

Soils with Many Layers of Tephra
a workshop on their
Description, Correlation, Classification and Management

Mount Saint Helens Area
Gifford Pinchot National Forest

Vancouver, WA

August 20-24, 2001

Workshop Format: Combined conference room and field study.

General Agenda

Monday	1230 – 1630	presentations
Tuesday	0730 – 1630	field trip (2 pedons)
Wednesday	0730 – 1630	field trip (3 pedons)
Thursday	0730 – 1630	review field observations, develop recommendations and follow-up tasks
Friday	0730 – 1200	write summary, recommendations and conclusions

Participants: Pedologists with interest and responsibility for description, correlation, classification and management of soils forming in many layers of tephra (AK, CA, HI, ID, OR and WA).

Purpose: To improve understanding and achieve greater consistency in description, correlation, classification and interpretation of soils developing in many layers of tephra.

Background: Soils in regions of episodic air-fall tephra can have 20 or more distinct layers of ash, pumice or cinders within two meters of the mineral soil surface. Relatively thin layers with strongly contrasting particle-size can affect water movement, root abundance and soil stability. Grouping several layers or averaging their characteristics may produce an erroneous result with interpretations generated from the “grouped” data. Alternatively, enormous effort is required to describe and record the characteristics of 20 or more individual horizons, and populate elements in a corporate database.

Agenda –Soils with Many Layers of Tephra

Monday, August 20 Moderator: Chad McGrath

- 12:30 – 12:40 pm Welcome – Tom High/Steve Howes and Forest Supervisor
- 12:40 – 12:50 pm Workshop Objective – Duane Lammers
- 12:50 – 1:20 pm Processes and characteristics of soils in many-layered tephra (water flow, clay content, CEC, Zero point of charge) – Bob Ahrens
- 1:20 – 2:00 pm Management concerns of soils in many-layered tephra – Panel: Dennis Robinson, Tom High, Pete Biggam
- 2:00 – 2:45 pm Field Description and mapping of soils in many-layered tephra - a field soil scientist's perspective - Panel: Ed Haagen, Keith Harrington, Jerry Weinheimer, Mike Mungoven, Tom High
- 2:45 – 3:00 pm Break
- 3:00 – 3:45 pm Data Needs for Interpretations and Models and Data Management in NASIS – Panel: Sue Southard, Ron Myhrum, Chad McGrath, Chris Smith, Bob Engel, Jim Fortner
- 3:45 – 4:15 pm Guidance on field description, series criteria and sampling of soils in many-layered tephra – Thor Thorson, Russ Langridge, Mike Wilson
- 4:15 – 4:45 pm Proposals for changes to Subgroups and Families – Thorson, Lammers
- 4:45 – 5:00 Proposal for spodic Subgroups in Andisols – Hipple, Myhrum
- 5:00 – 5:15 Introduction to the Field Trip – Tom High, Russ Langridge

Tuesday, August 21

- 0730 – 1630 Field trip (2 pedons)
Overview of Mt. St Helens Tephra – Scott Burns
Stop 1, Wright Meadows: Pit Boss – Thorson, Recorder - Langridge
Stop 2, Lower Falls: Pit Boss – Weinheimer, Recorder - Jasper

Wednesday, August 22

- 0730 – 1630 Field trip (3 pedons)
Stop 3, Ape Cave: Pit Boss – Myhrum, Recorder – Raney
Stop 4, Curley Creek: Pit Boss – Miller, Recorder – Dorr
Stop 5, Placid Lake: Pit Boss – Harrington, Recorder - Muller

Thursday, August 23

- 0730 – 1130 Summary of discussion at field stops (20 minutes each) - Recorders
Classification of series with many layers of tephra – Engel
- 1230 – 1630 Discussion on workshop topics, recommendations and action items - Hipple

Friday, August 24

- 0730 – 1200 Draft summary, recommendations and conclusions - Lammers

Topics to be addressed by the workshop:

Workshop topics are listed in the following table. Each topic has a title, task description and list of names of those working on the task. Part of each task is to present recommendations to those attending the workshop and to prepare text for inclusion in the workshop notebook. Presentations are listed in the left column and as a draft agenda. A separate agenda is included with this announcement, page 8.

Table 1. Workshop topics, tasks and task groups

Topics, Tasks and Task Groups	Agenda
<p><u>Topic:</u> Processes, functions and characteristics of soils in many-layered tephra: genesis, water flow, clay content, CEC, zero-point of charge</p> <p><u>Task:</u> Review literature on what is known about these soils, determine characteristics that are important to consider and present at the workshop</p> <p><u>Task group:</u> Bob Ahrens, Chr. -- Chris Smith, Chad McGrath, Bob Engel</p>	<p>Monday 12:45 – 1:15 pm</p> <p>Processes, functions and characteristics of soils in many-layered tephra (water flow, clay content, CEC, Zero point of charge)</p> <p>Bob Ahrens</p>
<p><u>Topic:</u> Management needs and concerns of soils in many-layered tephra:</p> <p><u>Task:</u> Identify problems in the management of these soils. Prepare for panel discussion.</p> <p><u>Task group:</u> Pete Biggam, Chr. -- Tom High, Dennis Robinson, Tom Terry</p>	<p>Monday 1:15 – 2:00 pm</p> <p>Management concerns of soils in many layered tephra</p> <p>Panel: Dennis Robinson, Tom Terry, Tom High, Pete Biggam</p>
<p><u>Topic:</u> Mapping, field soil description and field office data management</p> <p><u>Task:</u> Provide a field soil scientist’s perspective on describing soils in many-layered tephra. Review approaches used on Skamania County, WA, Hawaii, Alaska and elsewhere, to evaluate mapping concepts and series differentia. Can series correlated to tephra episode(s) discern important differences for use and management? Recommend a practical protocol for field descriptions and data entry.</p> <p><u>Task group:</u> Ed Haagen, Keith Harrington, Jerry Weinheimer, Mike Mungoven, Tom High</p>	<p>Monday 2:00 – 2:45 pm</p> <p>Field Description and mapping of soils in many-layered tephra - a field soil scientist’s perspective –</p> <p>Panel: Ed Haagen, Keith Harrington, Jerry Weinheimer, Mike Mungoven, Tom High</p>

<p><u>Topic:</u> Data needs for interpretations and models, and data management in NASIS:</p> <p><u>Task:</u> Identify current interpretations and models for which the data are used. Identify data elements that are needed for interpretations and models. Determine data gaps and problems in providing the data. Propose minimum data requirements and how data should be stored. Answer the following: Should each horizon be entered or should horizons be grouped into layers? Could several thin contrasting horizons be grouped and recognized as stratified material? How does combining layers affect interpretations? How should clay content and CEC be recorded?).</p> <p>Develop guidance for entering data for horizons or groups of horizons. Apply guidance to soils in workshop dataset. Write guidance for inclusion in workshop material, and present as panel discussion at workshop.</p> <p><u>Task group:</u> Sue Southard, Chr. – Chris Smith, Joe Moore, Ron Myhrum, Chad McGrath, Bob Engel <u>Database subgroup:</u> Jim Fortner, Chr. -- Martin Ferwerda, John Haagen, Sue Southard</p>	<p>Monday 3:00 – 3:45 pm</p> <p>Data needed for Interpretations and Models and Data Management in NASIS</p> <p>Panel: Sue Southard, Ron Myhrum, Chad McGrath, Chris Smith, Bob Engel, Martin Ferwerda, Jim Fortner</p>
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<p><u>Topic:</u> Soil description, field sampling and soil series differentia</p> <p><u>Task:</u> Review how these soils have been described and address the following questions: How should soils in many-layered tephra be described? Should all horizons be described? If horizons are combined, what are the rules (e.g. minimum thickness, contrasting), and how are they described? Is an additional master horizon or suffix symbol needed? Should markers of tephra deposits be recorded? Develop guidance for field description of soils in many-layered tephra. Apply guidance to set of soils and to soils visited during the workshop. Write proposed guidance for inclusion in workshop materials and present at the workshop.</p> <p><u>Task group:</u> Thor Thorson, Chr., Mike Wilson</p> <p><u>Task:</u> Evaluate limitations in sampling thin horizons and consequences of composite sampling of several horizons as one layer. Develop guidance for sampling soils with many thin horizons. Evaluate the effect of guidance on characterization and classification. Write guidance for field sampling for inclusion in workshop materials and present at workshop.</p> <p><u>Task group:</u> Mike Wilson, Chr., Rebecca Burt, Bob Engel</p> <p><u>Task:</u> Address the following concerning soil series criteria: What constitutes a different series in many-layered tephra. How should the range in characteristics be described for a layer with three or four contrasting textures? Is it appropriate to define a series by the tephra deposits (event markers) present?</p> <p><u>Task group:</u> Russ Langridge, Chr., Ed Haagen, Chris Smith,</p>	<p>Monday 3:45 – 4:15 pm</p> <p>Guidance on field description, field sampling and soils series criteria in many-layered tephra</p> <p>Thor Thorson, Mike Wilson, Russ Langridge</p>
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<p><u>Topic:</u> Subgroup classification</p> <p><u>Item:</u> Would an additional subgroup be useful in classifying these soils (e. g. tephritic, tephrentic, episodic, ejectic, vitrentic)?</p> <p><u>Task:</u> Propose a subgroup name and develop a definition; identify great groups to which it would apply. Demonstrate application with official soil series and soils visited during workshop. Evaluate the result of applying this recommended change in subgroup classification? Write proposal for inclusion in workshop material and present the proposal at the workshop.</p> <p><u>Task group:</u> Thorson, Chr., Langridge. Lammers, Engel</p>	<p>Monday 4:15 – 4:45 pm</p> <p>Proposals for Subgroups</p> <p>Thorson</p>
<p><u>Topic:</u> Family particle-size substitute class:</p> <p><u>Task:</u> Identify indistinct criteria or instructions used in classification into substitute classes and strongly contrasting substitute classes for family particle-size. Address the following questions: What additions or changes might be made to clarify and improve the way substitute class names are determined? Should the definition of aniso be changed? Should grouping of substitute classes as strongly contrasting be consistent? How could changes in the way that substitute classes are determined improve soil classification, make classification easier and more consistent, or result in more meaningful separations of the soils we classify?</p> <p>Draft additional or replacement instructions to effect consistent substitute class placement. Demonstrate draft instructions with existing soil series and with soils visited during the workshop. Present proposals for changes at the workshop.</p> <p><u>Task group:</u> Lammers, Chr., McGrath, Thorson, Langridge, Southard, Engel</p>	<p>Monday 4:15 – 4:45 pm</p> <p>Proposals for Family particle-size class</p> <p>Lammers</p>

<p><u>Topic:</u> Propose spodic subgroups in Andisols</p> <p><u>Task:</u> Develop list of soils that may classify in spodic subgroups. Draft proposal for spodic subgroups; apply to established soils and soil(s) visited during field trip. Evaluate the result of applying this recommended change in subgroup classification? Provide draft proposal and rationale for inclusion in workshop materials, and lead discussion during the workshop. Present the draft proposal at the workshop.</p> <p><u>Task group:</u> Hipple, Chr., -- Myhrum, Langridge, Engel, Burt</p>	<p>Monday 4:45 – 5:00</p> <p>Proposal for spodic Subgroups in Andisols</p> <p>Karl Hipple</p>
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Topic: Field Trip

Task: Select sites to visit during the workshop. Visit the sites, review descriptions and laboratory data (if available), and evaluate management concerns. Prepare descriptions, lab data and photos for workshop materials. Dry run the field tour route and stops and prepare a map for distribution to participants.

Task group: Tom High, Chr., Russ Langridge, Duane Lammers, Dennis Robinson

Topic: Soil data set

Task: Compile a list of soils that have been described in materials consisting of many tephra layers. From this list, select a subset on which to evaluate workshop proposals (i.e. soil descriptions, series criteria, laboratory sampling, subgroup and family classification, data base elements, and models and interpretations. Soils on this list are, also, examples of how these kinds of soil have been described and classified. Soils with laboratory data should be included. Soils in Japan that were visited by ICOMAND could be included; there are photographs and laboratory data for these soils. Soils from the Mt. St Helens study and other soils established in Skamania Co should be considered for the data set and field stops during the workshop.

Task group: Wilson, Chr., Langridge, High, Thorson, Lammers, Engel

Topic: Mt St Helens tephra deposits

Task: Prepare for discussion on chronsequence and characteristics of tephra deposits from Mt St Helens and present to workshop participants.

Task group: Scott Burns, Chr., Tom High, Aldo Aguilar

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