

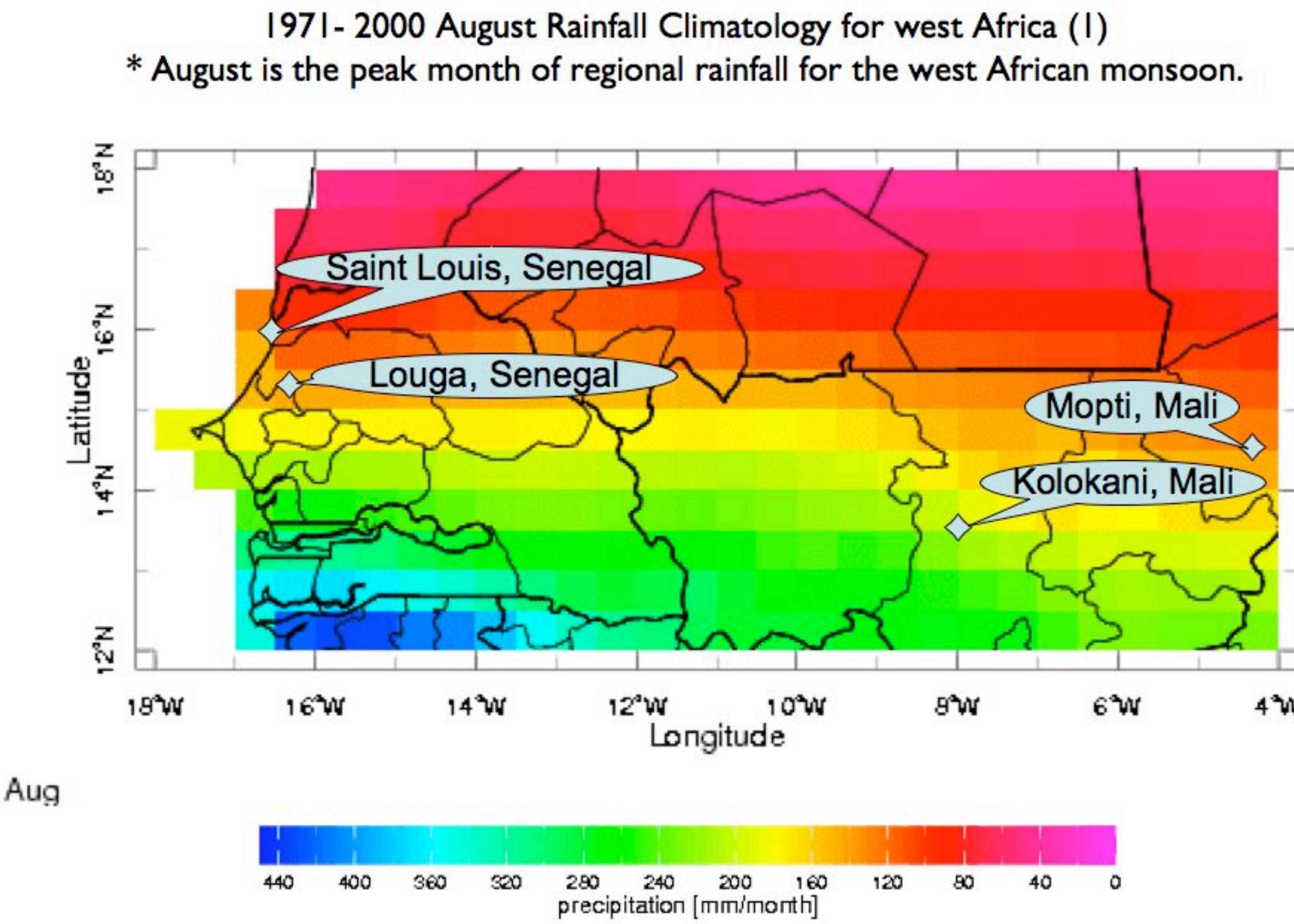
Statistical Characterization of the Dry Spell Risk During the West African Monsoon from Meteorological Station Data

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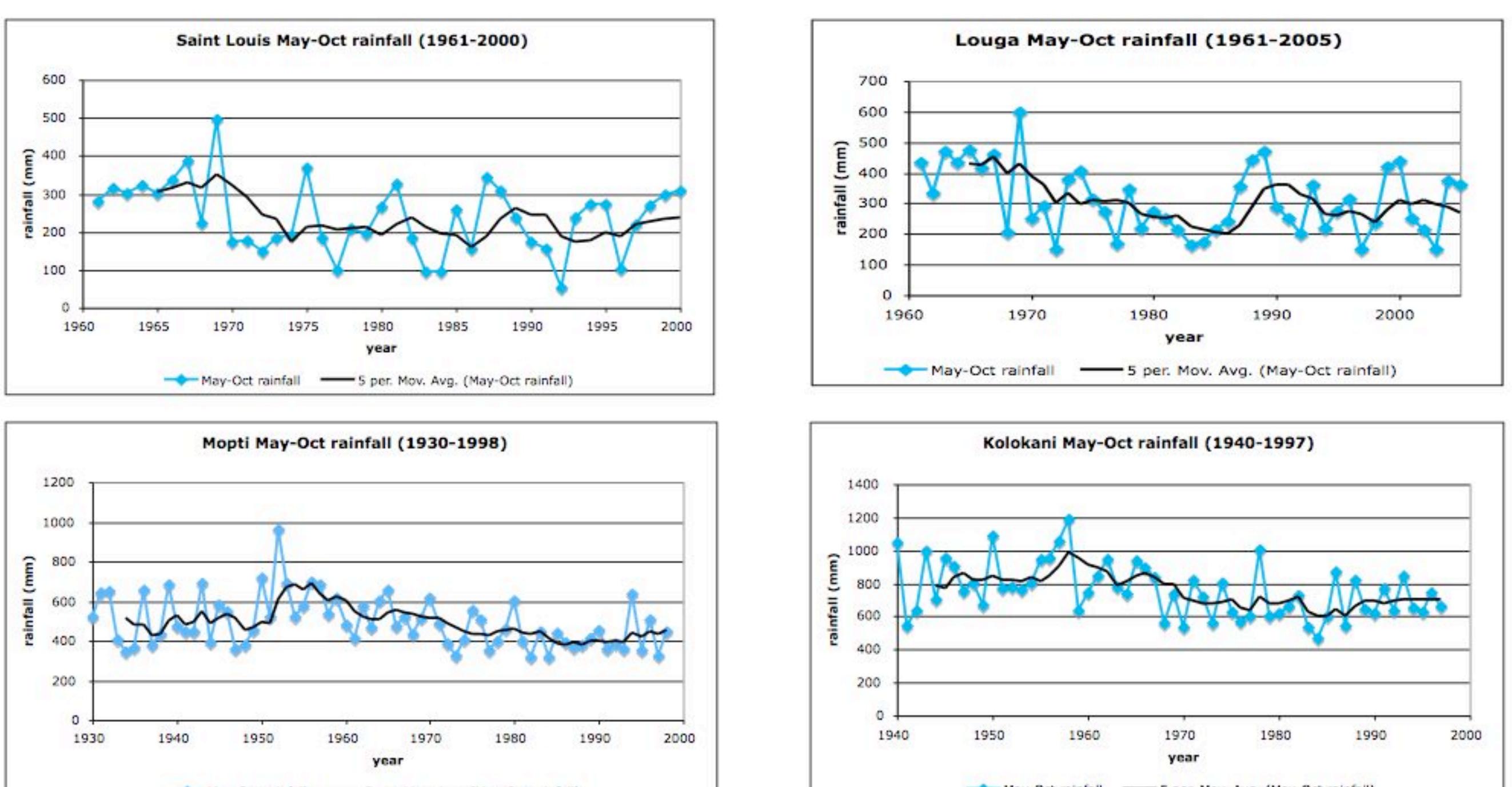
Introduction

Daily rainfall data are analyzed from two meteorological stations in Mali (Mopti, 4.2W, 14.5N (1930-1998) Kolokani 8W, 13.6N (1940-1997)) and two stations in Senegal (Louga 16.2 W, 15.6N (1961-2005) and St. Louis 16.5 W, 16N (1961-2000)). While these site locations are fairly specific, results from this study are intended to be more broadly replicable and to promote further inquiry. The primary variable emphasized is the dry spell risk (simply the probability of a dry spell of a given length starting on a given day of the rainy season), other summary statistics are also included below.

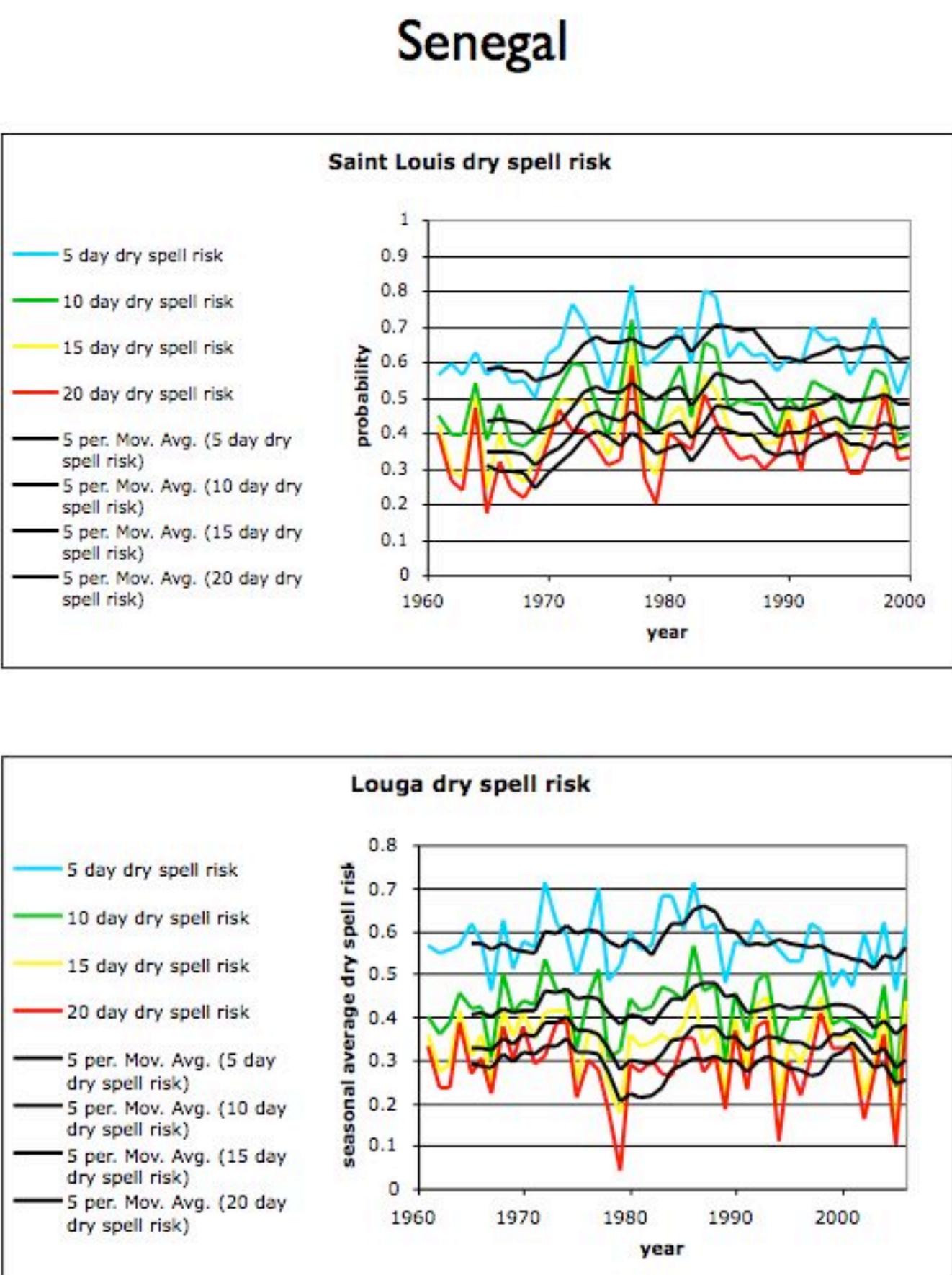
Climatology Summary



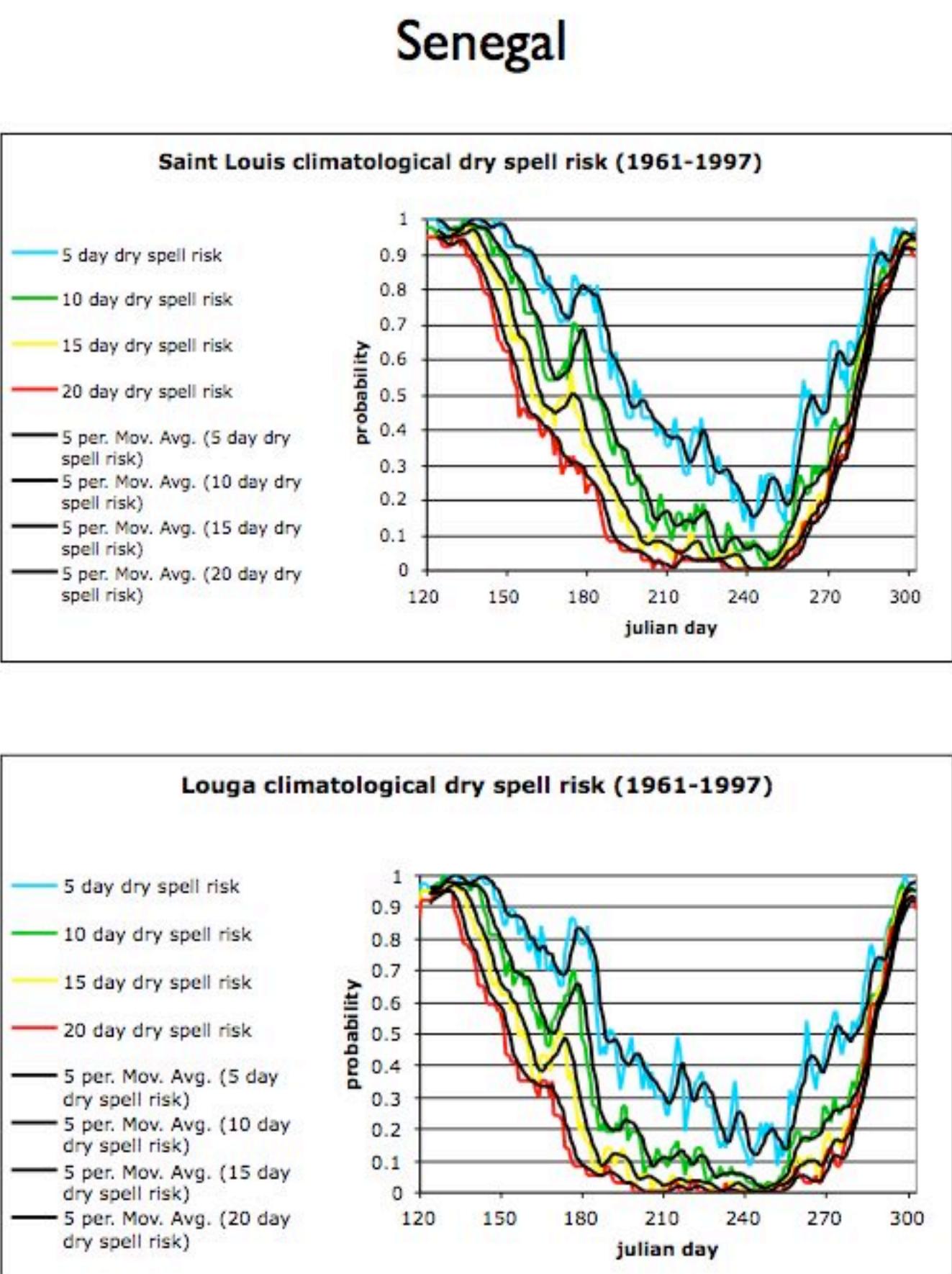
	Saint Louis	Louga	Mopti	Kolokani
Mean	234	311	449	708
Median	225	287	435	662
Standard Deviation	95	112	96	134
Minimum	53	150	316	474
Maximum	497	599	661	1003
5 th %ile	96	162	324	540
95 th %ile	374	474	620	943
33 rd %ile	185	249	395	625
67 th %ile	275	356	475	770



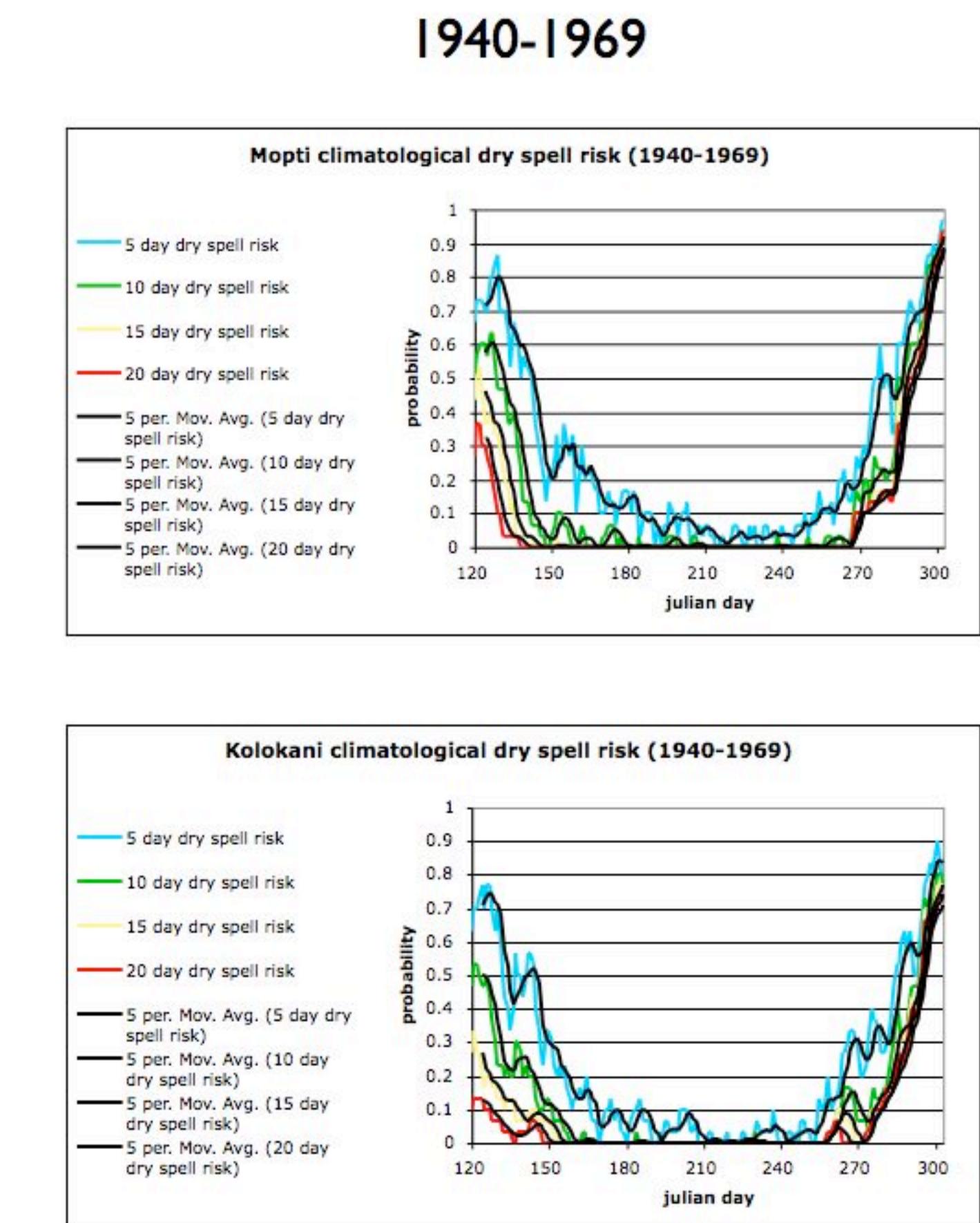
Dry Spell Risk Through Time



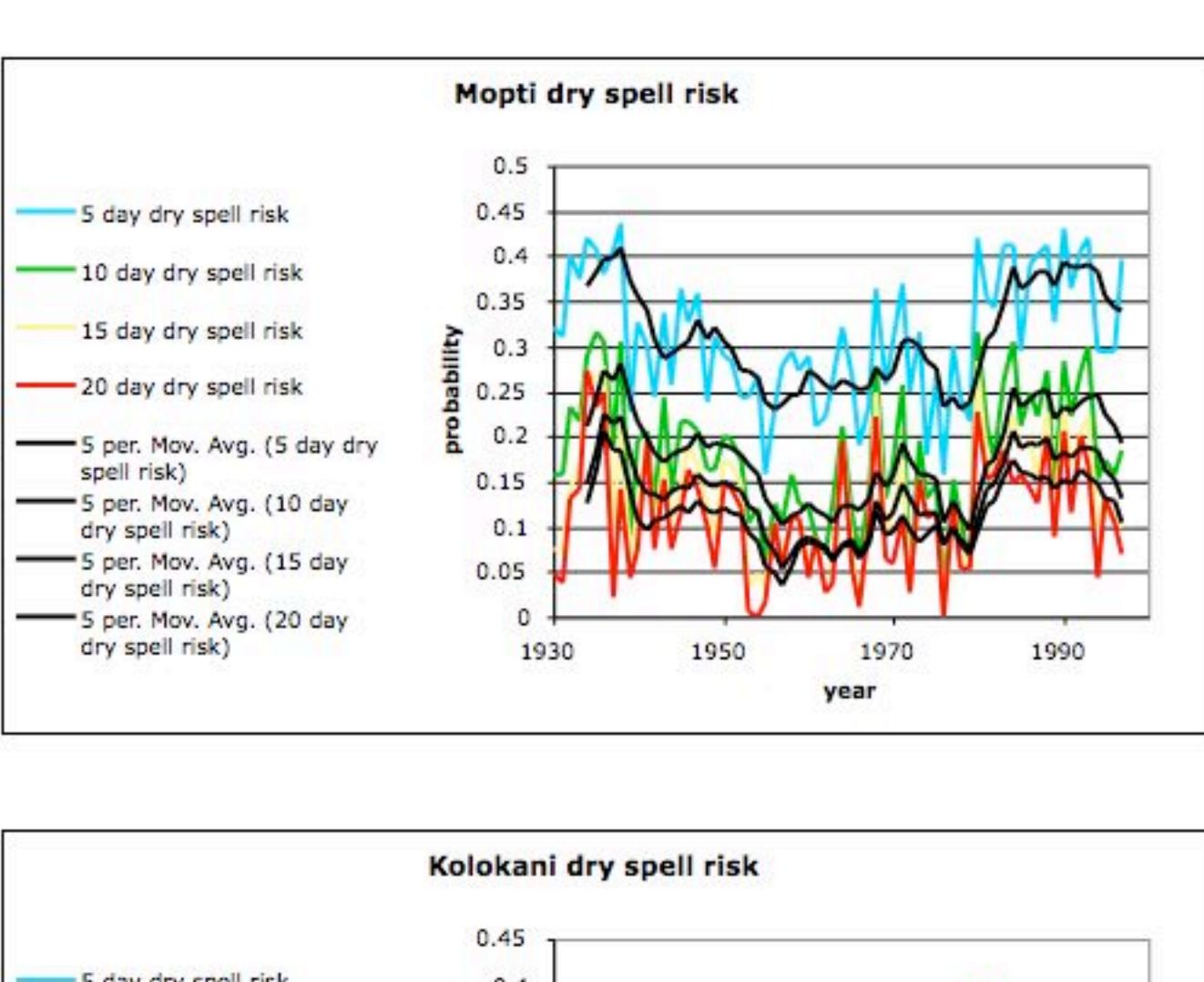
Climatological Dry Spell Risk (1961-1997)



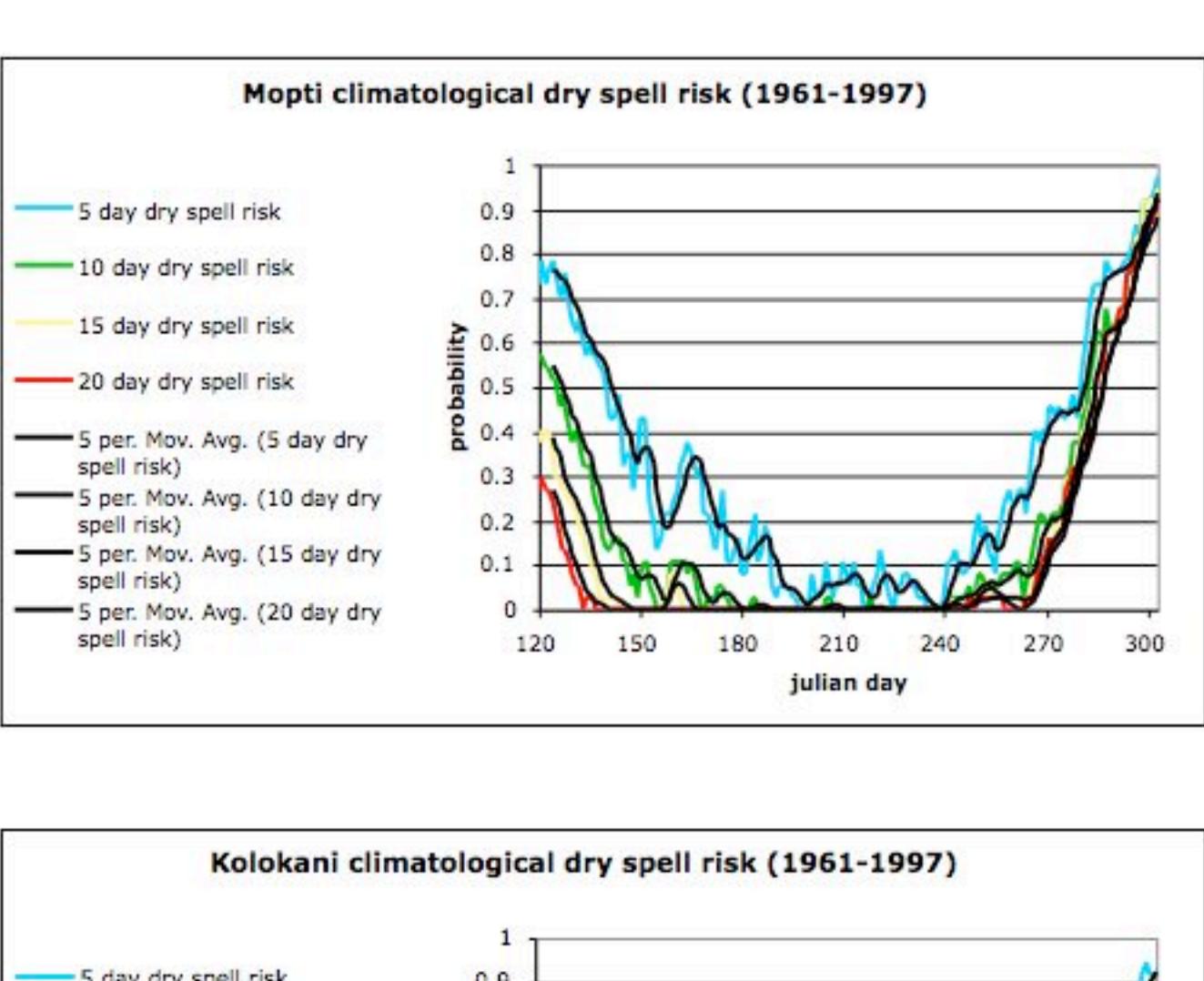
Historical Comparison of Climatological Dry Spell Risk



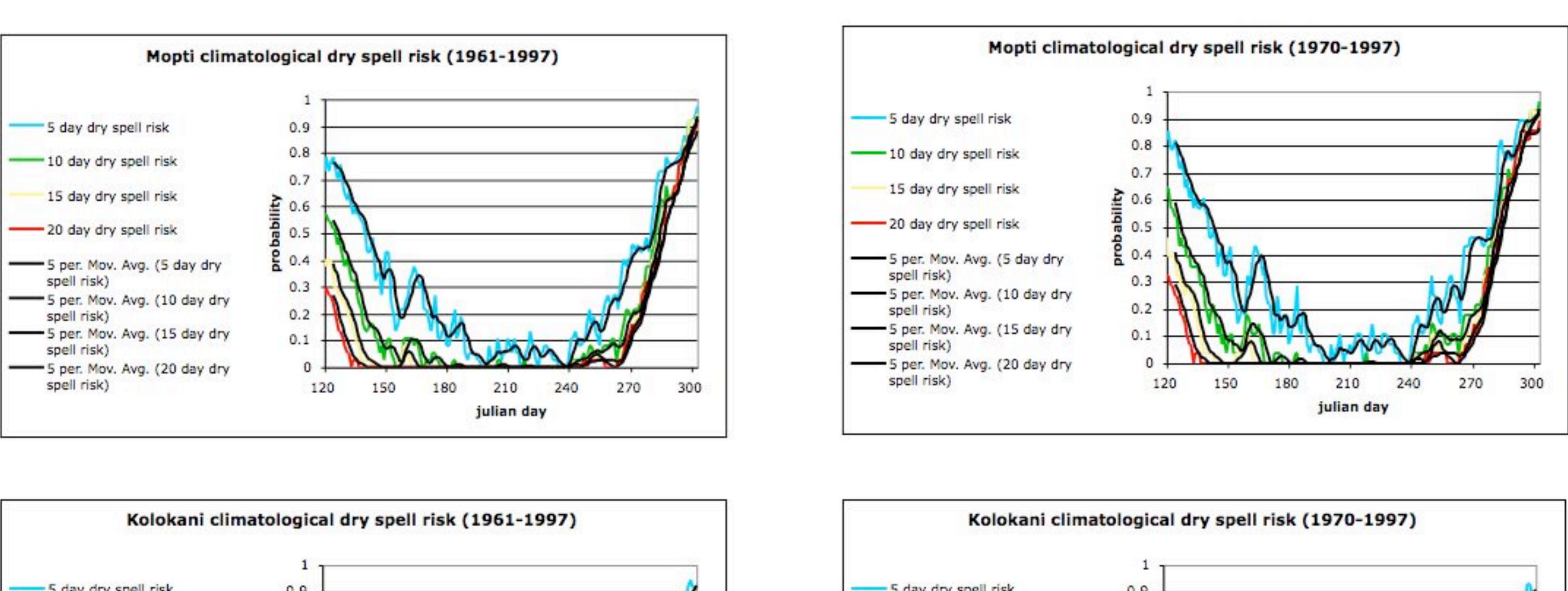
Mali



Mali



1970-1997



Conclusions

Certain well established features of west African climate are noted in these summary results that have been found in numerous other studies (including (2)) of the climate of the west African Sahel such as:

- A south-north decreasing **precipitation gradient** (accompanied by increasing proportional variance)
- **More variance** in monsoon onset compared to retreat
- **Substantial variance** in multidecadal rainfall totals

New Aspects

This analysis has yielded several advances discussed below

- Quantification of **multi-decadal variation** of the dry spell risk
- **Climatological evolution** of the dry spell risk- including during early season, a tendency for a decline in dry spell risk, followed by a subsequent brief increase, and then a decline into the core monsoon
- This “stutter” in the annual cycle seems more pronounced for the drier stations
- This now requires **physical interpretation**: for example, one possible explanation is the mechanisms proposed in (3);
 - the early arrival of an intertropical front at subtropical latitudes before the ITCZ has shifted to its monsoon position
- As a whole, these analyses are targeting information tailored to the needs of the agricultural community.

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References

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