

Drought, Political Exclusion, and Civil War



Ole Magnus Theisen^{1,2},
Helge Holtermann^{1,3}, and
Halvard Buhaug²

¹Norwegian University of Technology and Science;

²Centre for the Study of Civil War
International Peace Research Institute, Oslo (PRIO);

³University of Oslo (UiO)

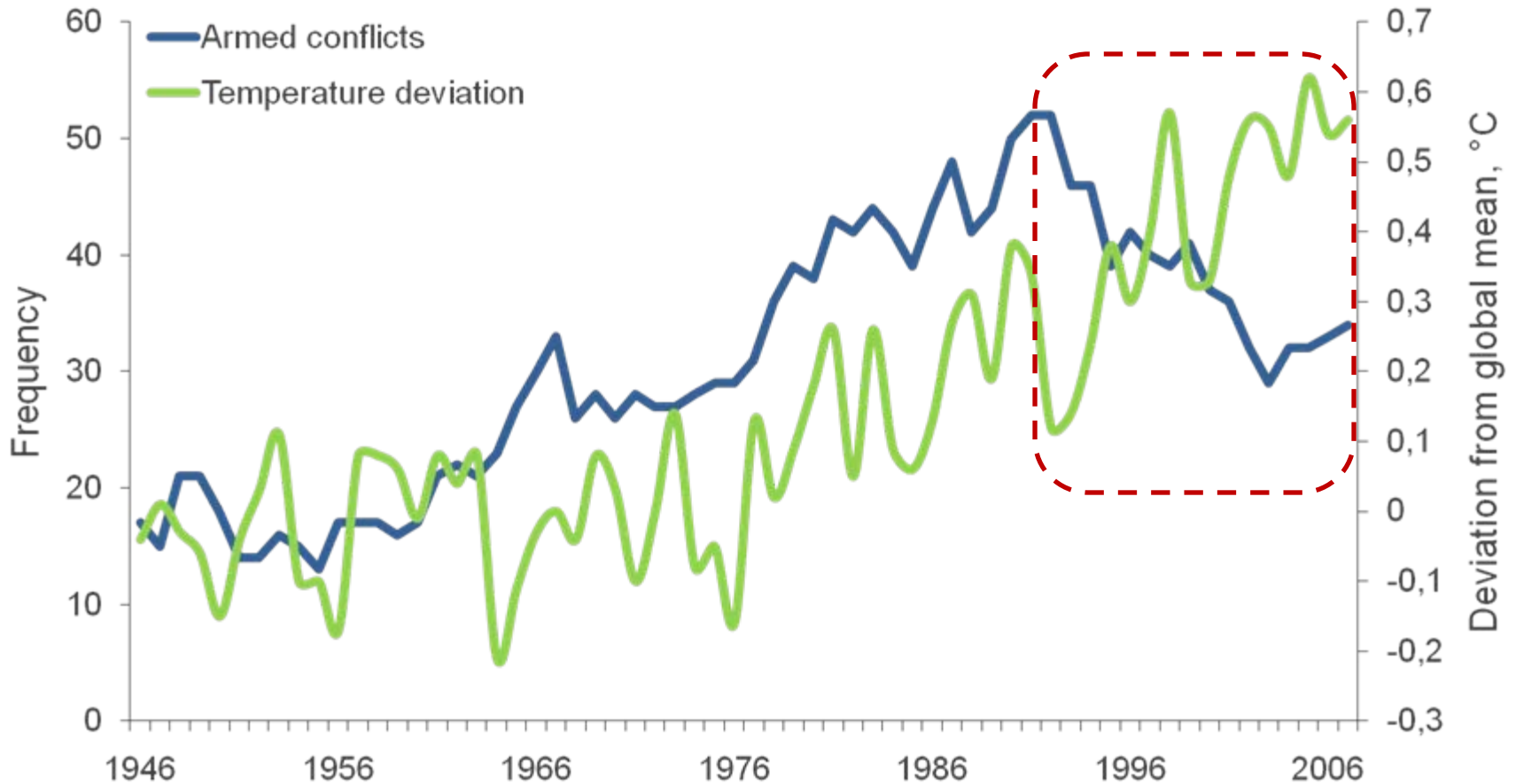
Conference on "Climate Change, Social Stress and Violent Conflict"
Research Group Climate Change and Security (CLISEC), Hamburg University
19–20 November 2009

Motivation

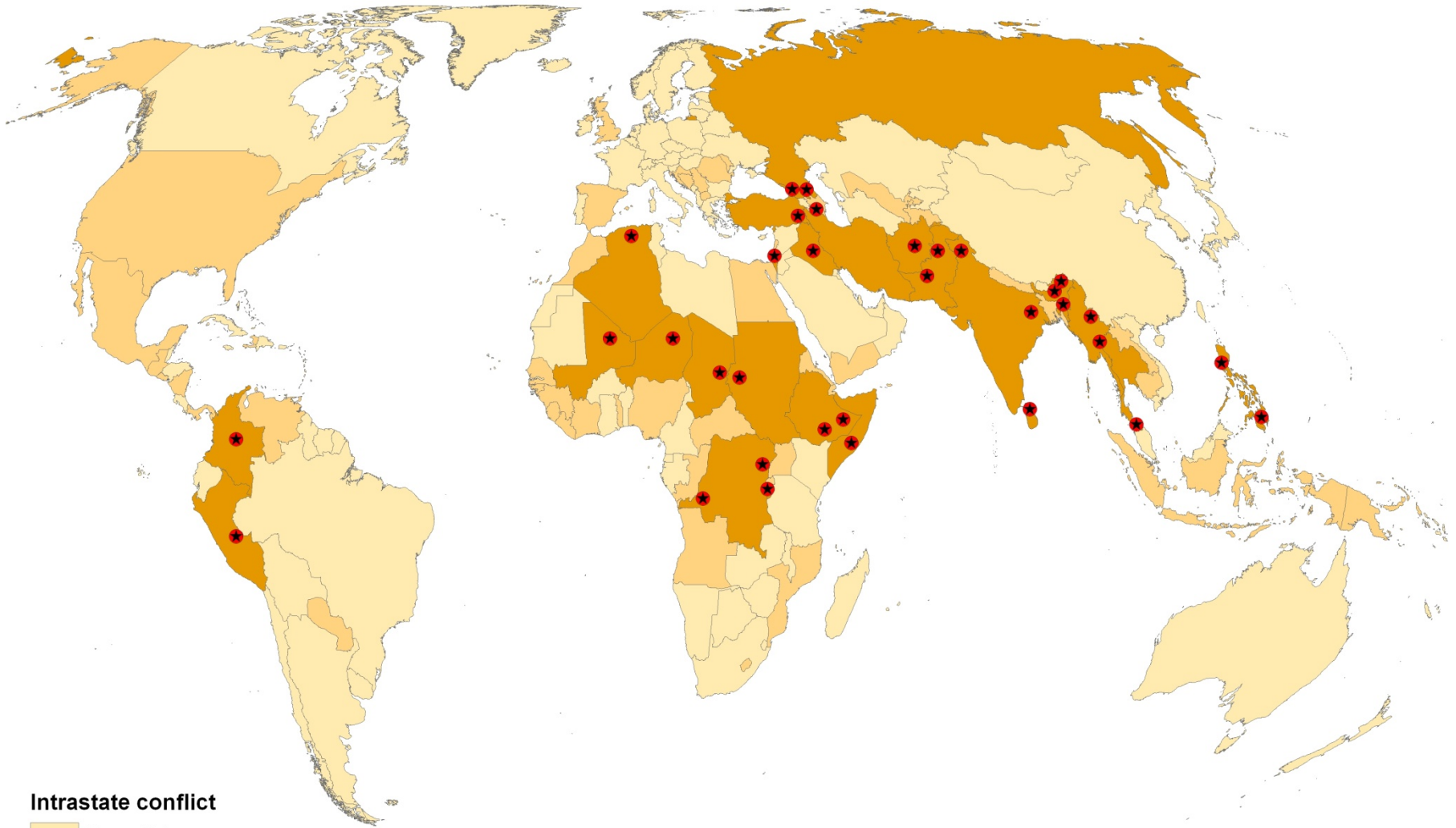
- Abrupt climate change may lead humanity into “constant battles for diminishing resources” (Schwartz & Randall, 2003)
- Climate change is an “all-encompassing threat” to human health, to global food supply, and to peace and security (Annan, 2006)
- “Climate change will help produce [...] insurgencies, genocide, guerrilla attacks, gang warfare, and global terrorism” (Homer-Dixon, 2007)
- Darfur is the first of many climate wars (Ban Ki-Moon on various occasions)
- Climate change may result in “increased danger of violent conflicts and wars, within and between states” (Mjøs, 2007)
- Climate change, through drought and crop failure, “breeds hunger and conflict” (Obama, 2009)



Trends in climate change and armed conflict



Armed conflicts across the globe



Intrastate conflict

- No conflict
- Conflict 1989-2007
- Conflict 2008

Africa

- 1/3 of African people live in drought-prone regions
 - Only 4% of arable land in SSA is irrigated
 - Large agricultural sector, subsistence economies
 - Home to almost half of all active armed conflicts
 - Global warming is likely to lead to a drying of northern and southern Africa; East Africa might get more rain
- General acceptance that Africa will be affected by future global warming first and most severely



Previous research

- Case-based Environmental Security literature contains several narratives of violent conflict within the context of resource competition and environmental degradation
- Quantitative research on a scarcity-conflict connection suffers from poor data and inappropriate research designs
- Some indication that rainfall 'shocks' increase risk of civil war through poor economic growth (Miguel et al. 2004)
- Incompatibilities of scale: case literature studies local dynamics, large-N literature focuses on countries
- Political conditions often downplayed or ignored; yet, almost all allegedly scarcity-driven conflicts involve politically marginalized populations, and these populations are those hardest hit by shocks

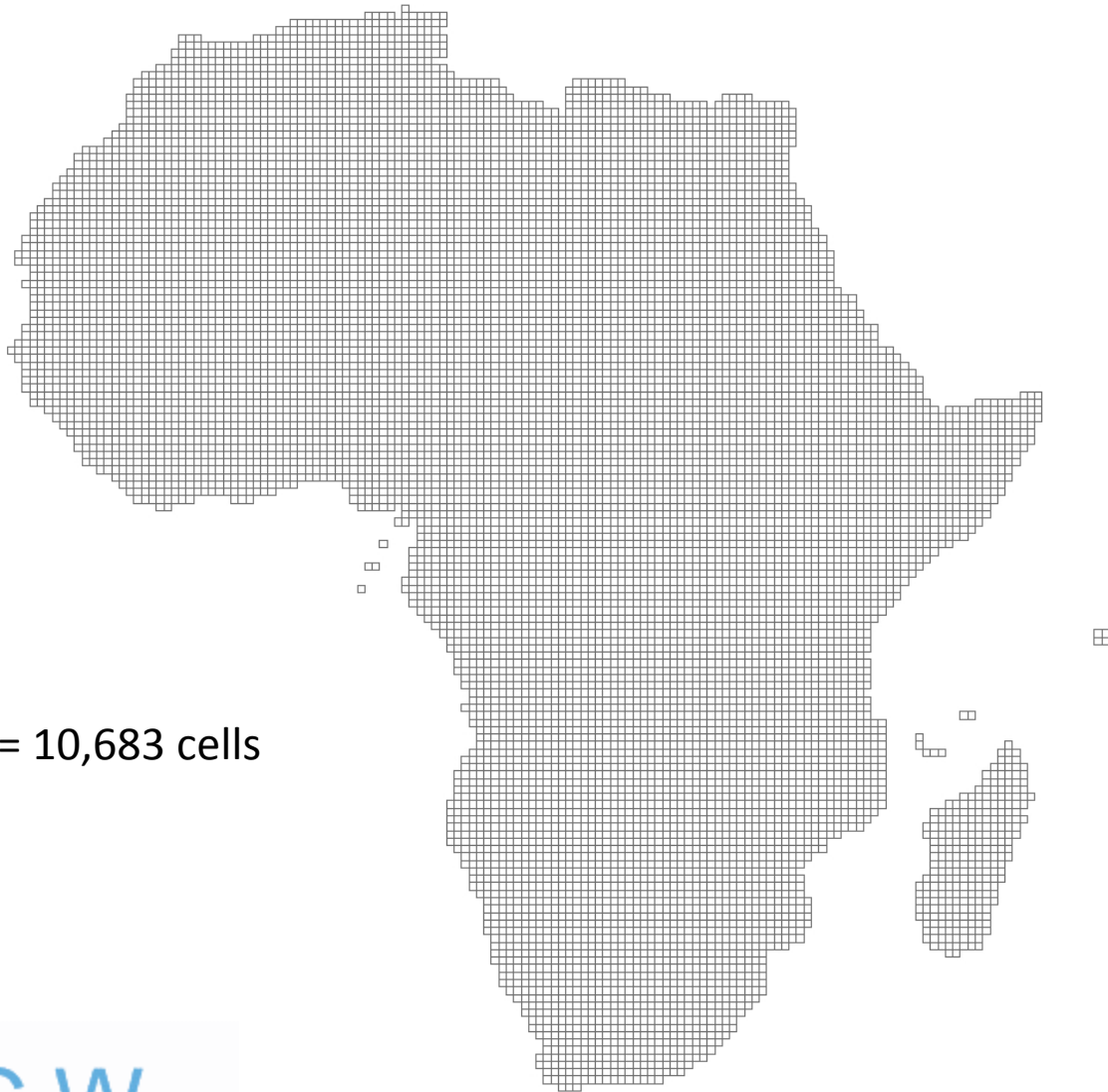


Research design

- Ambition: provide a rigorous empirical test of central Environmental Security propositions:
 - Drought increases the local risk of civil armed conflict
 - The risk-inducing effect of drought is strongest in areas inhabited by politically marginalized populations
- Sample: Africa 1960-2006
- Unit of analysis: 0.5° grid cell, yearly observations
- Dependent variable: armed intrastate conflict outbreak (geocoded) (UCDP/PRIO armed conflict data. >25 battle-deaths threshold.)
- Numerous measures of annual precipitation deviations plus drought indicators (SPI) that capture within-year variations



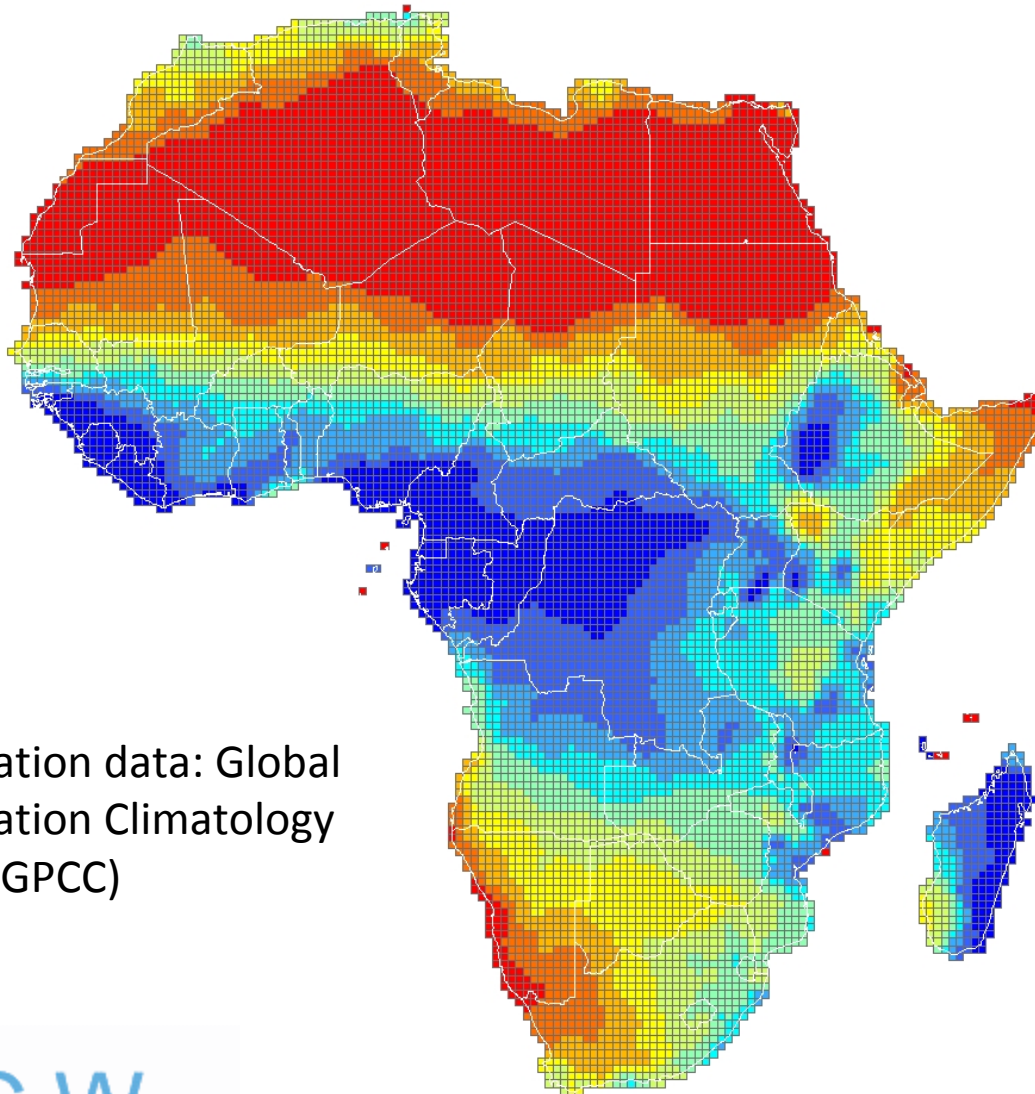
PRIO Grid 0.5° resolution



Africa = 10,683 cells



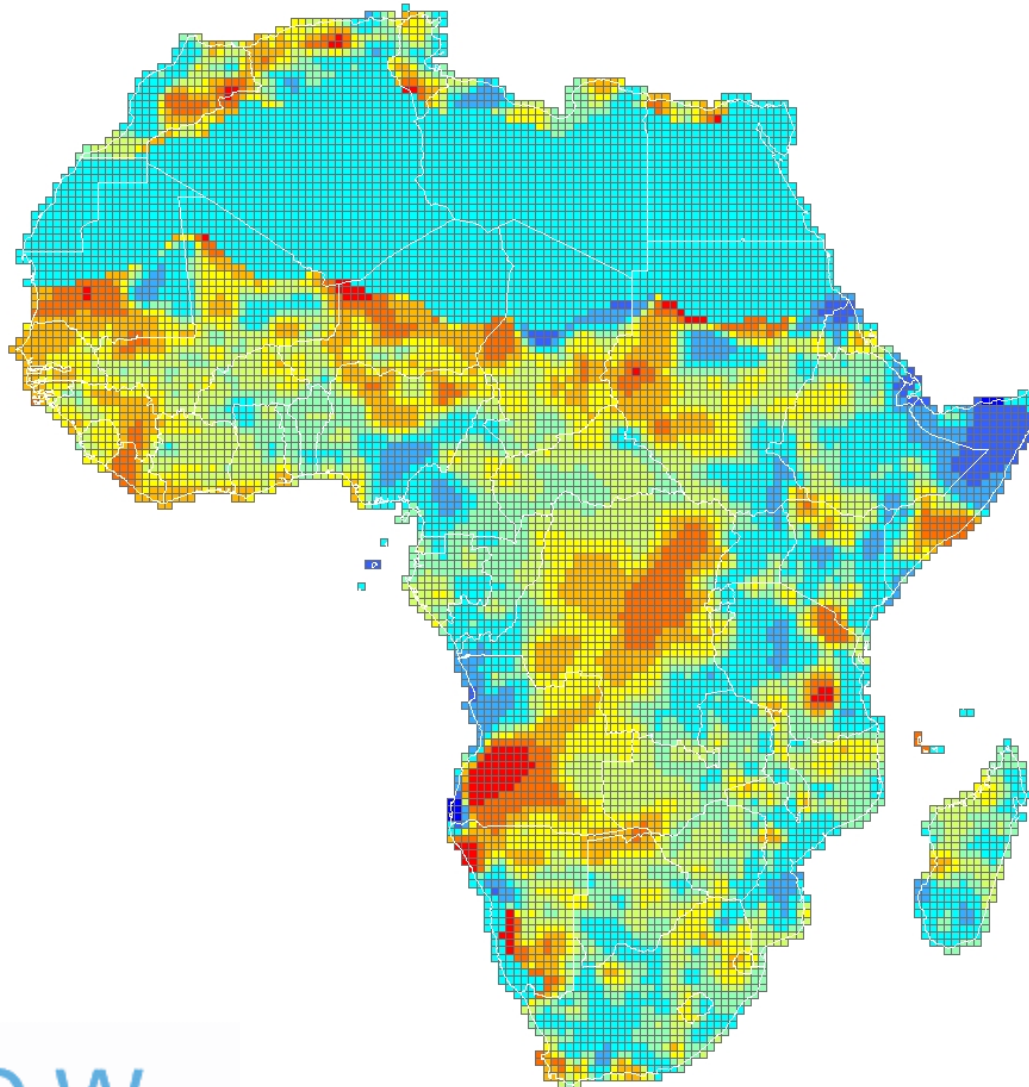
Average annual precipitation



Precipitation data: Global
Precipitation Climatology
Centre (GPCC)



Changes in precipitation, 1951-2004



Preliminary inspection

	Ethnic Group in Power		Marginalized Ethnic Group	
	No drought _{t-1}	Drought _{t-1}	No drought _{t-1}	Drought _{t-1}
No onset	101,257 (99.991%)	23,104 (100%)	190,487 (99.980%)	43,328 (99.972%)
Onset	9 (0.009%)	0 (0%)	39 (0.020%)	12 (0.028%)
Total	101,266 (100%)	23,104 (100%)	190,526 (100%)	43,340 (100%)



Full model

VARIABLES	(1) onset	(2) onset	(3) onset
SPI drought current year		-0.377 (0.339)	-0.364 (0.357)
EGIP	-1.364** (0.419)	-1.381** (0.421)	-1.368** (0.454)
EGIP × SPI-drought			-0.107 (1.152)
Distance to border (ln)	-0.287** (0.097)	-0.288** (0.098)	-0.288** (0.098)
Capital city	1.970** (0.484)	2.003** (0.476)	1.999** (0.480)
Population cell (log)	0.445** (0.097)	0.447** (0.097)	0.447** (0.097)
GDP per capita t-1 (log)	-0.232 (0.226)	-0.235 (0.228)	-0.235 (0.229)
Polity2 t-1	0.004 (0.022)	0.005 (0.022)	0.005 (0.022)
Brevity of peace	-0.094 (0.403)	-0.088 (0.407)	-0.088 (0.407)
Constant	-7.062** (2.177)	-6.990** (2.188)	-7.000** (2.205)
Observations	18,214	18,214	18,214
Log pseudolikelihood	-355.589	-355.023	-355.019



Drought measures

VARIABLES	Coefficient	Std. err.
Drought, t	-0.377	(0.339)
Drought, t-1	-0.083	(0.304)
Drought, t-2	0.190	(0.276)
Drought recorded in t-3 to t period	0.155	(0.278)
Number of drought events from t-4 to t	-0.007	(0.099)
Distance to nearest drought event, t (log)	0.028	(0.054)
Distance to nearest drought event, t-1 (log)	0.023	(0.061)
Distance to nearest drought event, t-2 (log)	-0.021	(0.065)



Table 2: Drought measures (cont'd)

VARIABLES	Coefficient	Std. err.
Rainfall deviation from mean, t (%)	0.002	(0.005)
Rainfall deviation from mean, t-1 (%)	-0.006	(0.004)
Rainfall deviation from mean, t-2 (%)	-0.001	(0.009)
Δ Rainfall, t (%)	0.392	(0.258)
Δ Rainfall, t-1 (%)	0.196	(0.464)
Δ Rainfall, t-2 (%)	0.352	(0.699)
UNEP drought, t	-0.988	(1.060)
UNEP drought, t-1	-1.062	(1.063)
UNEP drought, t-2	-0.214	(0.744)

Numerous interaction effects (notably political exclusion, poverty, democracy) and alternative sample inclusion criteria also explored without finding any significant coefficients



Preliminary conclusions

- No evidence that below-average precipitation or severe drought events have a systematic bearing on the risk of civil war onset in Africa
 - Droughts are frequent, conflicts are rare
 - Long-term effects and migration not explored
- Political exclusion is a powerful risk factor that should not be ignored
- Future priorities:
 - Get better data on environmental vulnerability
 - Explore consequences of drought for conflict dynamics
 - Explore consequences of conflict for vulnerability (famine, diseases, etc)
 - Explore other forms of violent conflict (e.g. communal conflicts)
 - Couple with data on likely changes in future precipitation patterns

