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Dune-dune repulsion[1] KAROL BACIK, University of Cambridge, SEAN LOVETT[2], Schlumberger Cambridge Research , COLM-CILLE CAULFIELD, NATHALIE VRIEND, University of Cambridge — Dunes are coherent sedimentary structures which arise spontaneously due to the dynamical interplay between granular matter and the flow of the overlaying fluid. Natural dunes rarely occur in isolation. Aeolian dunes form vast dune fields and subaqueous bedforms occur in groups. As of now, the mechanisms which regulate the large scale organisation of dune fields are poorly understood. In particular it is unclear if the dune configurations we observe are stable or transient. Here we investigate the dynamics of a quasi-2D dune corridor using a subaqueous experiment in an annular geometry. We show that the corridor structure appears to be robust and that stabilisation is achieved by long range dune-dune interactions. Our experiments reveal that by altering the flow, dunes strongly affect the shape and the migration rate of their downstream neighbours which leads to an effective dune-dune repulsion. Here, we discuss the physical origin of the repulsion mechanism and explore its consequences for the system-level dynamics of the dune corridor.

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