

DY 22: Invited Talk: Lucas Goehring (Nottingham)

Time: Tuesday 10:00–10:30

Location: DYc

Invited Talk

DY 22.1 Tue 10:00 DYc

Stability and dynamics of convection in dry salt lakes —•LUCAS GOEHRING¹, JANA LASSER², MARCEL ERNST³, MATTHEW THREADGOLD⁴, CÉDRIC BEAUME⁴, and STEVEN TOBIAS⁴ —¹Nottingham Trent University — ²Complexity Science Hub Vienna — ³University of Kassel — ⁴University of Leeds

Dry lakes covered with a salt crust organised into beautifully patterned networks of narrow ridges are common in arid regions. This talk will consider the possible origins of this pattern as the surface expression of buoyancy-driven convection in the porous soil beneath a salt crust. Specifically, we look at convection in a deep porous medium with a con-

stant through-flow boundary condition on a horizontal surface, which resembles the situation found below an evaporating salt lake. Solving the linear stability problem, we show that typical field conditions will be unstable to subsurface convection. Further exploring the non-linear regime of this model, we demonstrate how the growth of small downwelling plumes is itself unstable to coarsening, as the system develops into a dynamic steady state. Interestingly, a robust length-scale emerges for the pattern wavelength, which is largely independent of the driving parameters, and consistent with the size of typical salt crust patterns (arXiv:2004.10578). Finally, we will show how these results can be extended into three-dimensions and more realistic boundary conditions, and include comparisons to field observations.