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MASTER'S THESIS PRESENTATION

# Empirical analysis of banded vegetation patterns in Africa -- A comparison between spectral analysis and contour analysis

**WHEN**
**November, 10th 2021**
**2:30 PM, CST**

**WHERE**
**Via ZOOM**
ZOOM information will be provided in the email announcement for this seminar.


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Spatially periodic banded vegetation patterns, which are characterized as striped vegetation alternating with bare soil, are a distinctive feature in arid and semi-arid regions. The mechanism that explains the formation of these patterns has been studied for decades. In contrast to the comprehensive physical modelling studies of the pattern characteristics, empirical support from the quantitative analysis of real data is quite limited. A stable method to accurately identify the periodic patterns from the surrounding noise relative to the elevation gradient, and to report the variation in the wavelength and the orientations of these banded patterns, is the main goal of this empirical study. The two-dimensional spectral analysis is one of the prevailing methods to quantify the banded patterns, which can extract the wavelength and orientations of the patterns from the corresponding power spectrum that is obtained by Fourier transform. However, due to the conversion of data from the spatial domain to frequency domain, the results from spectral analysis can be challenging to interpret. In this thesis, an intuitive method which directly extracts the patterns from the images using contour detection techniques is proposed to confront the limitation of interpretability of spectral analysis method. A comparison between this method and the spectral method is included to demonstrate the strengths and weakness of these two methods, and to determine regions of consistency between them.


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