

**SESSION: Ecosystems, Biodiversity and Biodiscovery****MARS Themes:**

Understanding scales of biodiversity from molecular to ecosystem

**Title:**

Foregrounding geodiversity in landscape ecology studies: insights from the sub-Antarctic

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**Abstract:**

Biodiversity patterns are shaped by the interplay between geodiversity and organismal characteristics. Superimposing genetic structure onto landscape heterogeneity (i.e., landscape genetics) can help to disentangle these interactions to better understand population dynamics. Previous studies on the sub-Antarctic Prince Edward Islands highlighted the importance of landscape and climatic barriers in shaping spatial genetic patterns, and drew attention to the value of these islands as natural laboratories for studying fundamental concepts in biology. We aim to assess the fine-scale spatial genetic structure of the springtail, *Cryptopygus antarcticus travei*, an endemic to Marion Island, in tandem with high-resolution geology data. Using a species-specific suite of microsatellite markers and a fine-scale sampling design incorporating landscape complexity, we explore genetic patterns overlaid onto high-resolution digital surface models and surface geology data across two one-kilometre sampling transects. Genetic patterns across the landscape closely track landscape resistance data (viewed from the perspective of the study species) in concert with landscape discontinuities and barriers to gene flow identified at a scale of a few meters. These results show that the island's geodiversity plays an important role in shaping biodiversity patterns and intraspecific genetic diversity. This study illustrates that the fine-scale genetic patterns in soil arthropods are markedly more structured than initially anticipated, given the homogeneity of the vegetation complexes at the scale of tens to hundreds of meters. By considering and incorporating fine-scale and high-resolution geodiversity complexity into our study, we were able to explain much of the observed spatial genetic patterns. Our results not only foreground geodiversity as a driver of spatial complexity, but also holds implications for the conservation and management of the sub-Antarctic islands.

**Format:**

10-min oral

**Keywords:**

Springtails; Marion Island; Genetic diversity; Spatial patterns