IN DYNAMIC EQUILIBRIUM: THE AUTOGENIC LANDFORM CHANGE IN A FLUVIAL-AEOLIAN INTERACTING FIELD. B. Liu [1] and T. Coulthard [2], [1] College of the Environment and Ecology, Xiamen University, Xiamen, Xiang'an South Road, 361102 China, Baoli.liu@outlook.com, [2] School of Environmental Sciences, University of Hull, Cottingham Road, HU6 7SR United Kingdom, t.coulthard@hull.ac.uk.

Aeolian and fluvial systems are usually studied independently which leaves many questions unresolved in terms of how they interact. When sand dunes and rivers coincide with each other, the interaction of sediment transport fluxes between the two systems may lead to change in either or both systems therefore can significantly change surface morphology. An inventory is presented from 230 globally distributed study sites from locations where fluvial and aeolian systems interact with each other. At each location key attributes, wind/river direction, net sand transport direction, dune morphology, river channel pattern were identified and relationships between each factors were analyzed. The survey results show that there are about 47% of all examples in which the rivers flow parallel to the wind direction and braided rivers are the dominant channel pattern (42%). Longitudinal dunes rather than transverse dunes are most frequently associated with these braided channel patterns, possibly due to transverse dunes being associated with low sediment availability and therefore the aeolian sediment flux is insufficient to change the river channel type. In contrast meandering rivers occur more frequently when sand sheets dominate the aeolian system. Overall, cresentic dunes are the most common dune type (55%) where fluvial and aeolian systems interact. Furthermore, six types of interaction were classified that reflect a shift in dominance between the fluvial and aeolian systems. Results from this classification confirm that fluvial and aeolian processes can influence each other, but that only certain types of interaction were significant: the meeting angle and dune type, the meeting angle and interaction type and finally channel pattern and interaction type.

Based on this analyzes, a cellular aeolian/dune model and fluvial model are used to simulate interacting processes. Different factors (wind/water speed, sediment supply) are examined to investigate the triggers that may switch the dominance between processes and the consequent changes in morphology that may occur. Whilst various interacting behaviours have been observed in the simulations, an unexpected cyclic large scale landscape change is noticed where river channels would avulse around dunes significantly altering the river/dune configuration and affecting sediment output, which give us the chance to set up a link between system intrinsic dynamic processes and geomorphic change. In addition, for an abrupt or major landscape change to occur, the common explanations are undoubtedly due to the influence of climatic change, tectonics or even human activities. Nevertheless, this assumption could has prevented researchers from considering that large scale of landform instability may be inherent and driven by internal forces in the system in dynamic equilibrium. Hence, a sudden landscape change may be inherent in the normal development of a fluvial-aeolian interacting field and that a change in an external variable is not always required for a significant geomorphic event to occur but depends on the system intrinsic geomorphic threshold. If this geomorphic threshold condition can be identified, not only will different explanations for some landform or hydrologic, sedimentologic and stratigraphic anomalies emerge but also the ability to identify unstable landforms and to predict their change.