***Title:**	*Data on aeolian sand dune activity in the White River Badlands, South Dakota, northern Great Plains, USA*
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Data Article

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Abstract

This data paper reports on optically stimulated luminescence (OSL) data from samples collected in the White River Badlands, South Dakota, northern Great Plains. Sand samples were collected from the crests of parabolic dune heads and arms, as well as blowout exposures, on three tables located on private land in the Buffalo Gap National Grasslands. Using hand augers, samples were collected at depths of 1 and 2m below ground surface to minimize potential effects of bioturbation. An improvised split-spoon sampler was used at selected sites to ensure collection from laminated sediments. At auger and exposure localities, sediment was collected by inserting tubes into a full bucket auger or exposure face. Tubes were tightly packed and taped at both ends to prevent shifting of sediment during shipping. Samples collected from the truck-mounted corer were packed in black plastic liners to ensure samples were not exposed to sunlight. OSL analyses were conducted at the University of Nebraska's Luminescence and Geochronology Laboratory. Interpretation of OSL data was aided by analyses of aerial photographs from the National Agricultural Imagery Program and from the Aerial Photos Single Frame collection hosted on servers of the United States Geological Survey.

Specifications Table

Subject area	*Geology*
More specific subject area	*Quaternary geology; Aeolian geology*
Type of data	*Table, graph, figure*
How data was acquired	Risø model DA 20 TL/OSL reader, survey
Data format	*analyzed*
Experimental factors	Quartz grains (90-150 µm) were isolated by sieving, treatment with hydrochloric acid, floatation in heavy liquid and hydrofluoric acid to etch quartz grains and remove feldspars. The quartz grains were checked for purity by visual inspection and using IR diodes on the luminescence reader.
Experimental features	Samples were run on 5 mm aliquots using a minimum of 23 accepted aliquots using the Central Age Model (Galbraith, Roberts, Laslett, Yoshida, & Olley, 1999). Preheat temperatures were determined by preheat plateau tests (Wintle & Murray, 2006), and data reliability was checked through dose recovery tests. Environmental dose rate estimates were determined using the concentrations of K, U, and Th as determined by high-resolution gamma spectrometry, and long-term moisture contents were estimated to be 5%. The cosmogenic component of the dose rate was calculated using equations from Prescott and Hutton (1994), and the final dose rate values were calculated following equations from Aitken (1998). All OSL age estimates are presented as calendar years before 2016.
Data source location	Bouquet Table (43°39'37.076"N 102°16'15"W), Conata Table (43°41'36.449"N 102°26'16"W), Cuny Table (43°32'10.85"N 102°38'56"W)
Data accessibility	*Data is supplied in this article*
Related research article	Paul E. Baldauf, Patrick A. Burkhart, Paul Hanson, Maraina Miles, Ashley Larsen, Chronology of Dune Development in the White River Badlands, northern Great Plains, Aeolian Research, in press.

Value of the Data

- These data can be used to construct a chronology of aeolian activity in the northern Great Plains, USA.
- These data offer insight into climate fluctuations in the Late Pleistocene and Holocene of the Great Plains.
- These data can be compared to other indicators of aeolian activity in the Great Plains to establish regional extent of climate changes.

Data

Data describe the time, given in years before 2016, since quartz grains in a sediment sample were exposed to sunlight. Data are interpreted as time since burial of sand grains. General location data are included for the sample set.

Experimental Design, Materials, and Methods

OSL ages, determined from analysis of quartz grains in sand samples, are interpreted as time since burial of sediment. Sampling strategy in this study focused on crests of dunes so that ages would determine the timing of the waning stages of aeolian sedimentation (Baldauf, Burkhart, Hanson, Miles, & Larsen, in press). Sand samples were collected from the crests of parabolic dune heads and arms, as well as blowout exposures, on three tables located on private land in the Buffalo Gap National Grasslands. Using hand augers, samples were collected at depths of 1 and 2m below ground surface to minimize potential effects of bioturbation. An improvised split-spoon sampler was used at selected sites to ensure collection from laminated sediments. At auger and exposure localities, sediment was collected by inserting tubes into a full bucket auger or exposure face. Tubes were tightly packed and taped at both ends to prevent shifting of sediment during shipping. Samples collected from the truck-mounted corer were packed in black plastic liners to ensure samples were not exposed to sunlight.

OSL analyses were conducted at the University of Nebraska's Luminescence and Geochronology Laboratory. Quartz grains (90-150 µm) were isolated by sieving, treatment with hydrochloric acid, floatation in heavy liquid and hydrofluoric acid to etch quartz grains and remove feldspars. The quartz grains were checked for purity by visual inspection and using IR diodes on the luminescence reader. D_e values were determined on a Risø model DA 20 TL/OSL reader, and samples were run on 5 mm aliquots using a minimum of 23 accepted aliquots using the Central Age Model (Galbraith et al., 1999). Preheat temperatures were determined by preheat plateau tests (Wintle & Murray, 2006), and data reliability was checked through dose recovery tests. Environmental dose rate estimates were determined using the concentrations of K, U, and Th as determined by high-resolution gamma spectrometry, and long-term moisture contents were estimated to be 5%. The cosmogenic component of the dose rate was calculated using equations from Prescott and Hutton (1994), and the final dose rate values were calculated following equations from Aitken (1998). All OSL age estimates are presented as calendar years before 2016. Interpretation of OSL data was aided by analyses of aerial photographs from the National Agricultural Imagery Program and from the Aerial Photos Single Frame collection hosted on servers of the United States Geological Survey.

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