

First-Year Research in Earth Sciences: Dunes

Conference Presentation: Vredevoogd, Natalie, Peter Duimstra, Benjamin Adamson, Johnathan Cooper, Michael MacGillivray, Derek McClure, Hailey Postma, Delaney Sall, Emma Tuit, William Weiss. 2021. "A comparison between an artificial dune and Michigan coastal dunes." Annual Meeting of the Michigan Academy of Science, Arts, and Letters, Virtual Conference hosted by Alma College, Michigan, 12 March 2021; poster presentation.

Abstract: In August 2020, Calvin University brought 630 tons of sand to its campus, 40 miles from Lake Michigan, to simulate a dune environment as a COVID-19 adaptation for student research. Our research focused on how this artificial dune named Perseverance Dune compares with Lake Michigan dunes and whether sand is leaving the dune area over time. At Perseverance Dune, we measured mineralogy, grain size distribution, wind characteristics, erosion, deposition, sand depth, spread, and slope angles as well as collecting observational data and aerial imagery. We compared these with prior research, LiDAR data, and sand samples from the Michigan lakeshore. Our results show that Perseverance Dune is a layer of sand roughly 41 cm deep spread over an existing slope which determines its slope angles. The sand is smaller than Michigan dune sand but has a similar composition with mostly quartz grains and traces of magnetite. Sand is leaving the dune, but surface changes from wind processes are consistent with coastal dunes. However, water erosion on the lower dune is unusual. Measurements suggest the dune will shrink in sand volume over time. Similarities with Lake Michigan coastal dunes make Perseverance Dune a suitable simulation for certain various kinds of dune research.