Cook Farm

Water Content Analysis

Simple correlation

Date: April 17, 2007

* Received the following files

C:\Cook\_Farm\Excel\Original\**Bulk\_Density Values.xls**

C:\Cook\_Farm\Excel\Original\**Grid Points Water content 2006.xls**

C:\Cook\_Farm\Excel\Original\**Grid Points Water content with Ammonia\_Nitrate 2001-2005.xls**

C:\Cook\_Farm\Excel\Original\**Hesham 1999-2000 soil water data.xls**

C:\Cook\_Farm\Excel\Original\**Hesham 1999-2000 Yield data with Terrain Attributes.xls**

C:\Cook\_Farm\Excel\Original\**Hesham 2000 EM38 Data.xls**

C:\Cook\_Farm\Excel\Original\**Hesham 2001-2005 yield data with terrain attributes.xls**

Date: April 18, 2007

* Water content data were separated into the different years (1999-2006), separated to foot-by-foot and fall and spring data. All output files are in the directory C:\Cook\_Farm\Excel\Water Content\ listed in folders by year.

Ex.

\Year 1999

**Y99\_F\_1.xls** gravimetric water content for the 1st foot during fall 1999

**Y99\_F\_2.xls**

**Y99\_F\_3.xls**

**Y99\_F\_4.xls**

**Y99\_F\_5.xls**

**Y99\_F\_sorted.xls** gravimetric water content for the 1-5 feet during fall 1999

**Y99\_S\_1.xls** gravimetric water content for the 1st foot during spring 1999

**Y99\_S\_2.xls**

**Y99\_S\_3.xls**

**Y99\_S\_4.xls**

**Y99\_S\_5.xls**

**Y99\_S\_sorted.xls** gravimetric water content for the 1-5 feet during spring 1999

**Year1999.xls**

Same for:

\Year 2000

\Year 2001

\Year 2002

\Year 2003

\Year 2004

\Year 2005

\Year 2006

Date April 19, 2007

\Excel\WCR\**grid\_numbers.doc** ID2 of grid cells (Rows and columns)

\Excel\WCR\**cell\_un\_i\_year.xls** ID2 at the three fields A, B, and C

\Excel\WCR\**cell\_un\_id.xls** ID2 at sub-locations of the three fields A, B, and C

\Excel\WCR\**Sampling\_location.xls** Sampling locations

Date: May 13, 2007

* Correct/estimate missing and non-logic values of the GWC foot by foot

\Excel\WCR\**correction\_values\_F.xls** correction values for the fall GWC for all years,

Based on data from other years, top or lower foot

\Excel\WCR\**correction\_values\_S.xls** correction values for the spring GWC for all years,

Based on data from other years, top or lower foot

* Import gravimetric water content (GWC) into GIS. All GIS projects are in the directory C:\Cook\_Farm\Water\_Content

Project : **Year\_1999\_F** GWC for the fall data,1-5 feet added to the **Points\_1999**

**(Points\_1999** layer**)**  data layer, plot histograms and export to illustrator files, **Year\_1999\_F1.ai** to **Year\_1999\_F5.ai** (All illustrator files are in the directory C:\Cook\_Farm\Adobe)

Project : **Year\_1999\_S** GWC for the spring data,1-5 feet added to the **Points\_1999**

**(Points\_1999** layer**)**  data layer, plot histograms and export to illustrator files, **Year\_1999\_S1.ai** to **Year\_1999\_S5.ai** (All illustrator files are in the directory C:\Cook\_Farm\Adobe)

* Repeat the same for the other years:

Project: **Year\_2000\_F** (**middle\_section** layer), **Year\_2000\_F1.ai** to **Year\_2000\_F5.ai**

Project: **Year\_2000\_S** (**middle\_section** layer), **Year\_2000\_S1.ai** to **Year\_2000\_S5.ai**

Project: **Year\_2001\_F** (**Field\_B\_points\_WC01** layer), **Year\_2001\_F1.ai** to

**Year\_2001\_F5.ai**

Project: **Year\_2001\_S** (**Field\_B\_points** layer), **Year\_2001\_S1.ai** to **Year\_2001\_S5.ai**

Project: **Year\_2002\_F** (**Field\_A\_points\_WC02** layer), **Year\_2002\_F1.ai** to

**Year\_2002\_F5.ai**

Project: **Year\_2002\_S** (**Field\_A\_points\_WC02** layer), **Year\_2002\_S1.ai** to

**Year\_2002\_S5.ai**

Project: **Year\_2003\_F** (**Field\_C\_points** layer), **Year\_2003\_F1.ai** to **Year\_2003\_F5.ai**

Project: **Year\_2003\_S** (**Field\_C\_points** layer), **Year\_2003\_S1.ai** to **Year\_2003\_S5.ai**

Project: **Year\_2003\_F** (**Field\_C\_points** layer), **Year\_2003\_F1.ai** to **Year\_2003\_F5.ai**

Project: **Year\_2004\_F** (**Field\_B\_points** layer), **Year\_2004\_F1.ai** to **Year\_2004\_F5.ai**

Project: **Year\_2004\_S** (**Field\_B\_points** layer), **Year\_2004\_S1.ai** to **Year\_2004\_S5.ai**

Project: **Year\_2005\_F** (**Field\_A\_points\_WC05** layer), **Year\_2005\_F1.ai** to

**Year\_2005\_F5.ai**

Project: **Year\_2005\_S** (**Field\_A\_points\_WC05** layer), **Year\_2005\_S1.ai** to

**Year\_2005\_S5.ai**

Project: **Year\_2006\_F** (**Field\_C\_points** layer), **Year\_2006\_F1.ai** to **Year\_2006\_F5.ai**

Project: **Year\_2006\_S** (**Field\_C\_points** layer), **Year\_2006\_S1.ai** to **Year\_2006\_S5.ai**

* Plot histograms of GWC for all years foot-by-foot (8 histograms):

\Adobe\ **Histogram\_F\_1.ai** 8 years, fall, first foot

\Adobe\ **Histogram\_F\_2.ai** 8 years, fall, second foot

\Adobe\ **Histogram\_F\_3.ai** 8 years, fall, third foot

\Adobe\ **Histogram\_F\_4.ai** 8 years, fall, fourth foot

\Adobe\ **Histogram\_F\_5.ai** 8 years, fall, fifth foot

\Adobe\ **Histogram\_S\_1.ai** 8 years, spring, first foot

\Adobe\ **Histogram\_S\_2.ai** 8 years, spring, second foot

\Adobe\ **Histogram\_S\_3.ai** 8 years, spring, third foot

\Adobe\ **Histogram\_S\_4.ai** 8 years, spring, fourth foot

\Adobe\ **Histogram\_S\_5.ai** 8 years, spring, fifth foot

* Summarize the statistics of the GWC for the 8 years

\Excel\WCR\WCR\_fit\_F1\**Stat\_F\_1.xls** statistics for the GWC in the first foot during the

Fall season for the 8 years.

\Excel\WCR\WCR\_fit\_F1\**Stat\_F\_2.xls ,, ,, ,, ,,**

\Excel\WCR\WCR\_fit\_F1\**Stat\_F\_3.xls ,, ,, ,, ,,**

\Excel\WCR\WCR\_fit\_F1\**Stat\_F\_4.xls ,, ,, ,, ,,**

\Excel\WCR\WCR\_fit\_F1\**Stat\_F\_5.xls ,, ,, ,, ,,**

\Excel\WCR\WCR\_fit\_S1\**Stat\_S\_1.xls ,, ,, ,, ,,**

\Excel\WCR\WCR\_fit\_S1\**Stat\_S\_2.xls ,, ,, ,, ,,**

\Excel\WCR\WCR\_fit\_S1\**Stat\_S\_3.xls ,, ,, ,, ,,**

\Excel\WCR\WCR\_fit\_S1\**Stat\_S\_4.xls ,, ,, ,, ,,**

\Excel\WCR\WCR\_fit\_S1\**Stat\_S\_5.xls ,, ,, ,, ,,**

* Import GWC data into the file \Excel\WCR\WCR\_fit\_F1\**WCR\_F\_1.xls ,** part by part, and calculate the relative GWC (value – min / max – min)
* Use simple correlation between relative GWC for all the different years (16 combination) to estimate missing values and values at locations where no sampling were collected. Data are presented foot-by-foot in the files

\Excel\WCR\WCR\_fit\_F1\**WC 99\_06\_F\_1.xls** (8 files for fall, and 8 for spring)

* All correlations are plotted and collected in the file \Excel\WCR\WCR\_fit\_F1\**WCR\_curves.doc**
* The best correlations are used to estimate missing values and values at un-sampled locations and converted back from relative to normal GWC, and the data are sorted foot-by-foot in the file \Excel\WCR\WCR\_fit\_F1\**WC 99\_06\_F\_1\_sorted.xls** (this is the data for the GWC based on simple correlation analysis, for all 369 points at 5 feet during fall and spring and for the years 1999-2006)
* Measured and estimated GWC (based on simple correlation) were imported into GIS and added to the **South\_points** layer, histograms for the GWC for the entire area were collected, and interpolation using IDW was used to prepare maps for the GWC for the entire area. This was performed foot-by-foot and all the projects names in GIS followed the previous rules (ex. Year\_1999\_F\_1).

Cook Farm

Water Content Analysis

Multiple Regression

Date: June 15

Prepare input files for the multiple regression analysis of GWC data (foot-by-foot). Description of files and data is found in the file C:\Cook\_Farm\SAS\_inf\**merge\_files.doc.**

Soil1F one file for all 8 years during the fall

Soil1S one file for all 8 years during the spring

Soil2\_99 one file for each year

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Soil2\_06

Soil3F1\_99 GWC data for the first foot during fall 1999

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Soil3F5\_06 GWC data for the fifth foot during fall 1999

Soil3S1\_99 GWC data for the first foot during spring 1999

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Soil3S5\_06 GWC data for the fifth foot during spring 1999

* Merge Soil1F with Soil3F1\_99 🡪 merg1F199
* Merge merg1F199 with Soil2\_99 🡪 **merg2F199** (total of five files)
* Repeat for the spring data, then for other years
* Total files: 5 x 2 x 8 = **80** files
* Merging was done using SAS and stepwise multiple regression analysis was carried out. The input files for the analysis (**merg2F199**), and the variables selected along with the predicted values for the water content listed in file (**regpf199**) are found in the directory C:\Cook\_Farm\Excel\VWC\VWC\_feet\reg\_pre (total of 160 files).
* Variables selected in the regression models and R2 values are found in the files **reg\_result1.doc, reg\_result2.doc, reg\_result3.doc, reg\_result4.doc**
* Comparison between GWC as estimated by simple correlation and multiple regression, data in the directory C:\Cook\_Farm\Excel\WC\_cor\_rg
* Comparison between missing values as determined by both simple correlation and multiple regression is in the directory C:\Cook\_Farm\Excel\WC\_cor\_rg

Date: July 25, 2007

* Using bulk density values, the VWC were calculated. VWC calculated foot-by-foot are found in the directory C:\Cook\_Farm\Excel\VWC\VWC\_feet
  + **VWCF00.xls** VWC for the fall season, 2000 foot-by-foot, for both the

Measured (bold) and the predicted GWC data based on the

Regression analysis.

* + Total of 16 files, 8 years fall, and 8 years spring.
* Correlation between VWC (foot-by-foot) at the different years are presented in the files **VWC\_Cor\_F1\_99\_06.xls** (5 files for every foot during spring and fall). Also plots of the correlations are collected in the files **VWCcor\_F1\_99\_06.doc** (5 files for every foot during spring and fall)
* VWC summed over the entire profile **(m/profile)** are calculated based on the GWC from sampling locations only (not the entire area), files **VWCF\_SP\_00.xls** are in the directory C:\Cook\_Farm\Excel\VWC\VWC\_feet
* Total of 16 files, 8 years fall, and 8 years spring.
* VWC summed over the entire profile for all years during fall, sampling locations only (not the entire area), are in the file C:\Cook\_Farm\Excel\VWC\VWC\_feet\**VWC\_SP\_F\_99\_06.xls**, and the correlation between the different years are collected in the file **VWC\_SP\_F\_99\_06.doc**
* VWC summed over the entire profile for all years during spring, sampling locations only (not the entire area), are in the file

C:\Cook\_Farm\Excel\VWC\VWC\_feet\ **VWC\_SP\_S\_99\_06.xls**, and the correlation

between the different years are collected in the file **VWC\_SP\_S\_99\_06.doc**

Cook Farm

Water Content Analysis

Multiple Regression (VWC-SP)

Date: Sep 1, 2007

* Multiple regression analysis for the VWC-SP started by preparing the VWC\_SP files based on measured data. Files are in the directory C:\Cook\_Farm\SAS\_inf\ and listed as

**Soil3Fvwc\_99.xls**,…., **Soil3Fvwc\_06.xls** (8 files for the fall)

**Soil3Svwc\_99.xls**,…., **Soil3Svwc\_06.xls** (8 files for the spring)

* These files were merged with the previously prepared files of the soil and topographic attributes, and multiple regression analysis was carried out in SAS. The results and the prediction of VWC-SP over the entire area (369 points) are listed in the directory C:\Cook\_Farm\Excel\VWC\VWC\_profile\reg\_vwc

Files are named **regpFvwc99\_n.xls** (8 files for fall) and **regpSvwc99\_n.xls** (8 files for spring)

* Variables selected in the regression models and R2 values are found in the file C:\Cook\_Farm\Excel\VWC\VWC\_profile\ **reg\_result\_vwc\_n.doc**
* All VWC-SP during fall (8 years) (for both measured and predicted locations) are listed in the file C:\Cook\_Farm\Excel\VWC\VWC\_profile\ **VWC\_SP\_mp\_99F\_06F.xls**
* All VWC-SP during fall (8 years) (measured values added) are listed in the file C:\Cook\_Farm\Excel\VWC\VWC\_profile\ **VWC\_SP\_99F\_06F.xls (This is the file to use in the GIS projects)**
* All VWC-SP during spring (8 years) (for both measured and predicted locations) are listed in the file C:\Cook\_Farm\Excel\VWC\VWC\_profile\ **VWC\_SP\_mp\_99S\_06S.xls**
* All VWC-SP during spring (8 years) (measured values added) are listed in the file C:\Cook\_Farm\Excel\VWC\VWC\_profile\ **VWC\_SP\_99S\_06S.xls (This is the file to use in the GIS projects)**
* Correlation between estimated and predicted VWC-SP for all years during fall are plotted in the file C:\Cook\_Farm\Excel\VWC\VWC\_profile\ **VWC-SP\_F99\_06plots.doc**
* Correlation between estimated and predicted VWC-SP for all years during spring are plotted in the file C:\Cook\_Farm\Excel\VWC\VWC\_profile\ **VWC-SP\_S99\_06plots.doc**
* Predicted VWC-SP for the 8 years (the two files **VWC\_SP\_99F\_06F.xls, VWC\_SP\_mp\_99S\_06S.xls**) were included into the South\_Point layer in GIS, and IDW was used to interpolate the VWC-SP over the entire area (369 points). Projects were named **VWC\_F99\_n** (total of 16 files).
* The predicted maps for the VWC-SP over the entire area were re-classified into the same legend range and plots of the maps are presented in the file **vwc\_F\_99\_06\_n.ai** (8 years during fall), and the file **vwc\_S\_99\_06\_n.ai** (8 years during spring)
* Based on the VWC-SP (entire area), the rate of consumption was calculated as:
  + C\_S99\_F99 = PVWC-SP\_S99 – PVWC-SP\_F99
  + Consumption data for 8 years are in the file C:\Cook\_Farm\Excel\VWC\VWC\_profile\ **PVWC\_F\_S\_consumption.xls**
* Data were imported into GIS and included into the South\_Points layer (variable name: C\_S99\_F99), using IDW consumption values were interpolated to the entire area, projects are named **C\_S99\_F99** (total of 8 ), and plots of the 8 maps are in the file **Consumption.ai**
* Based on the VWC-SP (entire area), amount of recharge (cm) was calculated as:
  + R\_S00\_F99 = (PVWC-SP\_S00 - PVWC-SP\_F99) \* 100
  + Amount of recharge for 7 years are in the file C:\Cook\_Farm\Excel\VWC\VWC\_profile\ **PVWC\_F\_S\_recharge.xls**
* Data were imported into GIS and included into the South\_Points layer (variable name: R\_S00\_F99), using IDW recharge values were interpolated to the entire area, projects are named **R\_S00\_F99** (total of 7 ), and plots of the 7 maps are in the file **Recharge\_cm.ai**
  + Histograms of the recharge values from the 7 years are in the file **R\_Histogram.ai**
  + A box plot of the recharge data is in the file **Rech\_bp.ai**
* Recharge efficiency (%) were calculated as:
  + RE\_S00\_F99 = (R\_S00\_F99 / prec. from Sep to sampling time in spring) \* 100
  + Recharge efficiency for 7 years are in the file C:\Cook\_Farm\Excel\VWC\VWC\_profile\ **PVWC\_F\_S\_recharge.xls**
* Data were imported into GIS and included into the South\_Points layer (variable name: RS00F99P), using IDW recharge values were interpolated to the entire area, projects are named **R\_S00\_F99\_P** (total of 7 ), and plots of the 7 maps are in the file **Rech\_Effic.ai**
  + Histograms of the recharge values from the 7 years are in the file **Rech\_Ef\_His.ai**
  + A box plot of the recharge data is in the file **Rech\_eff\_bp.ai**

Cook Farm

Water Content Analysis

Weather data

Date: Nov 15, 2007

Monthly weather data for the years 1999-2006 are found in the directory C:\Cook\_Farm\Excel\weather

* Total precipitation (rainfall/snow) month by month is presented in the file C:\Cook\_Farm\Excel\weather\**total\_prec.xls**

* Amount of rainfall between samplings is presented in the file C:\Cook\_Farm\Excel\weather\**weather3.xls**

Cook Farm

Water Content Analysis

EOF (4 years)

Date: Dec 1, 2007

* Spatial anomalies of the VWC-SP (measured locations) were calculated for the three blocks (A, B, and C) based on data from 4 years.
* Block A is based on the data in fall and spring from the years (1999, 2000, 2002, 2005), data in the file C:\Cook\_Farm\Excel\EOF\spatial\_anomaly\**spa\_anom\_a.xls**, EOF analysis does not allow for missing values, so missing values were completed based on predicted VWC-SP, results are organized in the file **matrix\_Za.xls**.
* PCA was carried out in SAS, and the PC (8 PCs) output are listed in the file **PCS\_mtfa.xls**
* The first 4 PCs (EOF1, EOF2, EOF3, EOF4) are listed in the file C:\Cook\_Farm\Excel\EOF\EOF\_out\**EOF\_a.xls**
* Regression analysis was used to predict an EOF value at all 369 points based on regression with soil and topographic attributes. Variables selected in the regression models are in the file **EOF\_reg\_res.doc**
* EOF values and all other soil and topographic data used in the regression analysis are listed in the file **EOFa\_reg.xls**
* Original EOF values and the predicted EOF (for all 369 points) are found in the file **P\_EOFa\_reg.xls**
* Final estimated and predicted EOF are listed in the file **P\_EOFa.xls**, (use this file)
* Block B is based on the data in fall and spring from the years (1999, 2000, 2001, 2004), data in the file C:\Cook\_Farm\Excel\EOF\spatial\_anomaly\**spa\_anom\_b.xls**, EOF analysis does not allow for missing values, so missing values were completed based on predicted VWC-SP, results are organized in the file **matrix\_Zb.xls**.
* PCA was carried out in SAS, and the PC (8 PCs) output are listed in the file **PCS\_mtfb.xls**
* The first 4 PCs (EOF1, EOF2, EOF3, EOF4) are listed in the file C:\Cook\_Farm\Excel\EOF\EOF\_out\**EOF\_b.xls**
* EOF values and all other soil and topographic data used in the regression analysis are listed in the file **EOFb\_reg.xls**
* Original EOF values and the predicted EOF (for all 369 points) are found in the file **EOFb\_reg.xls**
* Final estimated and predicted EOF are listed in the file **P\_EOFb.xls**, (use this file)
* Block C is based on the data in fall and spring from the years (1999, 2000, 2003, 2006), data in the file C:\Cook\_Farm\Excel\EOF\spatial\_anomaly\**spa\_anom\_c.xls**, EOF analysis does not allow for missing values, so missing values were completed based on predicted VWC-SP, results are organized in the file **matrix\_Zc.xls**.
* PCA was carried out in SAS, and the PC (8 PCs) output are listed in the file **PCS\_mtfc11.xls**
* The first 4 PCs (EOF1, EOF2, EOF3, EOF4) are listed in the file C:\Cook\_Farm\Excel\EOF\EOF\_out\**EOF\_c.xls**
* EOF values and all other soil and topographic data used in the regression analysis are listed in the file **EOFc\_reg.xls**
* Original EOF values and the predicted EOF (for all 369 points) are found in the file **EOFc\_reg.xls**
* Final estimated and predicted EOF are listed in the file **P\_EOFc.xls**, (use this file)
* EOF values were imported into GIS and add to the **South\_Points** Layer (variable names: EOF1a, EOF2a, EOF3a, EOF4a,…, EOF4c). Using IDW values are interpolated to the entire area (369 points) and maps are produced to show the spatial pattern of each EOF (projects named **EOF1a**…..), all maps are plotted in the file **EOFs.ai.**
* Correlations between the EOFs of the spatial soil moisture anomalies and soil and topographic attributes were determined according to the relation:



Where *A* is an EOF and *B* is a regional attribute and  and  are the associated means.

* Correlations are listed in the files **EOFa\_corr.xls, EOFb\_corr.xls, EOFc\_corr.xls**, and results are collected in the file **EOF\_chara\_corr.xls**.
* The percent of variability explained by each EOF from the three blocks are shown in the file **var\_per.xls**
* Expansion coefficients (ECs) are presented in the file **ECs.xls**
* Weighted ECs (by the amount of variance they explain) are presented in the files **WECs\_a.xls, WECs\_b.xls, WECs\_c.xls**, and are plotted in the file **WEC.ai**
* Weighted pattern correlation between EOFs and selected soil and topographic attributes are presented in the files **WPcorr\_a.xls, WPcorr\_b.xls, WPcorr\_c.xls**, and plotted in the file **WPcorr.doc**
* EOF1 from the three blocks was used to reconstruct the soil moisture patterns based on EC1 values and the average moisture (measured locations). Data are fund in the file **P\_EOF1\_01\_06.xls** for all the 8 years (fall, spring). Simple correlations between measured moisture content and predicted values based on EOF1 from the three blocks are also found in the same file. Use this file to plot a GIS map of the entire area (not done), after adding the measured values of the VWC onto the predicted values at measurement locations.

Cook Farm

Water Content Analysis

EOF (2 years)

Date: Dec 20, 2007

The previous analysis was repeated based on data from every 2 years in the three blocks (A,B, and C). Using data from 2 years at the same location eliminated the need to fill any missing values in the EOF analysis.

* Spatial anomalies of the VWC-SP (measured locations) were calculated for the three blocks (A, B, and C) based on data from 2 years, data are collected in the file C:\Cook\_Farm\Excel\EOF\spatial\_anomaly\**matrix\_Za42, matrix\_Zb4, matrix\_Zc4**
* PCA was carried out in SAS, and the PC (4 PCs) output are listed in the files **PCS\_mtfa4.xls, PCS\_mtfb4.xls, PCS\_mtfc11\_4.xls**
* The first 4 PCs (EOF1, EOF2, EOF3, EOF4) are listed in the file C:\Cook\_Farm\Excel\EOF\EOF\_out\**EOF\_a.xls**
* Regression analysis was used to predict an EOF value at all 369 points based on regression with soil and topographic attributes. Variables selected in the regression models are in the file **EOF\_reg4\_res.doc**
* Original EOF values and the predicted EOF (for all 369 points) are found in the file **P\_EOFa4\_reg.xls**
* Final estimated and predicted EOF are listed in the file **P\_EOFa4.xls**, (use this file). For block B the same file is **P\_EOFb4.xls**, and for block C, the file is **P\_EOFc11\_4.xls**
* EOF values were imported into GIS and add to the **South\_Points** Layer (variable names: EOF1a4, EOF2a4, EOF3a4, EOF4a4,…, EOF4c4). Using IDW values are interpolated to the entire area (369 points) and maps are produced to show the spatial pattern of each EOF (projects named **EOF1a4**…..), all maps are plotted in the file **EOFs\_4.ai.**
* Correlations between the EOFs of the spatial soil moisture anomalies and soil and topographic attributes were determined according to the relation:



Where *A* is an EOF and *B* is a regional attribute and  and  are the associated means.

* Correlations are listed in the files **EOFa\_corr\_4.xls, EOFb\_corr\_4.xls, EOFc\_corr\_4.xls**, and results are collected in the file **EOF\_chara\_corr\_4.xls**.
* The percent of variability explained by each EOF from the three blocks are shown in the file **var\_per\_4.xls**
* Expansion coefficients (ECs) are presented in the file **ECs\_4.xls**
* Weighted ECs (by the amount of variance they explain) are presented in the files **WECs\_a\_4.xls, WECs\_b\_4.xls, WECs\_c\_4.xls**, and are plotted in the file **WEC\_4.ai**
* Weighted pattern correlation between EOFs and selected soil and topographic attributes are presented in the files **WPcorr\_a\_4.xls, WPcorr\_b\_4.xls, WPcorr\_c\_4.xls**, and plotted in the file **WPcorr\_a4.doc**, and **WPcorr\_4.doc**
* EOF1 from the three blocks was used to reconstruct the soil moisture patterns based on EC1 values and the average moisture (measured locations). Data are fund in the file **P\_EOF1\_4\_99\_06.xls** for all the 8 years (fall, spring). Simple correlations between measured moisture content and predicted values based on EOF1 from the three blocks are also found in the same file.
* Predicted VWC-SP (8 years, fall and spring) based on EOF1 from block A are collected in the file **PVWC\_SP\_a4.xls** Use this file to plot a GIS map of the entire area, values are added to the **South\_Points** layer, variable names **VWCF99\_a4, VWCF00\_a4,….,** **VWCS00\_a4**. IDW was used to interpolate the VWC-SP over the entire area (369 points). Projects were named **VWC\_F99\_a4** (total of 16 files). Maps of VWC-SP are found in the file **VWC\_S99\_06\_a4.ai** (8 years, spring), and the file **VWC\_F99\_06\_a4.ai** (8 years, fall).
* Correlation between measured VWC and predicted VWC based on EOF from the different blocks and on the multiple regression are shown in the file **VWC\_corr\_EOF4\_reg.xls**