**‘Data from: Field measurement of wind erosion flux and soil erodibility factors as affected by tillage and seasonal drought’**

**Experimental Details**

The experiment was located on the Area IV Soil Conservation Districts (SCD) Cooperative Research Farm which is operated by the Northern Great Plains Research Laboratory of the Agricultural Research Service, U. S. Department of Agriculture. The site consists of very gently rolling topography (0 - 3% slope) and consists of Mollisol soils classified in the USDA system as Temvik-Wilton silt loams (Fine-silty, mixed, superactive, frigid Typic and Pachic Haplustolls).

Field plots were laid out in 2003 and 2004 to accommodate tillage treatments (Figure 1). The first year of the study was carried out during a fallow year following a barley (*Hordeum vulgare* L.)-winter wheat (*Triticum aestivum* L.)-sunflower (*Helianthus annus* L) rotation; the second year of the study was on fallow following a spring wheat (*Triticum aestivum* L.)-winter wheat-sunflower rotation.

Tillage treatments consisted of a single operation in spring consisting of (a) no-tillage (NT), (b) a single pass of a Massey tandem disk set; and (c) two passes of a John Deere offset disk set (ODT).

The principal instruments used for measuring wind erosion-generated sediment fluxes were Big Spring Number Eight (BSNE) sediment samplers (Fryrear, 1986). These sediment samplers were placed near the center of plot borders several meters inside the plots. Other instruments used were SENSIT piezoelectric particle sensors.

Vertical flux profile was determined by stacked sediment samplers capturing sediment at 5 heights between 5 and 100 cm. The stacked sediment samplers were positioned in the ODT treatment. Data were fitted to two sequential power functions of the form

 Q = aZ-b [1]

in which Q is horizontal flux, Z is elevation above the surface, and a and b are constants. The percentage of the vertical profile in which the flux was between the 5 and 10 cm interval was 18.6%. This figure was an important parameter used for the calculation of sediment flux values from sediment sampler yield data.

The chain method (Saleh, 1993) was used to measure soil surface roughness. The bicycle chain used for this was randomly placed in the four quarters of each plot in a north-south and east-west alignment. Live and dead residue coverage was measured by observations made at 25 points along a 7.6-m cable. Measurements of standing residue were made by photographic means and of aggregate size distribution by compact rotary sieve.

The Revised Wind Erosion Equation (RWEQ) model (Fryrear et al., 2000) was applied to the data collected in this experiment. RWEQ is an empirical estimator of soil losses due to wind erosion with a multiplicative factors structure.

Information given here is an abridgement and summarization of material found in Merrill et al. (2022).

Fryrear, D. W. (1986). A field wind erosion sampler. *Journal of Soil and Water Conserv*ation, *41*, 117-120.

Fryrear, D. W., Bilbro, J. D., Saleh, A., Schomberg, H. M., Stout, J. E., and Zobeck, T. M. (2000). RWEQ: Improved wind erosion technology. *Journal of Soil and Water Conserv*ation*, 55*, 183-189.

Merrill, S. D., Zobeck, T. M., and Liebig, M. A. (2022). Field measurement of wind erosion flux and soil erodibility factors as affected by tillage and seasonal drought. *Soil Science Society of America Journal 86*, 1296-1311.

Saleh, A. (1993). Soil roughness measurement: Chain method. *Journal of Soil and Water Conservation 48*, 527-529.





Figure 1. Field plot layout for the wind erosion project, from Merrill et al. (2022).