



## **Spatial and temporal variations in the sediment state of North American dune fields**

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This research evaluates geomorphic and chronologic data from the INQUA Dune Atlas for three areas of North America: 1) the Prairie, Parkland and Boreal ecozones of the northern Great Plains in Canada; 2) the Central Great Plains of the USA; and 3) the deserts of southwestern USA and northern Mexico. Chronometric data for periods of dune activity and stability are compared with palaeoenvironment reconstructions to assess dune system response to changes in sediment supply, availability, and mobility. Dune fields in the northern Great Plains were formed from glaciofluvial or glaciolacustrine sediments deposited during deglaciation 16–11 ka. Subsequent aeolian deposition occurred in Parkland and Prairie dune fields as a result of mid-Holocene (8–5 ka) and late-Holocene (< 3.5 ka) activity related to drought conditions. In the Central Great Plains, many dune fields are closely linked to fluvial sediment sources. Sediment supply was high in these dune fields during deglaciation of the Rocky Mountains and resulted in widespread dune construction 16–10 ka. Multiple periods of Holocene reactivation are recorded and reflect increased sediment availability during drought episodes. Dune fields in the southwestern deserts experienced periods of construction as a result of enhanced supply of sediment from fluvial and lacustrine sources during the period 11.8 – 8 ka and at short but repeated intervals during the late Holocene. Despite spatial and temporal gaps in chronometric data, the record from North American dune fields indicates the strong influence of sediment supply on dune construction, with changes in sediment availability, as a result of drought, being the primary driver of dune activity during the Holocene.