Title suggestions:

Social dynamics and movement in a periodically constrained system

Most ecosystems are only temporarily suitable for exploitation by animals, but the rate at which they transition between usable and unusable states is often too slow to study the effects of a changing environment and innate behaviour on interactions between individuals.

The tidal mudflats of the Wadden Sea are critical feeding areas for shorebirds, but their exploitation is periodically constrained by the tidal cycle. Tides briefly create suitable foraging areas for waders such as red knots *Calidris canutus islandica*, which feed on the buried zoobenthos. This periodic fluctuation occurs at an interval (~ 6 hours) that allows individuals to choose their neighbours by their relative success at finding food. Individual knots in lab studies fall along a spectrum of exploratory behaviour, with individual consistency over time. This is also expected to affect their distribution on the mudflats, and their social environment.

Here, we examine the interaction of two predictors of knot sociality and space-use: the tidal cycle, and consistent individual differences in exploratory behaviour. We ask whether: 1. Sociality – proxied by neighbour distances – is driven by the tide, or arises from conspecific affinity, and 2. Whether knots of similar exploratory tendency cluster together.

environment forms fission-fusion dynamics which ﻿consist regular shifts in the size and composition of social groups. ﻿Thus, the individual and environmental factors that drive social dynamics have become an important focus. Red knots *Calidris canutus* are migratory shorebirds forage on the tidal mudflats. Recent studies revealed that red knots show consistent individual differences on their exploration behavior that it is negatively correlated with gizzard mass which reflects the quality of prey that is consumed. ﻿Exploratory behavior in a laboratory setting is related to space use in the wild; meaning that exploratory individuals forage in greater distance and select higher quality prey. Yet, the factors that influence their social foraging groups have not been studied. This study aims to investigate the influence of individual (personality type, gizzard mass), social (group size) and environmental (low and high tide) factors on movement of red knots. We followed individually characterized 41 red knots for 3 days with TOA transmitter tags that release detailed location information. We expect to find higher distance between exploratory and sedentary individuals during low tide than high tide because of the exploitation of the mudflats. Furthermore, we aim to test our hypothesis with comparing simulation model and observed data. Ultimately this study aims to give a comprehensive description of social aspects of red knot movement.