Information about EC surfaces

Caley Gasch, WSU

10/19/2015

Surveys of ECa were conducted in spring and fall of 2013 using an EM38-MK2 (Geonics Limited, Mississauga, Ontario) coupled with an AgGPS 132 differential global positioning system (Trimble, Sunnyvale, CA). The readings from the EM38 were attached to their location every second using the Handheld Geographic Information Systems software package (StarPal, Fort Collins, CO). The effective measurement depth (in vertical dipole orientation) was 1.5 m [*Sudduth et al.*, 2001] with units of milliSiemens per meter (mS/m). In the spring, readings were taken at points on a 30 x 30 m grid (420 locations). At every other grid point, we added a measurement point at short range, alternating in distance by 1 or 3 m and in orientation by the four cardinal directions. For fall surveys, the instrument was placed in a polyvinyl chloride pipe carrier that was pulled behind an all-terrain vehicle, which was driven in a north-south, east-west grid across the fields. Surveys were conducted by Maninder Chahal, Caleb Grant, Matteo Poggio.

The ECa surfaces (10 x 10 m) were created using either ordinary kriging (OK), or regression kriging (RK) models, using the covariates listed below. For each prediction surface, we randomly split the data into a training set used for model fitting (70% of points), and a validation set used to assess prediction accuracy (30% of points). Accuracies (root mean squared error) are listed below. All geostatistical analyses were conducted in R [*R Core Team*, 2015], using the ‘gstat’ package [*Pebesma*, 2004], with assistance from the ‘rgdal’ [*Bivand et al.*, 2015], ‘raster’ [*Hijmans*, 2015], and ‘plyr’ [*Wickham*, 2011] packages. Caley Gasch conducted the geostatistical analysis.

All surfaces have spatial reference NAD83 UTM11N

|  |  |  |  |
| --- | --- | --- | --- |
| **File** | **Survey date** | **Type of kriging, covariates** | **Interpolation accuracy** |
| aes\_spr\_ec | April 23, 2013 | RK with slope, insolation, and planform curvature | 4.23 mS/m |
| aes\_fa\_ec | September 21, 2013 | OK | 1.61 |
| jns\_spr\_ec | May 4, 2013 | RK with elevation, slope, insolation, profile curvature, easting, and northing | 5.77 mS/m |
| jns\_fall\_ec | September 19, 2013 | OK | 2.02 mS/m |
| odb\_spr\_ec | May 19, 2013 | OK | 4.52 mS/m |
| odb\_fall\_ec | September 19, 2013 | OK | 2.59 mS/m |
| wlf\_spr\_ec | April 18, 2013 | RK with elevation and elevation^2 | 4.28 mS/m |
| wlf\_fall\_ec | September 14, 2013 | OK | 2.47 mS/m |