TESTING NICHE VERSUS NEUTRAL MODELS OF EDIACARAN COMMUNITY ASSEMBLY Emily G. Mitchell[1], Charlotte G. Kenchington[2], Alexander G. Liu[1], Simon J. Harris[3], Philip R. Wilby[3], Nicholas J. Butterfield[1], [1] Department of Earth Sciences, University of Cambridge, Downing Street, Cambridge CB2 3EQ, UK.
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Bedding-plane assemblages of Ediacaran fossils from Newfoundland, Canada and Charnwood Forest, UK, (~565 Ma), are among the oldest known examples of macroscopic communities. These organisms are fundamentally different from those found in other time periods, making it difficult to resolve their phylogenetic relationships or their ecology. However, the preservation of these immobile organisms in large in-situ bedding plane populations means that the position of fossil specimens on their bedding surfaces (their spatial positions) reflect the biological and ecological processes that they were subject to in-life. As a result, statistical analyses of these positions allows the original spatial distributions to be analysed, revealing key insights into the ecological dynamics of these early communities.

The full potential of this spatial approach, however, has been limited by the slow acquisition rate of large quantities of accurate data, and a focus on only a small number of bedding surfaces. Using a high-resolution tripod-mounted Laser Line Probe, we have overcome these logistical issues, and comprehensively mapped six of the most diverse and abundant Avalonian communities to a resolution of 50 µm. These include the Mistaken Point 'E' Surface, Spaniard's Bay and two previously undocumented surfaces from Newfoundland, Canada; and the North Quarry and Memorial Crags surfaces in Charnwood Forest, UK.

For each community, we analysed taxa spatial distributions taxa using pair correlation functions (PCF) and have compared the patterns with different models of known biological and habitat interactions. Preliminary analyses suggest that Avalonian communities were predominately dominated by dispersal, with only weak habitat interactions. This result stands in stark contrast to modern sessile communities where habitat or 'niche' processes dominate over dispersal or 'neutral' models of community assembly. Rapid data acquisition enables the comparison of inter-regional ecological dynamics, enabling the broader ecological patterns of the Ediacaran-Cambrian transition to be uncovered.