The dependence of vegetation bands on band spacing

Ida Gaulke[1], David Dunkerley[1] and Andrew Gunn[1]

[1]Monash University School of Earth, Atmosphere, and Environment

- **This abstract is for an Oral**
- **Proposed Session: GIS/Remote Sensing of Connectivity and Geomorphic Change (Friday 16th February)**

ABSTRACT

Banded vegetation (BV) is a vegetation pattern that forms in arid and semi-arid regions and consists of a mosaic of alternating bands of vegetation and bare ground that align perpendicular to the slope or less often, the dominant wind direction (Valentin et al. 1999). BV acts as a runoff-runon system whereby the majority of precipitation that falls on the intergroves is lost as overland flow and absorbed by the adjacent downslope grove which can receive up to 200% of the direct precipitation (Bromley et al. 1997; Dunkerley and Brown 1995). Known vegetation communities to manifest BV include grasses, shrubs, and trees, or a combination and the pattern has been shown to be effective in limiting hillslope erosion and resisting disturbances such as grazing pressure (Valentin et al. 1999).

Band spacing is dependent on macroscopic boundary conditions such as slope, rainfall, sediment grain size, and sediment characteristics. These include the band width ratio between the vegetated and bare ground, the combined width of one vegetated and adjacent bare band, the stepped microtopography (resulting from the difference in infiltrability between vegetation and bare regions and ensuing erosion and deposition by overland flow), and the vegetation density (dependent on soil structure and water and nutrient availability).

No study has yet examined whether these relationships are maintained within the variability of a single site, instead past research has focused on single transects or comparison of single transects between sites. Here, we analyse the influence of band spacing on band characteristics across a BV site at Boolcoomatta, west central South Australia, to determine this dependence. We use remote sensing to collect photogrammetry and LiDAR data, combined with vegetation and infiltration surveys. As the macroscopic boundary conditions are consistent across the site, we are able to eliminate the influence of these variables on intra-site irregularity and determine the correlation between band spacing and microscopic characteristics.

REFERENCES

Bromley, J., Brouwer, J., Barker, A.P., Gaze, S.R., and Valentin. C., 1997. The role of surface water redistribution in an area of patterned vegetation in a semi-arid environment, south-west Niger. Journal of Hydrology, 198, 1–29.

Dunkerley, D.L., Brown, K.J., 1995. Runoff and runon areas in a patterned chenopod shrubland, arid western New South Wales, Australia: characteristics and origin. Journal of Arid Environments, 30, 41–55.

Valentin, C., d'Herbès, J.M., Poesen, J., 1999. Soil and water components of banded vegetation patterns. CATENA, 37, 1–24.