

# CHARACTERIZATION OF DRYLAND DEGRADATION USING TRENDS IN VEGETATION/ RAINFALL SEQUENTIAL LINEAR REGRESSION SLOPES

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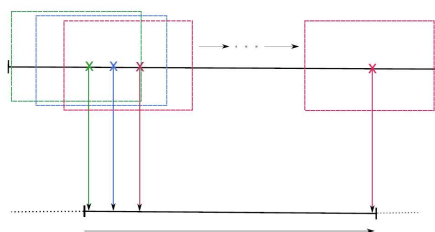
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## RESEARCH RESULTS

### NEW FRAMEWORK TO DETECT LAND DEGRADATION IN DRYLANDS:

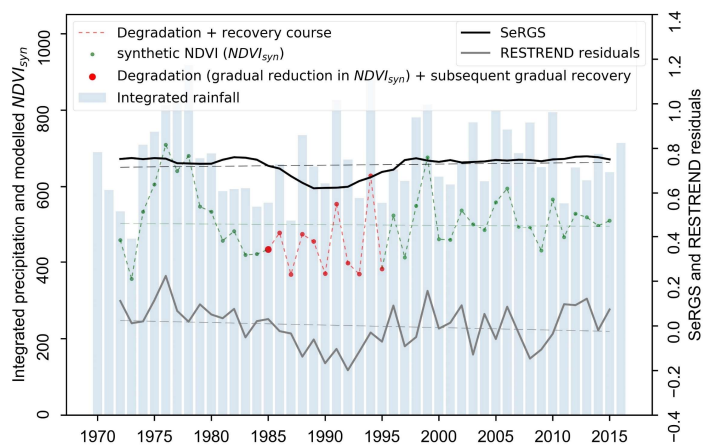
Interpretation of the slopes from a **SEQUENTIAL LINEAR REGRESSION (SeRGS)**



Ordinary least square regression within:

- **Temporal moving window** along the time series  
→ taking temporal variability of VRR over time into account
- **Spatial moving window** over study area  
→ assure statistically significant regression results from increasing the number of observation points

Performance evaluation from simulated land degradation scenarios and comparison against RESTREND



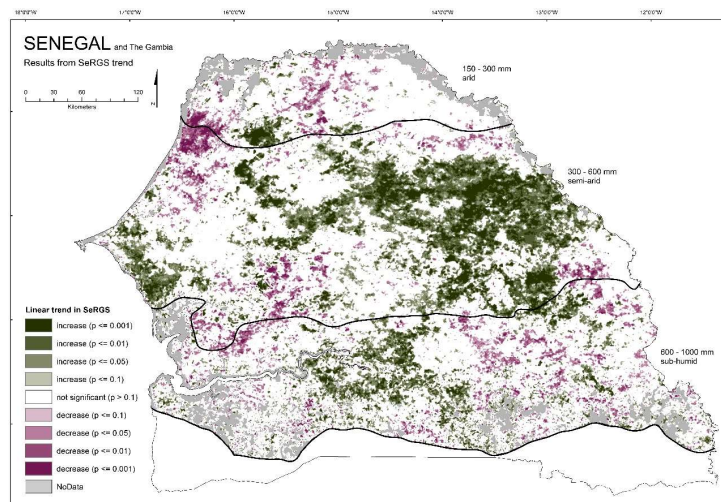
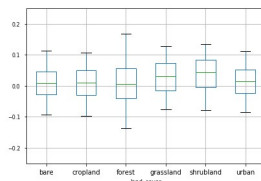
- Spatio-temporal moving window size: 9x9 pixel, 4 years
- Long-term trends over SeRGS more evident and significant as compared to trends from residuals
- Improved validity of results
- Reduced influence of inter-annual rainfall variability
- Improved preconditions for breakpoint detection analysis

→ SUPERIOR TO TRADITIONAL APPROACHES (E.G. RESTREND)

### Results for Senegal

- Twice as many positive trends than negative ones
- Overall positive median trends for all land cover classes
- Positive median trends for semi-arid and sub-humid zone
- Negative median trends for arid zone

- Patterns and trends in SeRGS over Senegal match relevant studies



Abel, C., Horion, S., Tagesson, T., Brandt, M., Fensholt, R., 2018. Towards improved remote sensing based monitoring of dryland ecosystem functioning using sequential linear regression slopes (SeRGS) *Remote Sensing of Environment* (under revision)

## COMING RESEARCH

Experiment and adjust the proxies for vegetation and rainfall - Inclusion of temperature and extent study to global drylands -

Breakpoint detection analysis - Exploration of new data and resources, e.g. Sentinel - Combination with ancillary data, e.g. population data