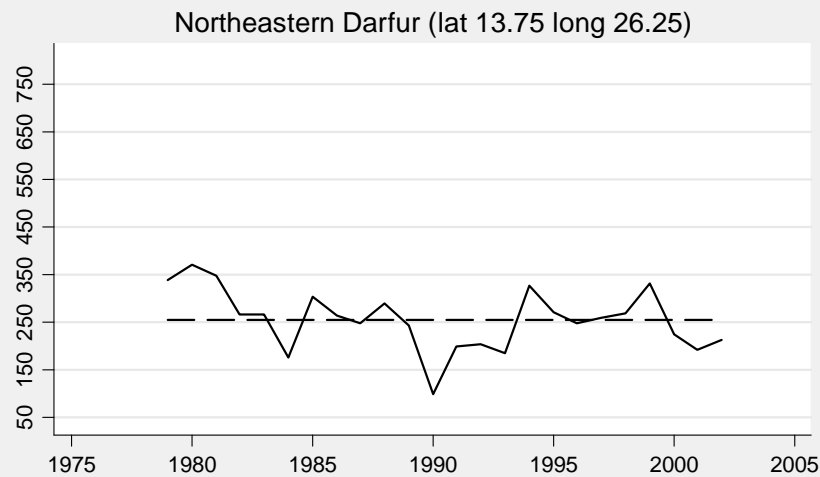
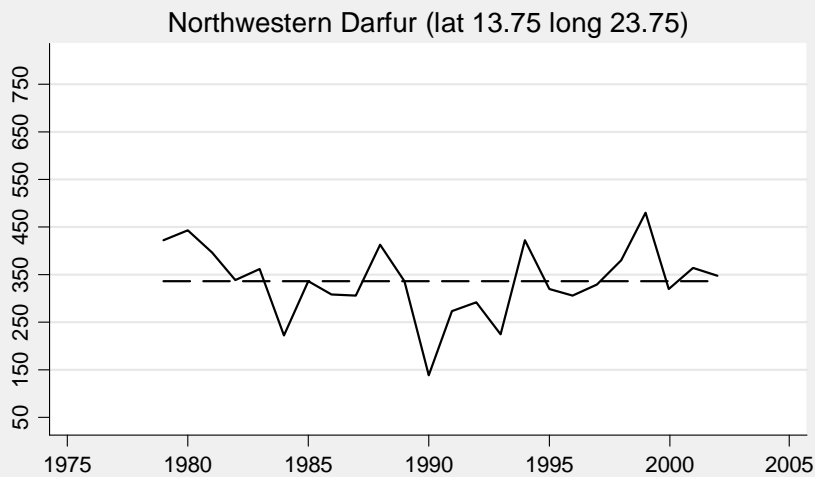
# Figure 2: Rainfall at four rain stations in Darfur area (annual mm.), 1972-2002 (dashed lines are mean rainfall for period)



Source: Sudan rain station data provided by David Lister, Climatic Research Unit, University of East Anglia

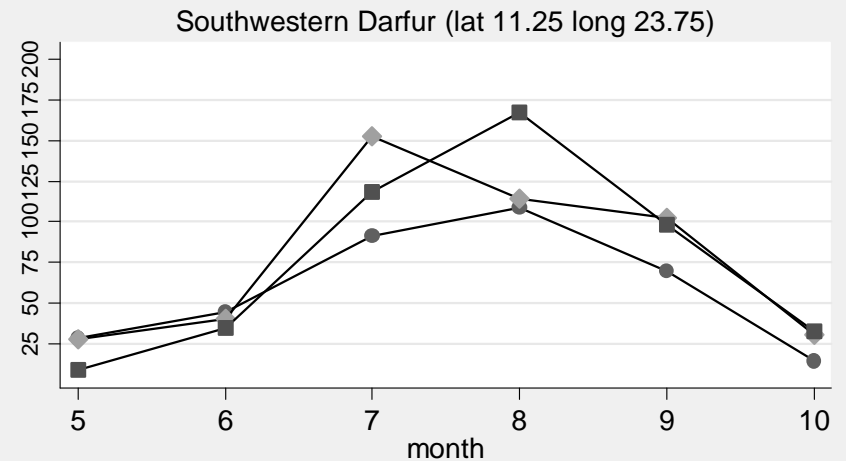
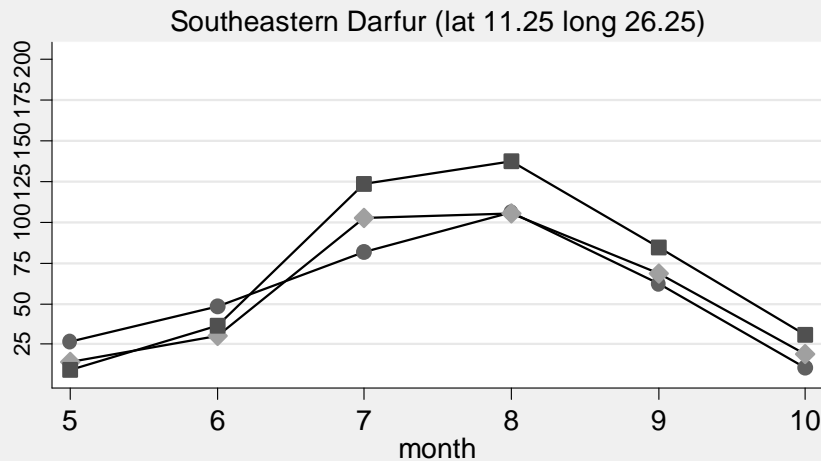
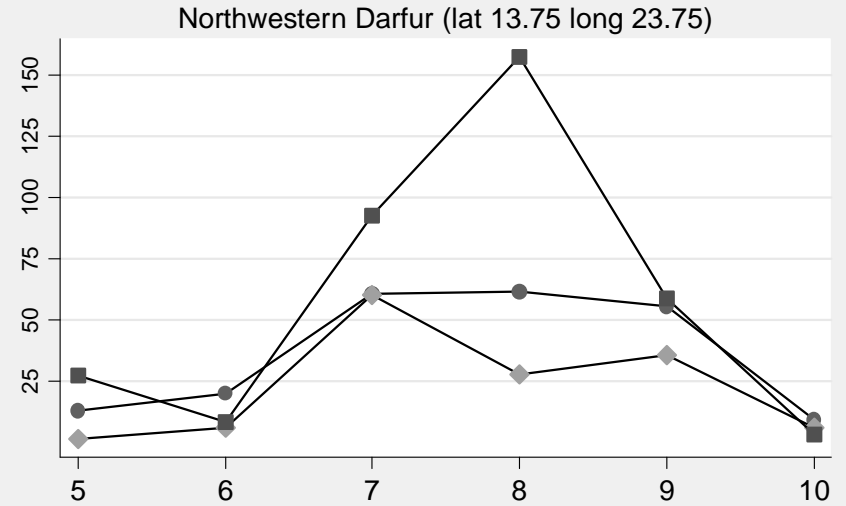
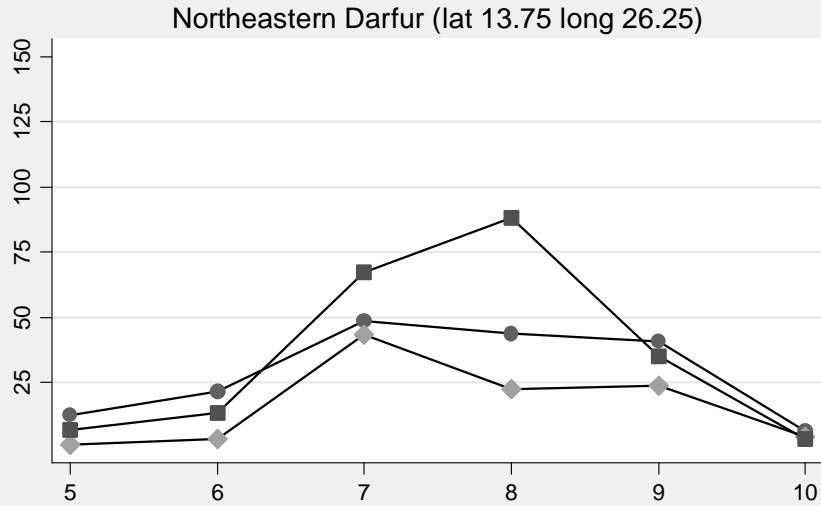
# Figure 3: Rainfall at four latitude-longitude nodes in Darfur (annual mm.), 1979-2002

(dashed lines are mean rainfall for period)



Source: GPCP Version 2 Combined Precipitation Data Set

# Figure 4: Distribution of monthly rainfall in Darfur in 1984, 1990 and 2002

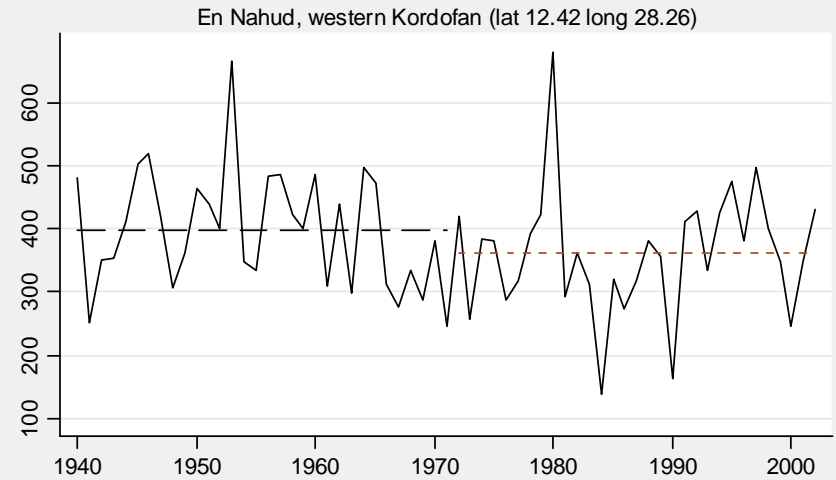
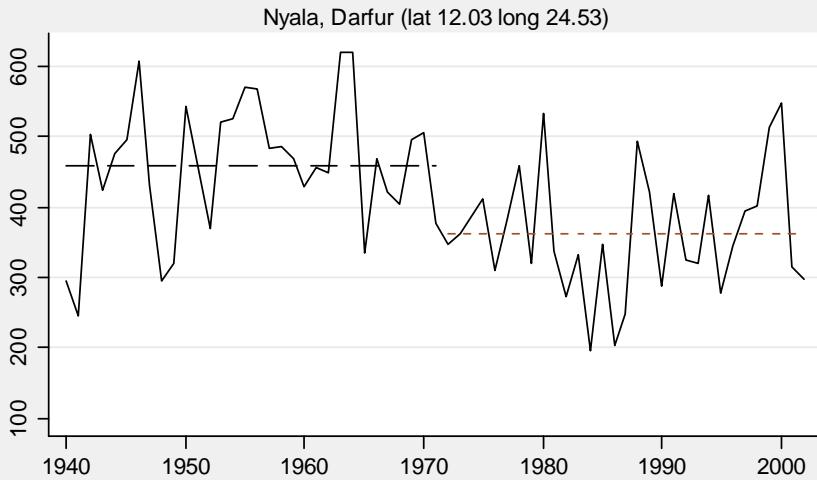
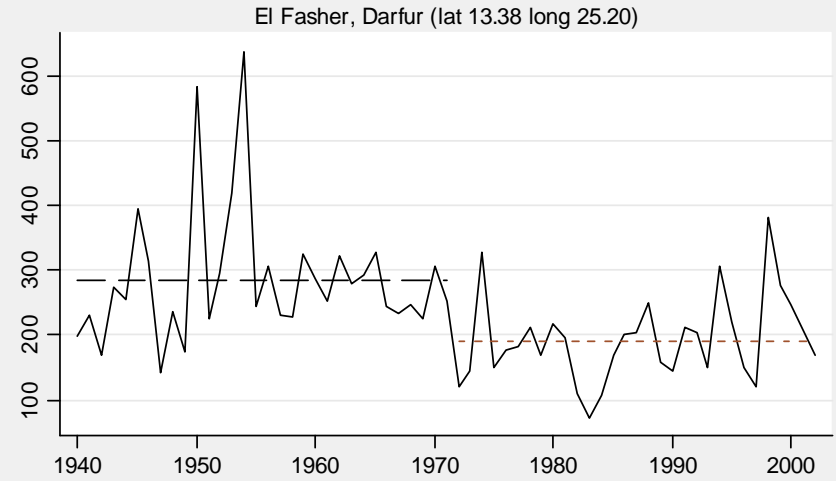
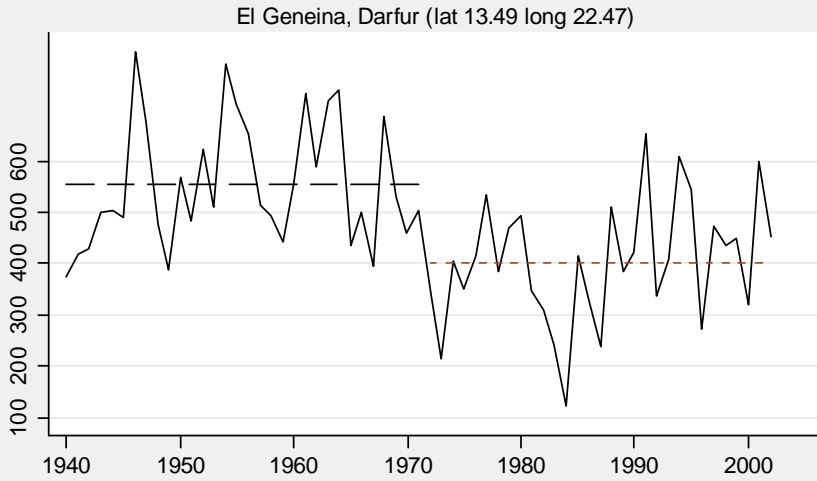


1984    
  1990    
  2002

1984    
  1990    
  2002

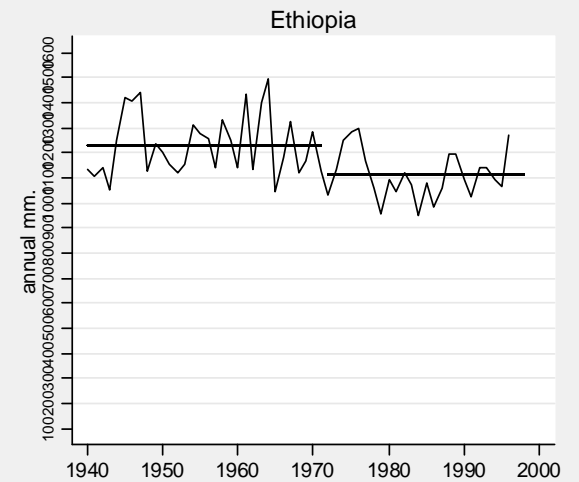
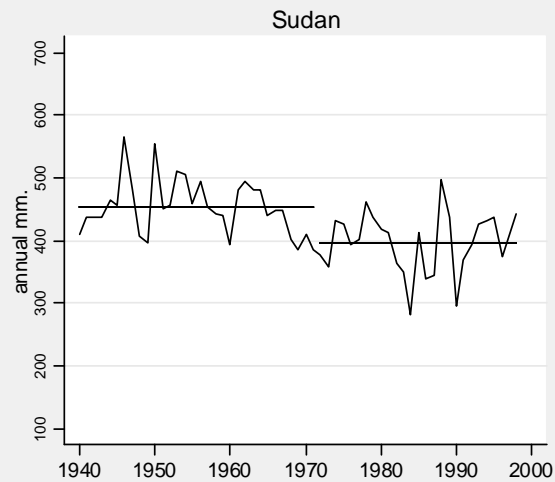
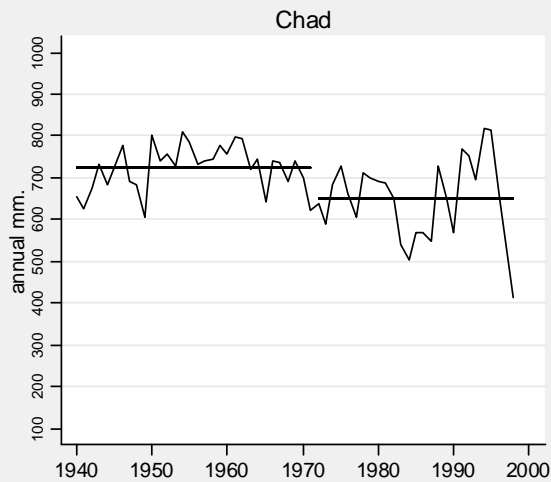
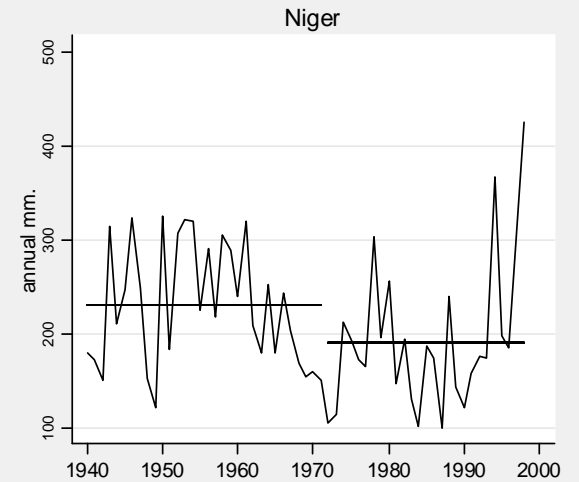
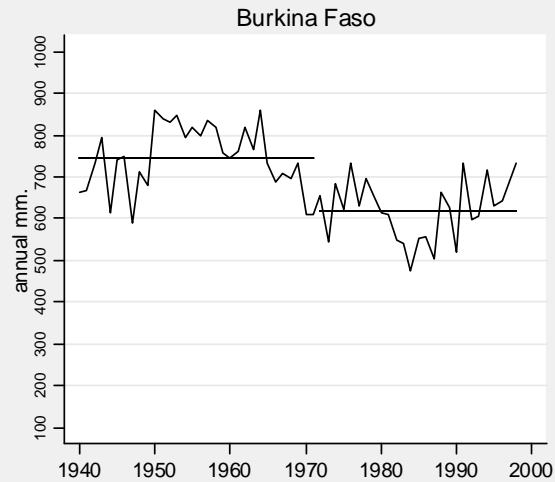
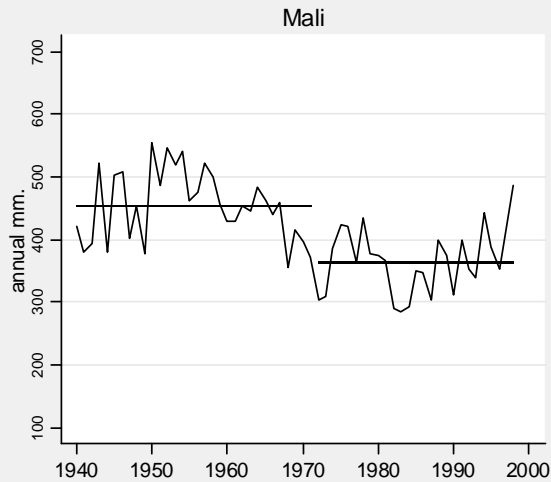
Source: GPCP Version 2 Combined Precipitation Data Set

Figure 5: Rainfall at four rain stations in Darfur area (annual mm.) 1940-2002  
 (dashed lines are means for 1940-71 and 1972-2002)



Source: Sudan rain station data provided by David Lister, Climatic Research Unit, University of East Anglia

Figure 6: Rainfall in six Sahelian countries, 1940-1998  
(dashed lines indicate mean levels for 1940-71 and 1972-1998)



Source: gu23wld0098.dat (Version 1.0), provided by Mike Hulme, Climatic Research Unit, University of East Anglia