Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

**Dynamic Mode Decomposition of Flow Around Interacting Barchan Dunes** NATHANIEL BRISTOW, GIANLUCA BLOIS, TAEHOON KIM, Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, Indiana, U.S., PETER SCHMID, Department of Mathematics, Imperial College, London, England, JIM BEST, Department of Geology, Geography, and Ven Te Chow Hydrosystems Laboratory, University of Illinois, Champaign, Illinois, U.S., KENNETH CHRISTENSEN, Department of Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, Indiana, U.S. — Barchan dunes are crescentic bedforms located in environments with unidirectional flow and limited sediment supply, including deserts, river beds and the craters of Mars. The evolution of, and interactions between, barchans are highly dynamic, involving feedback mechanisms between the fluid flow, morphological change and sediment transport. A series of experiments were undertaken to discretely simulate the collision of a smaller barchan with a larger, downstream one using fixed bedform models, each experiment representing a successive snapshot in the dune collision process. These experiments thus capture the turbulent flow over fixed-bed morphologies that correlate with rapid morphological change and high rates of sediment transport using time-resolved PIV in the wall-parallel plane. The use of a Refractive Index Matching (RIM) flow facility allows for the light to pass through the model, capturing areas which are otherwise obscured, such as around the horns of the dune and the sheltered region behind the crest. Dynamic Mode Decomposition is used to identify the most dominant modes contributing to flow dynamics in each collision stage.

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Date submitted: 01 Aug 2015 Electronic form version 1.4