Spatial and temporal heterogeneity of phenology patterns in Kruger National Park: climate or landscape variability?

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Aim

To investigate the influence of climate, woody cover and soil characteristics on 5 vegetation phenology metrics derived from 14 years of time series NDVI data to assess their potential for monitoring change.

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Dawie van Zyl from the Agricultural Research Council's Institute for Soil, Climate and Water for the AVHRR data.
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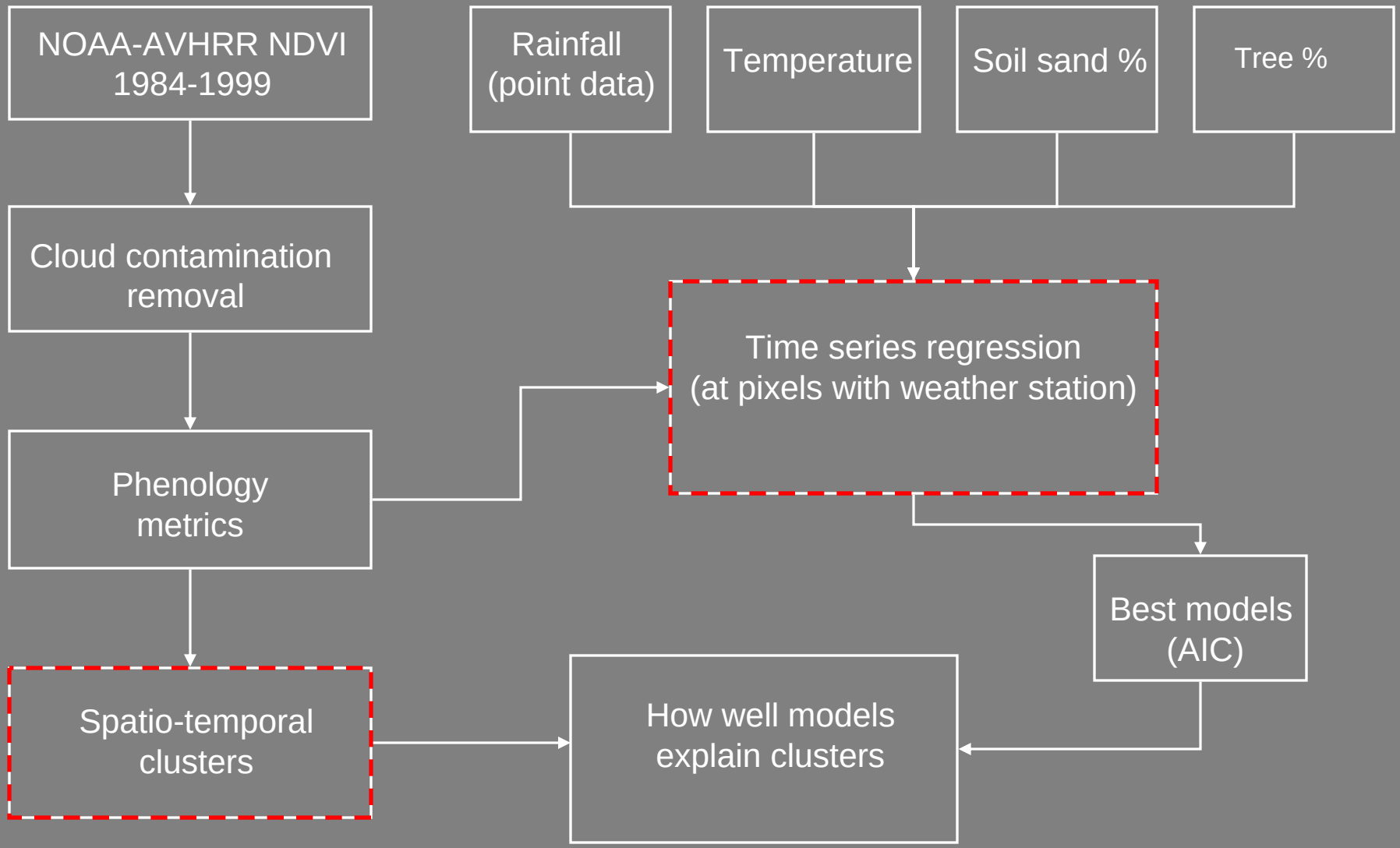
Methods

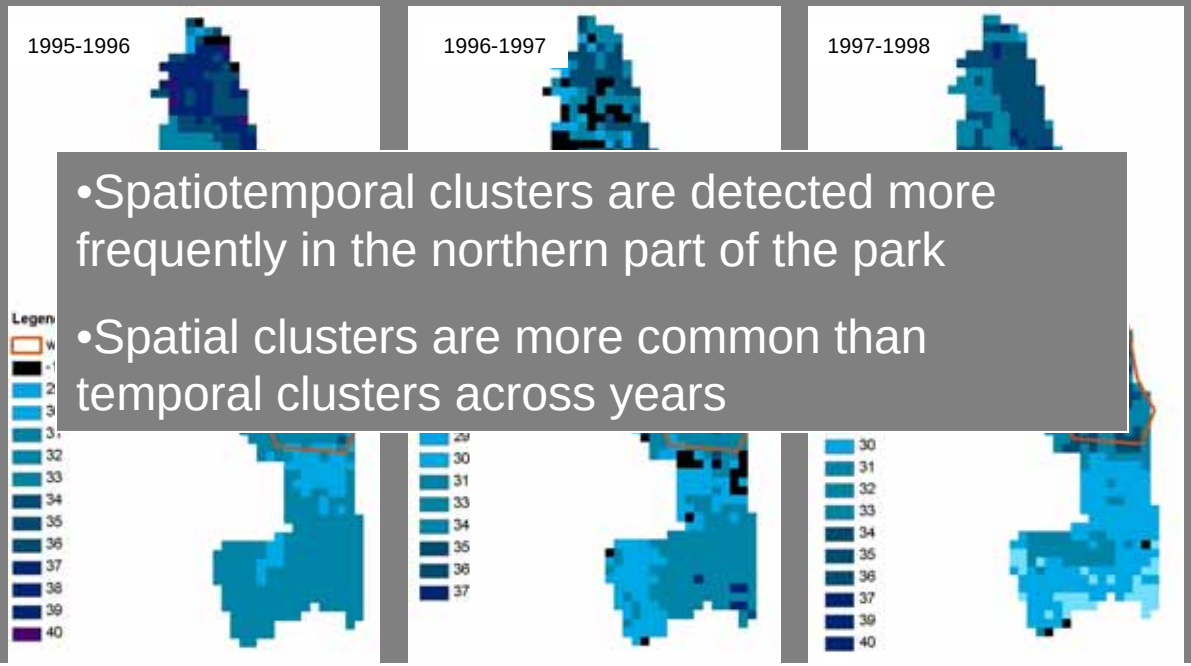

NOAA-AVHRR NDVI
1984-1999
Rainfall
(point data)
Temperature
Soil sand %
Tree %
Cloud contamination
removal
Time series regression
(at pixels with weather station)
Phenology
metrics
Best models
(AIC)
Spatio-temporal
clusters
How well models
explain clusters

Results

Summary of the variables that were most represented in the regression models receiving best support (w within 90% of the best model) explaining the observed variations at weather stations for the derived phenological metrics.

Metric	Best models include
GSS	Dry season rainfall ; tree %; sand %
GSE	Total wet season rainfall ; sand %; tree%; T_{max}
GSL	Previous wet season rainfall; sand %
$NDVI_{max}$	Wet season rainfall to month before max NDVI value
iNDVI	Total wet season rainfall, T_{min}

Example of spatio-temporal cluster. Growing season start dates across KNP for the period 1995-1998 when SatScan detected a cluster in the central part of KNP.



Conclusion

•***Limitation*:** explaining NDVI clusters by using rainfall measures averaged across weather stations and not spatially explicit rainfall measures.

•***Solution and challenge*:** construct spatially explicit rainfall models using ground weather radar which give the spatial footprint of single rainfall event → detailed assessment of vegetation response to localised rainfall events.