ASSESSING FUTURE STABILITY OF US HIGH PLAINS LAND-COVER: INTEGRATION OF PROCESS MODELING WITH LANDSAT, *IN SITU* MODERN AND PALEOCLIMATIC DATA

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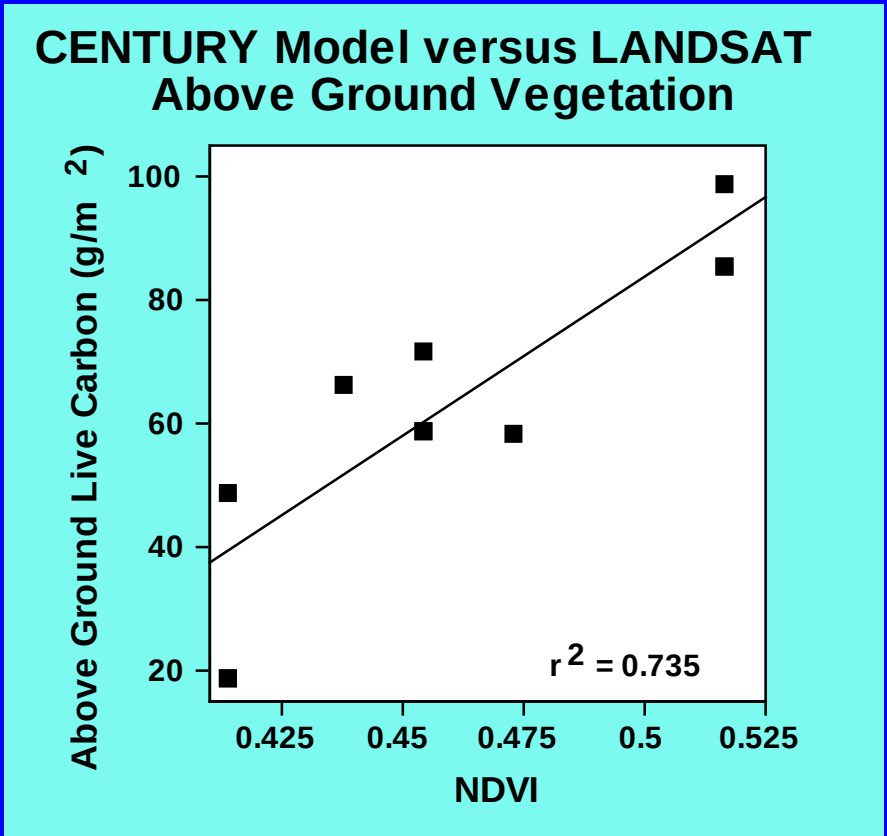
Introduction

- Question: What are the past and potential future thresholds of climate change and variability that result in significant High Plains landcover change
- Goal: To enhance current understanding of the sensitivity of High Plains land-cover to climate and human land-use forcing through an interdisciplinary effort involving remotely-sensed data, paleoclimate analyses, and process modeling.
- Approach: 1) document spatial coherency of aridity across the High Plains and improve temporal control on the latest Holocene dune reactivation, 2) constrain the range of land-cover change under specified climate and to understand past High Plains land-cover change, 3) map land-cover responses to hydroclimatic extremes (wet and dry) using LANDSAT images in order to monitor land-cover change and document responses to different climatic forcing.

Results

- ecosytem modeling indicates the persistence of 1930's drought conditions is not sufficient to initiate dune mobilization
- severe, extended drought (>30% reduction in growing season moisture) depletes vegetation sufficiently to initiate mobilization
- the impact of extreme drought is amplified by fire, grazing, or shifts to more homogenous vegetation
- LANDSAT monitored temporal land-cover responses correlate with climate driven ecosystem model simulations of vegetation cover

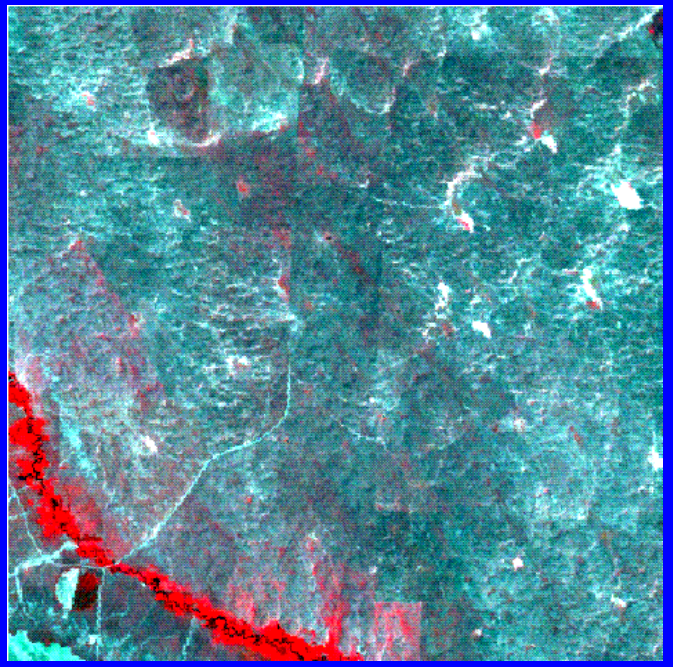


FUTURE WORK

expand current temporal variability with NDVI values from a north-south transect for comparison with CENTURY simulated above ground vegetation and cumulative precipitation anomalies analyses for the Water Year (Oct-Sept)

Conclusions

- Results suggest the possibility of using LANDSAT images combined with process modeling to monitor threshold changes in High Plains landcover and to anticipate dune mobilization responses to hydroclimatic extremes



Publications

Kerwin, M., Overpeck, J.T. Webb, R.S., DeVernal, A., Rind,D.H., and Healy., R.J., 1999. The role of oceanic forcing in mid-Holocene Northern Hemisphere Climatic Change. *Paleoceanography* 14, 200-210.

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Overpeck, J.T. and Webb, R.S., 2000. Non-glacial Rapid Climate Events: Past and Future. *Proceedings of the National Academy of Sciences* U.S.A. 97: 1335-1338 .