**ABSTRACT**

The Swift current water quantity and quality is an annual time-series database covering the period of 1962-2011. This database contains datasets for annual runoff volume, peak flow rates, water quality attributes from an edge of field study conducted at Swift Current, SK. Three watersheds, each differing in their tillage and management practices contribute to the dataset. Using the runoff volumes and water quality parameters, loads of nutrient and herbicide leaching could be calculated under different management conditions.

**DETAILS**

***Watershed description***

Detailed description of the location, soil properties of the watersheds are published elsewhere (Cessna *et al.*, 2013). The list of crops grown, tillage and management practices for the watersheds are provided in separate datasets in the database.

***Runoff***

Runoff values are water flow arising predominantly from snowmelt events and occasionally from rainfall. The given values are cumulative amount of flow (in mm) that occurred in a period of one day. Runoff depth was measured between 1962 and 2013 using a Stevens water level chart recorder in the stilling well of each flume. Since 1994, pressure transducers were also used to record water level. Daily (1962 – 2013) and hourly (1994 – 2013) runoff rates were calculated from these water level measurements using a rating curve developed for each watershed (Cessna et al., 2013). The H-flumes were heated in cold weather to prevent icing. No runoff was measured during 1970. A heavy rainfall event on 14 June 1964 caused flow rates to exceed the flume capacity (McConkey *et al.*, 1997). Raised grass bromes were constructed in each of the watershed prevented transfer of flow between the watersheds. A value of zero in runoff and peak flow indicates an actual zero runoff volume and/or peak flow rates during that day. Three kinds of flags are used to define the quality and nature of the runoff data points. Flag ‘g’ denotes that the observation is “good” and there is high confidence in these data points; flag ‘s’ is ‘suspicious’ due to a possible cross flow of runoff from one watershed to another; flag ‘a’ refers to data points where the runoff is adjusted to compensate for round-off errors that occurred during data migration process, average values for that plots were used whenever these errors were encountered; flag, “m” denotes missing runoff value due to equipment malfunction.

***Runoff chemistry***

Runoff chemistry was measured from runoff samples collected from the flume at the downstream of each watershed. Gas chromatography was used to quantify the herbicide concentrations. The details on sample collection, quantification methodologies are described by Cessna *et al.* (2013)

***Database files and mnemonics***

The database features multiple datasets that are presented in a “.csv” format. Runoff and peak flow data are available in a separate dataset for the years 1962-2011. Management details for each watershed and management system definitions form two separate datasets. Data for each of the water quality attributes, snow water equivalent, soil nutrients (nitrate and phosphorus), and the soil moisture content are presented in individual csv files only those days when observations were made. These files will have the corresponding year, month and day fields that could be linked to the runoff dataset as needed.

***References***

Cessna, A.J., B.G. McConkey and J.A. Elliott, 2013. Herbicide transport in surface runoff from conventional and zero-tillage fields. Journal of environmental quality, 42(3): 782-793.

McConkey, B., W. Nicholaichuk, H. Steppuhn and C. Reimer, 1997. Sediment yield and seasonal soil erodibility for semiarid cropland in western canada. Canadian journal of soil science, 77(1): 33-40.