Development of Soil Model Parameter Repositories for Modeling in CEAP

Mauro Di Luzio
Lee Norfleet
Jeff Arnold
Jimmy Williams
Jim Kiniry

Texas A&M AgriLife Research
USDA NRCS
USDA ARS
Texas A&M AgriLife Research
USDA ARS

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PULA / SARDINIA / ITALY
Presentation Outline

- Background and Scope
- Database developments
- Work in Progress
- Conclusions
Background: CEAP National

Agricultural Policy Environmental eXtender

SWAT Watershed System

Soil and Water Assessment Tool
Scope

GeoCEAP Input Databases and Tools
Scope:
US-SOILM-CEAP Construction
Data Sources

STATSGO (1:250,000 scale)

SSURGO (1:24,000 scale)
# SSURGO Tables of Attributes

<table>
<thead>
<tr>
<th>Table</th>
<th>Short Description (USDA-NRCS, 2012)</th>
<th>Level of Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEGEND</td>
<td>Provides the soil survey area that the legend is related to, and related information.</td>
<td>Soil Survey Area</td>
</tr>
<tr>
<td>MAPUNIT</td>
<td>Map units included in the referenced legend and data related to the map unit as a whole.</td>
<td>Map Unit</td>
</tr>
<tr>
<td>COMPONENT</td>
<td>Map unit components identified in the referenced map unit, and selected properties of each component.</td>
<td>Component</td>
</tr>
<tr>
<td>CHORIZON</td>
<td>Horizon(s) and related data for the referenced map unit component.</td>
<td>Horizon</td>
</tr>
<tr>
<td>CHFRAGS</td>
<td>Mineral and organic fragments that generally occur in the referenced horizon.</td>
<td>Horizon Fragment</td>
</tr>
<tr>
<td>CHTEXTUREGRP</td>
<td>Range of textures for the referenced horizon as a concatenation of horizon texture and texture modifier(s).</td>
<td>Horizon</td>
</tr>
<tr>
<td>MUAGGATT</td>
<td>Variety of soil attributes and interpretations that have been aggregated from the component level to a single value at the map unit level to express a consolidated value or interpretation for the map unit as a whole.</td>
<td>Map Unit</td>
</tr>
</tbody>
</table>
Input / Output Data Structure

SSURGO Data

Data Domain

Model Attributes and Maps

Component (COMP)

chkey

Map Unit (MU)

Mukey

Horizon (H)

H1
H2
H3
Hn

Vertical

Rock Fragment (RF)

Component (COMP)

chkey

1..*

Component (COMP)

chkey

1..*

Component (COMP)

chkey

1..*

Component (COMP)

chkey

1..*

Unified Modeling Language (UML)

Composition symbol

Aggregation symbol

Di Luzio et al., IJGER 2014
Relationships

Di Luzio et al., IJGER 2014
GDB Links

- US_Soil_CEAP_01.gdb
- US_Soil_CEAP_02.gdb
- US_Soil_CEAP_03.gdb
- US_Soil_CEAP_04.gdb
- US_Soil_CEAP_05.gdb
- US_Soil_CEAP_06.gdb
- US_Soil_CEAP_07.gdb
- US_Soil_CEAP_08.gdb
- US_Soil_CEAP_09.gdb
- US_Soil_CEAP_10.gdb
- US_Soil_CEAP_11.gdb
- US_Soil_CEAP_12.gdb
- US_Soil_CEAP_13.gdb
- US_Soil_CEAP_14.gdb
- US_Soil_CEAP_15.gdb
- US_Soil_CEAP_16.gdb
- US_Soil_CEAP_17.gdb
- US_Soil_CEAP_18.gdb
- US_Soil_CEAP_19.gdb
- US_Soil_CEAP_20.gdb
- US_Soil_CEAP_21.gdb

Identify from: MapUnits_H8_02050306

- hagerstown silt loam, 1 to 4 percent slopes
- ALMANAC component
- APEX component
- Hagerstown component
- SWAT component
- Hagerstown SWAT Layer
  - B1
  - B2

| Location: |
|-----------|---|

Field | Value
--- | ---
CHKEY | 542756:1726877
CBID | 54275601
COKEY | 542756:78850
LABEL | L_Ap
LAYERNUM | 1
NAME | Ap
OBJECTID | 2465
SOL_ALB | 0.37
SOL_AWC | 0.17
SOL_BD | 1.3
SOL_CBR | 1.15
SOL_CLAY | 25
SOL_CLC | 0
SOL_K | 83.84
SOL_Rock | 14
SOL_SAND | 20.5
SOL_SILT | 54.3
SOL_z | 250
TEXTURE | SIL
USE_K | 0.32
Work in Progress

- Comparison and implementation of gap filling methods.
- Inclusion of the National Cooperative Soil Survey (NCSS) Soil Characterization Data.
- Models’ specs updates.
- Inclusion of soil quality parameters.

(Haney R. and L.)
Conclusions

- Constructed hydrology-based soil CEAP model parameters repositories combining geo-spatial features and multi-model attributes
- US coverage.
- Construction is largely automated.
- Use of auxiliary GIS information (LULC and WBD maps).
- Common data sources for the three models (SWAT, APEX, and ALMANAC).
- Raster and/or Polygon geographic features.
- Relational attribute tables.
Thanks!!