

# Identifying/Classifying Buried Soil Horizons

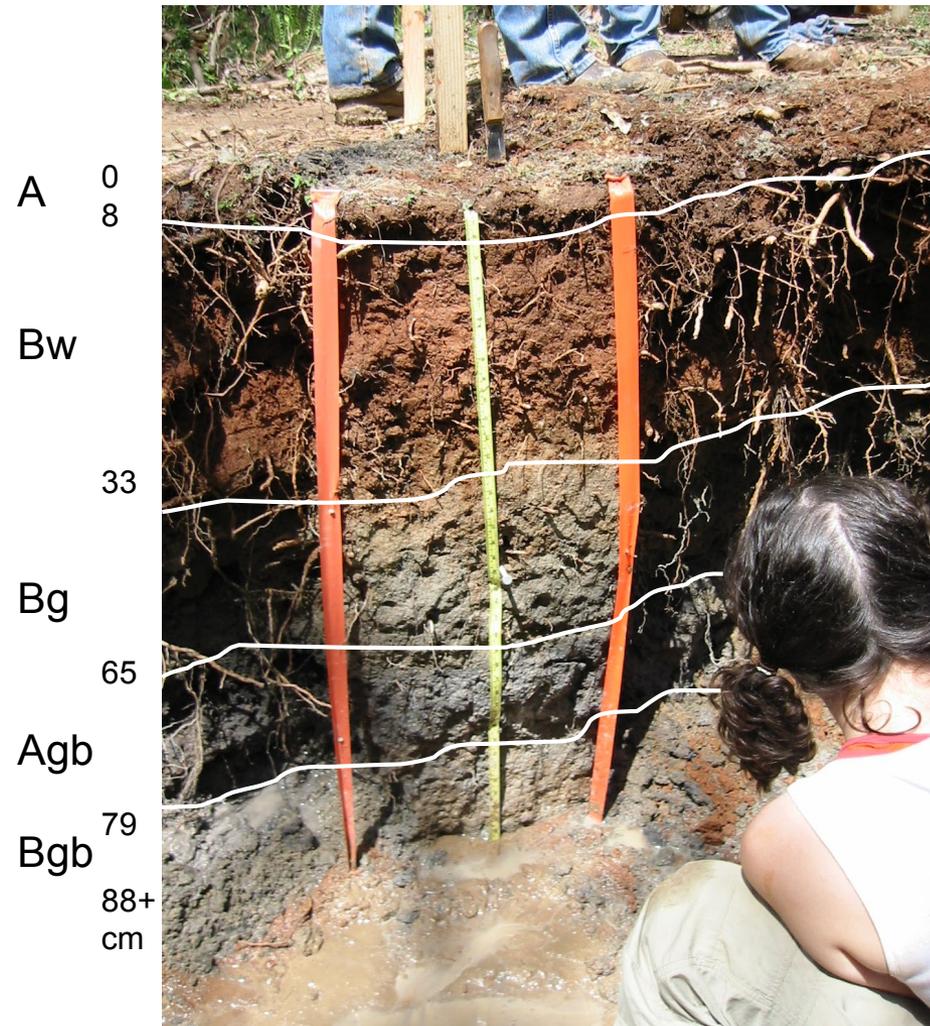
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# Recently Buried Soil



# Buried Soil Horizons

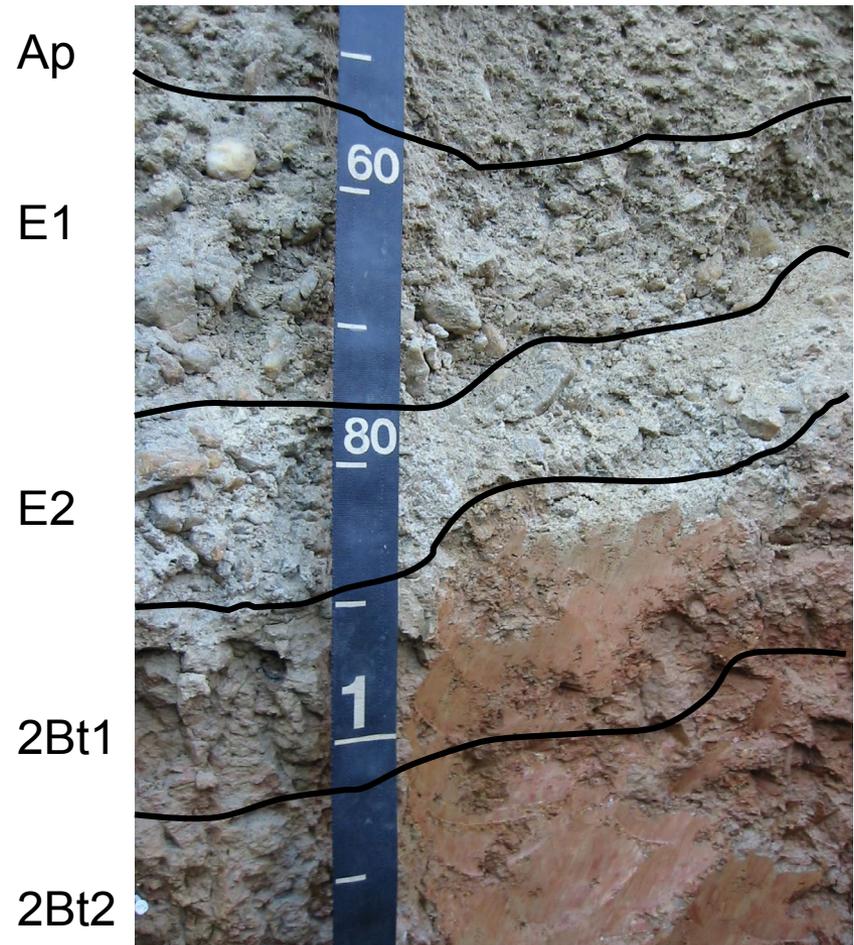
- A buried soil horizon is a genetic soil horizon that formed in place and then was covered by recently transported material. Evidence of recent burial includes:
  - 1) A buried A horizon at depth, causing an irregular (higher-lower-higher) change in carbon with depth, or
  - 2) The identification of a C horizon over an A or B horizon.
- Place a “b” suffix after the horizon designators for buried A, E, or B horizons. The “b” suffix may also be used with an O horizon buried by mineral soil material. The “b” suffix is used only with genetic horizons; it is not used with C horizons. C horizons are parent materials.
- Geologic burial is described differently (see lithologic discontinuity).

# Buried Soil Horizons

- There is no minimum thickness of recently transported material before a “b” suffix can be used, but there is a minimum thickness needed before a “buried soil” can be recognized and therefore be diagnostic in the “Keys to Soil Taxonomy.”
- Most buried soils are on flood plains, but they may also be on footslopes, under landslides, in areas of windblown sand, below volcanic materials, or in urban construction areas.

# Ancient Buried Soil

- We do not use the suffix “b” in the horizon designators for some upland soils even if there was a change in parent materials or an agent of transportation buried the former soils or parent materials. The suffix “b” is used only if there are buried A horizons, an irregular decrease in carbon, or thin strata left from flooding and we think that soil formation has taken place across both materials since the burial.
- For example: The soil to the right has gravelly, sandy river alluvium over residuum. Most likely, at one time the contact at 89 cm was a gravel bar over metamorphic bedrock. The albic and argillic horizons appear to have formed after the deposition of the alluvium, so post-deposition pedogenic processes have been superimposed across both parent materials and have destroyed any organic-carbon-enriched horizons that may have been buried. There is even some rock-controlled structure in the 2Bt2 horizon.
- Instead of the “b” suffix being used on these horizons, a “2” or “3” prefix can be used. This designation means we observe ancient (pre-Holocene) burial from a distinctly different parent material at 89 cm but the morphology and chemistry of the original mantle have been completely altered over time.



# Lithologic Discontinuity

- On flood plains, a lithologic discontinuity is restricted to overbank deposits over buried channel (gravel bar) deposits. It is indicated by different prefix numbers.
- On other landforms, a clear or abrupt change in parent materials with depth can be observed, indicating that a significant change in agent or energy of transportation has taken place. Buried “b” horizons may remain.
- On uplands, significant soil formation has commonly taken place in all materials since deposition, removing the carbon irregularities with depth and translocating or transforming materials across the contact. In that case, we do not use a “b” suffix in the horizon names; a numeral 2 or a caret (^) prefix is used instead. Examples of lithologic discontinuities and buried horizons are shown next.

# Identification of a Buried Soil

These sequences have buried horizons but not necessarily a buried soil:

- A, Bw, C, 2Btb, 2BCb, 2C
- Ap, C, Ab, C', A'b, C''
- A, C, Ab, Bwb, Bgb, Cg
- A, C, Bwb, BCb, C'
- A, Bw, Bg, Abg, Bgb, Cg
- A1, A2, Bw, Ab, Bwb
- ^A, ^Bw1, ^Bw2, Btgb, Cg

# Mantles

A mantle is a deposit of recently transported material above a buried horizon. In order for a deposit to be considered a mantle:

- A buried soil horizon must be underneath a deposit of new material (such as an alluvial, colluvial, or eolian deposit or human-transported material), and
- The 7.5 cm just above the shallowest buried horizon cannot meet the requirements for any diagnostic epipedon or horizon. It can, for example, be a C horizon or a B horizon that is too sandy or too dark to be a cambic horizon.

# Minimum Thickness for a Mantle as It Relates to a Buried Soil

The mantle must be 50 cm or more thick before the sequence of buried horizons underneath can be declared a buried soil.

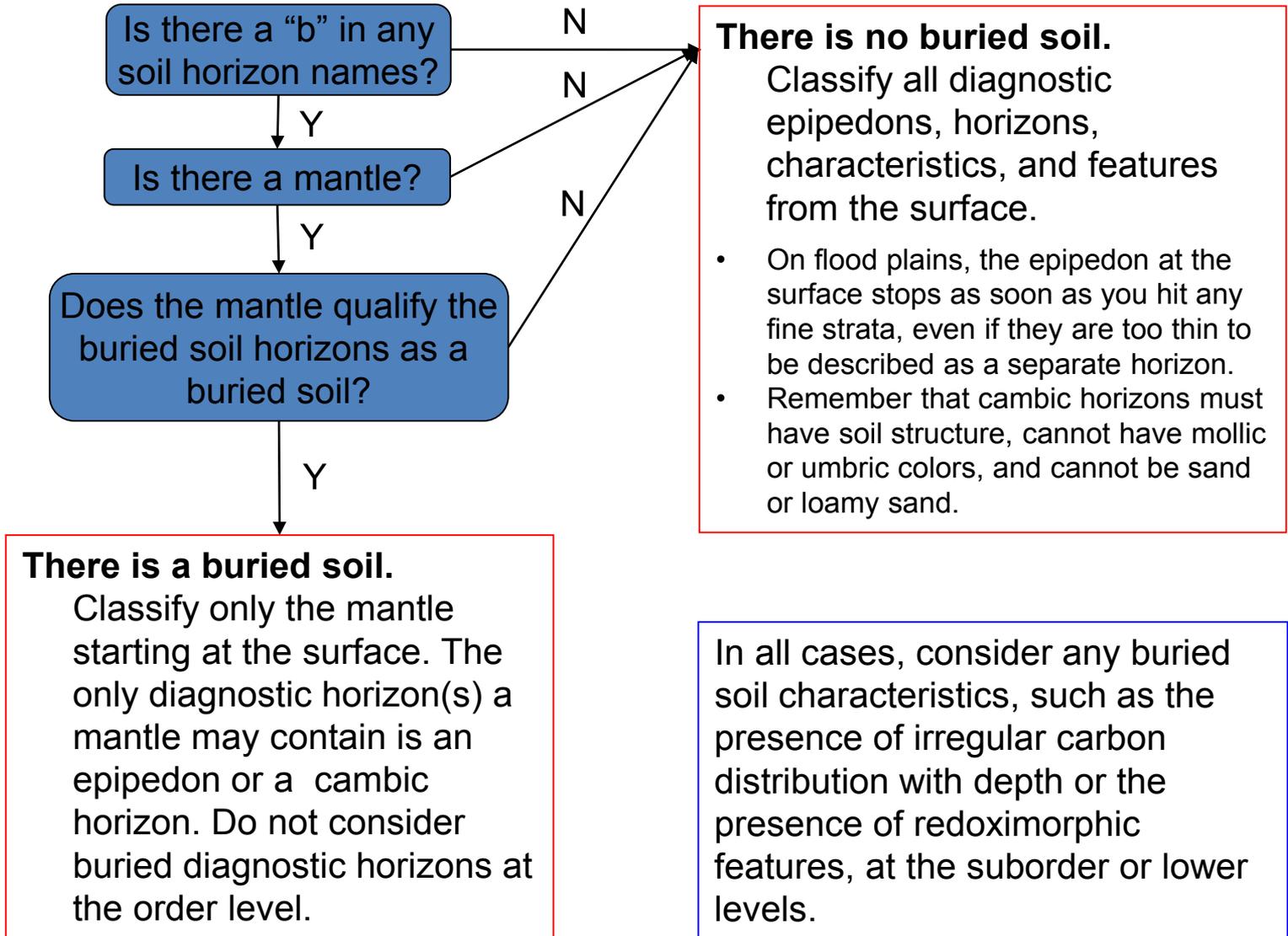
You have a buried soil **ONLY** if the mantle meets the minimum thickness requirements.

*“Should I identify differentiae only in the buried soil, only in the mantle, or in both?”*

The pedon always begins at the current surface of the soil.

- If you have a buried soil, identify differentiae to the order level only in the mantle. For lower classification levels, consider all soil properties throughout the soil.
- If you do not have a buried soil, identify all differentiae from the surface down at all levels of soil taxonomy.

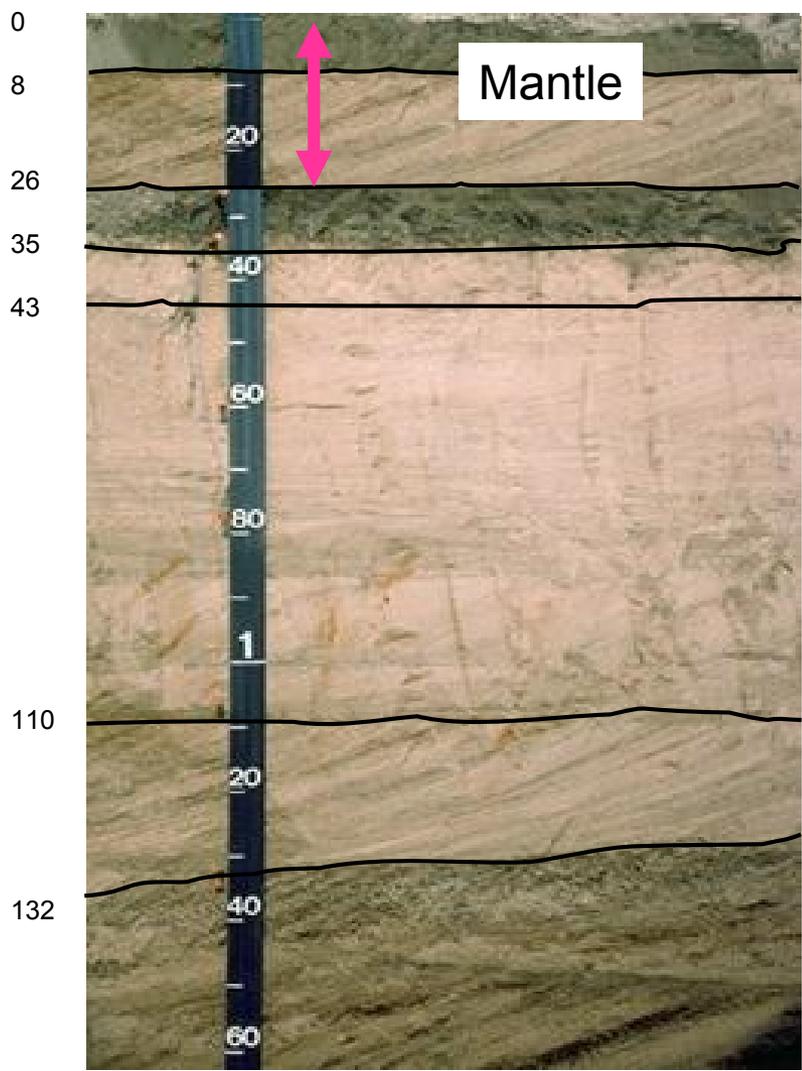
# Classification Flowchart



# Examples

- The following slides provide examples to show how the rules are applied.
  - Soils with a mantle but no buried soil (2 examples)
  - Soils with a mantle and a buried soil (2 examples)
  - Soils with no mantle and no buried soil (4 examples)
- Not all situations are covered.
- For more information, see “Soil Survey Technical Note 10—Buried Soils and Their Effect on Taxonomic Classification” (available online).

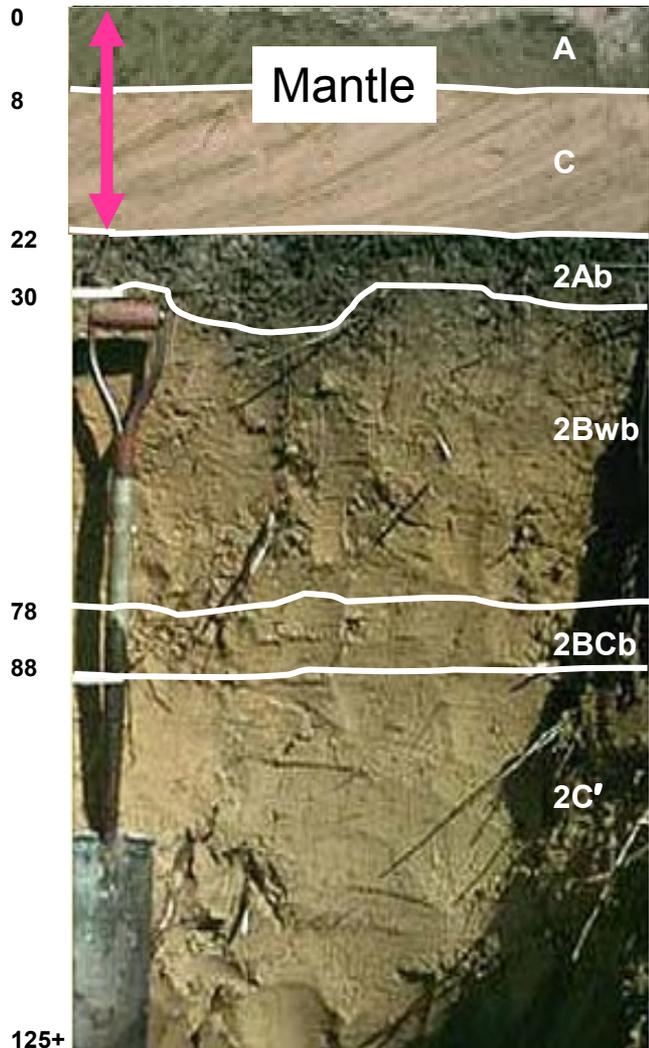
# A soil with a mantle but no buried soil (1)



**A** ← Epipedon—ochric. Textures are sands throughout.  
**C** ← There is a mantle because the lower 7.5 cm of the recent deposit is not part of a diagnostic horizon.  
**Ab**  
**Bwb**  
**C'1**  
**2C'2**  
**3C'3**  
**classify**

There is an ochric epipedon (Ab) under the recent deposit, but there are no diagnostic subsurface horizons.  
 The Bwb is too thin to be a cambic horizon. Even if it were thick enough, it would be too sandy to be a cambic horizon.  
 There is no buried soil because the mantle on top is too thin (<30 cm thick).  
 This soil is an Entisol, a Typic Xeropsamment.

# A soil with a mantle but no buried soil (2)



← Epipedon—ochric. All textures above 22 cm are sands, but textures below 22 cm are loams and silt loams.

← There is a mantle because the lower 7.5 cm of the recent deposit is not part of a diagnostic horizon.

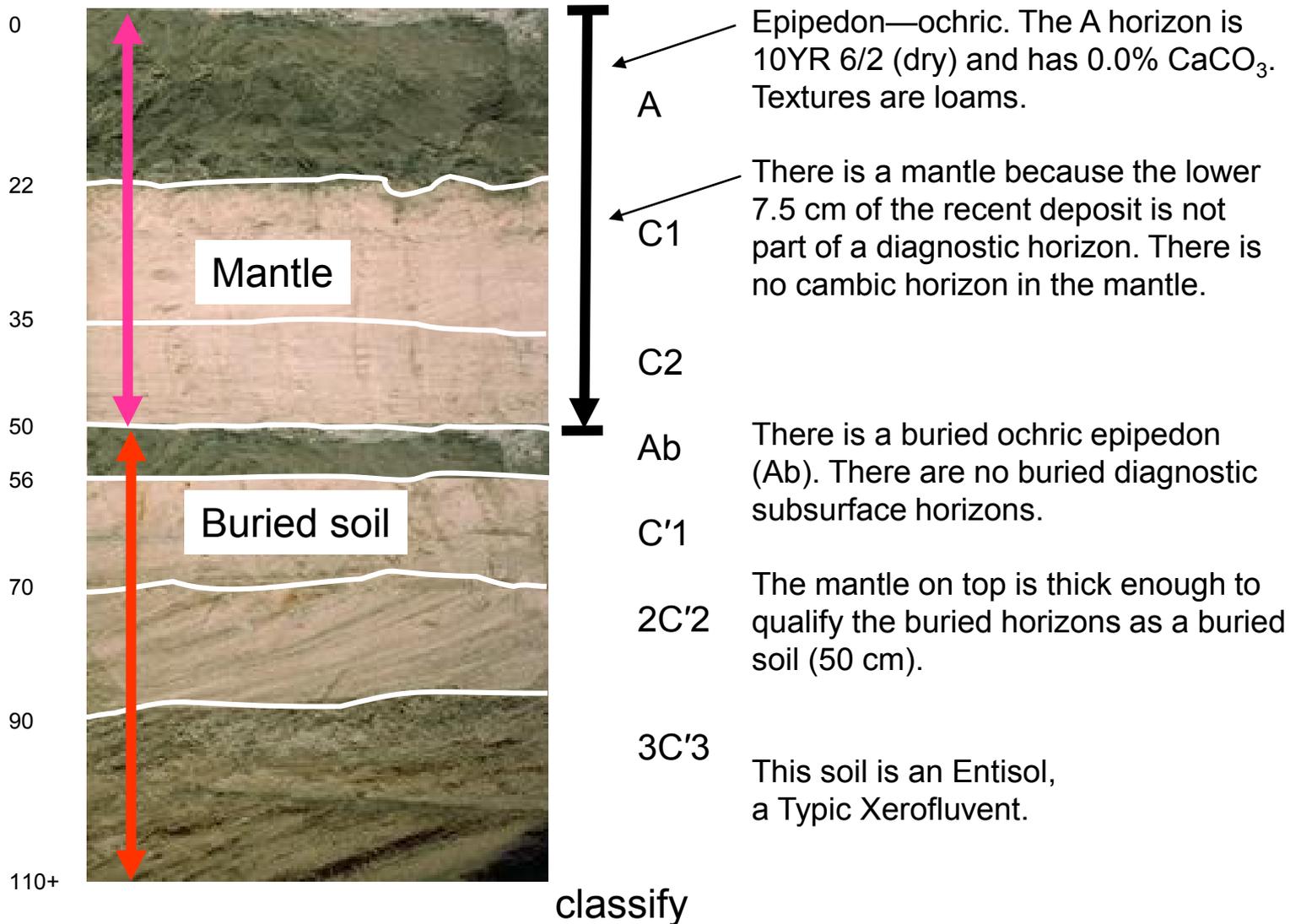
There is an ochric epipedon (2Ab) and a cambic subsurface horizon (2Bwb and 2BCb) under the recent deposit.

There is no buried soil because the mantle is too thin (22 cm thick). For the profile to have a buried soil, the mantle must be at least 50 cm thick.

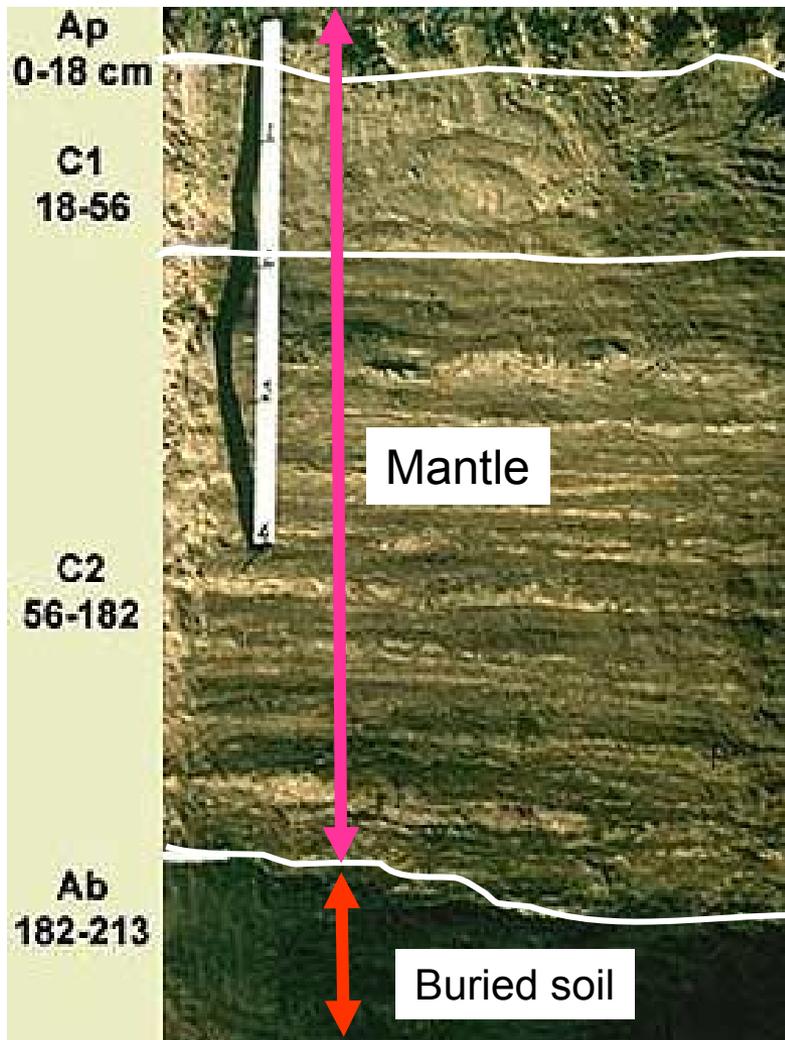
The buried cambic horizon would be used to classify this soil as an Inceptisol, a Fluventic Haploxerept.

classify

# A soil with a mantle and a buried soil (1)



# A soil with a mantle and a buried soil (2)



← Epipedon—none. What would have been an ochric epipedon is an Ap horizon that directly overlies freshly stratified sediments with an irregular decrease in carbon.

Textures are loams and silt loams.

← There is a mantle because the lower 7.5 cm of the recent deposit is not part of a diagnostic horizon.

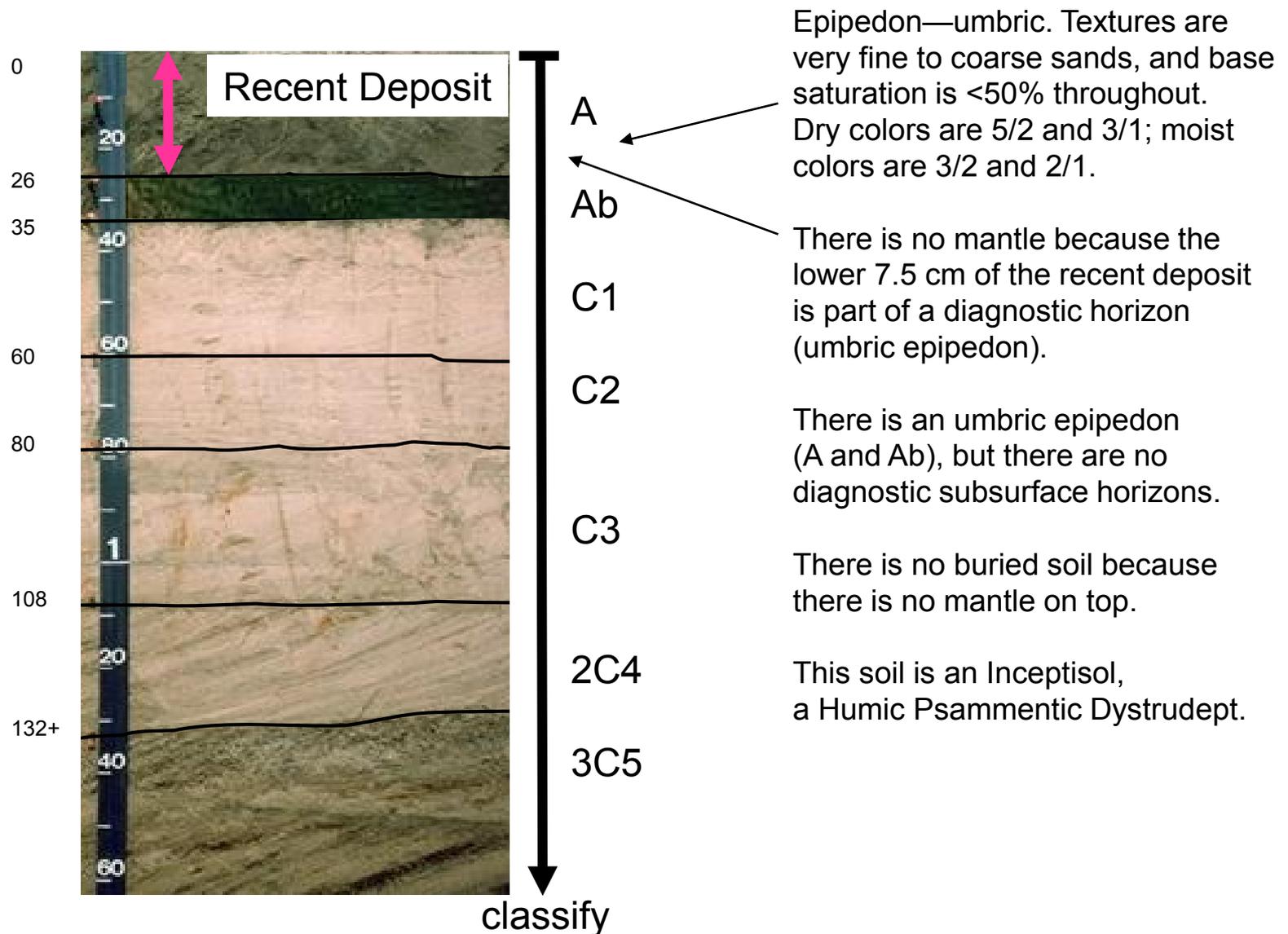
There is no cambic horizon in the mantle.

← There is a buried mollic (Ab) epipedon and buried soil beginning at 182 cm. The mollic epipedon is not considered, except to confirm an irregular decrease in carbon.

classify

This soil is an Entisol, a Typic Xerofluvent.

# A soil with no mantle and no buried soil (1)



Epipedon—umbric. Textures are very fine to coarse sands, and base saturation is <50% throughout. Dry colors are 5/2 and 3/1; moist colors are 3/2 and 2/1.

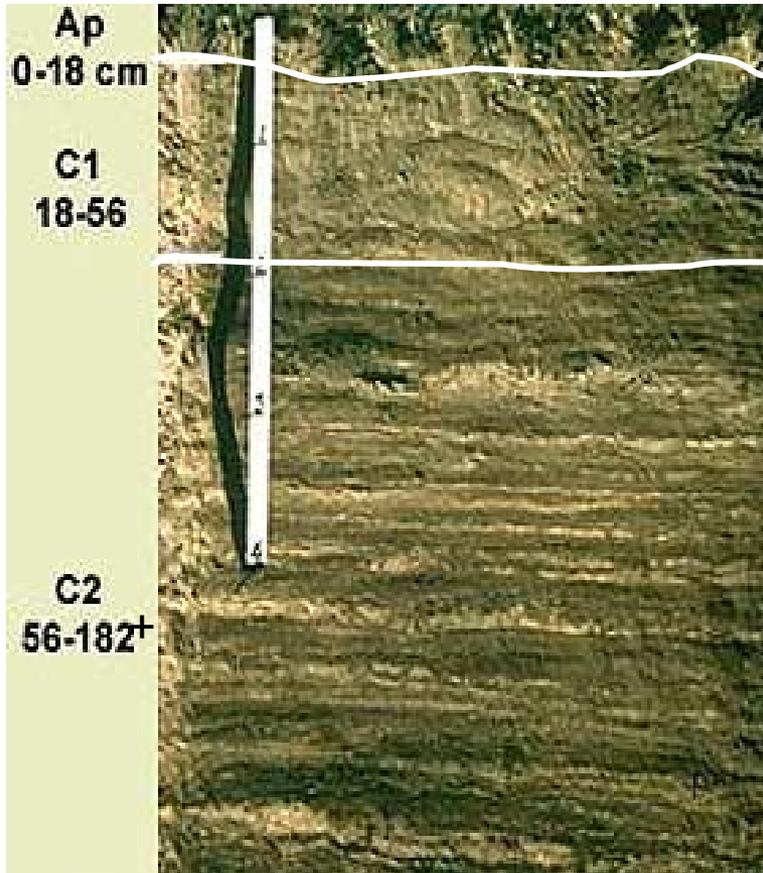
There is no mantle because the lower 7.5 cm of the recent deposit is part of a diagnostic horizon (umbric epipedon).

There is an umbric epipedon (A and Ab), but there are no diagnostic subsurface horizons.

There is no buried soil because there is no mantle on top.

This soil is an Inceptisol, a Humic Psammentic Dystrudept.

# A soil with no mantle and no buried soil (2)



Epipedon—none. What would have been an ochric epipedon is an Ap horizon that directly overlies freshly stratified sediments and an irregular decrease in carbon. Texture is loam.

Textures are sandy loams stratified with loams below 18 cm.

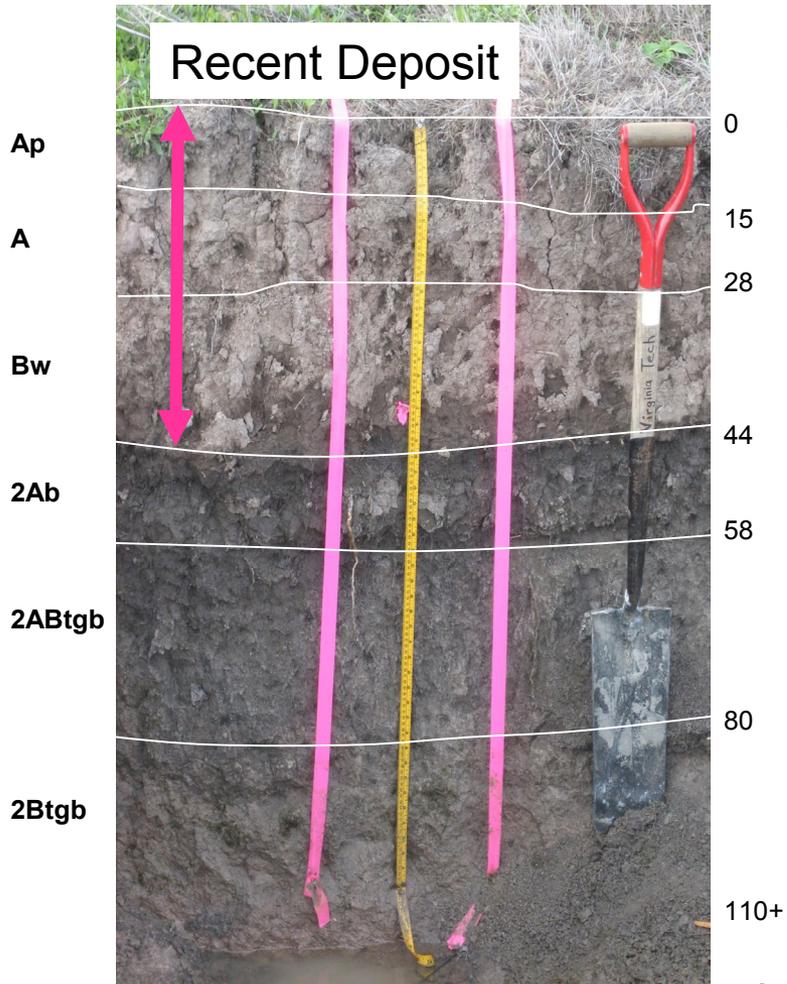
There is no mantle since the whole soil is a recent deposit.

There are no buried horizons and no diagnostic subsurface horizons.

This soil is an Entisol, a Typic Xerofluvent.

classify

# A soil with no mantle and no buried soil (3)



Epipedon—mollic. Dry colors are 7.5YR 4/2 or 5/2; moist color is 3/2. All textures are loams or silt loams. Base saturation is >50% throughout.

The recent deposit is <50 cm thick (44 cm). There is no mantle because the lower 7.5 cm of the recent deposit is part of a diagnostic cambic horizon (Bw). Moist color is 3/4.

There is a second mollic epipedon (2Ab and 2ABtgb) under the recent deposit.

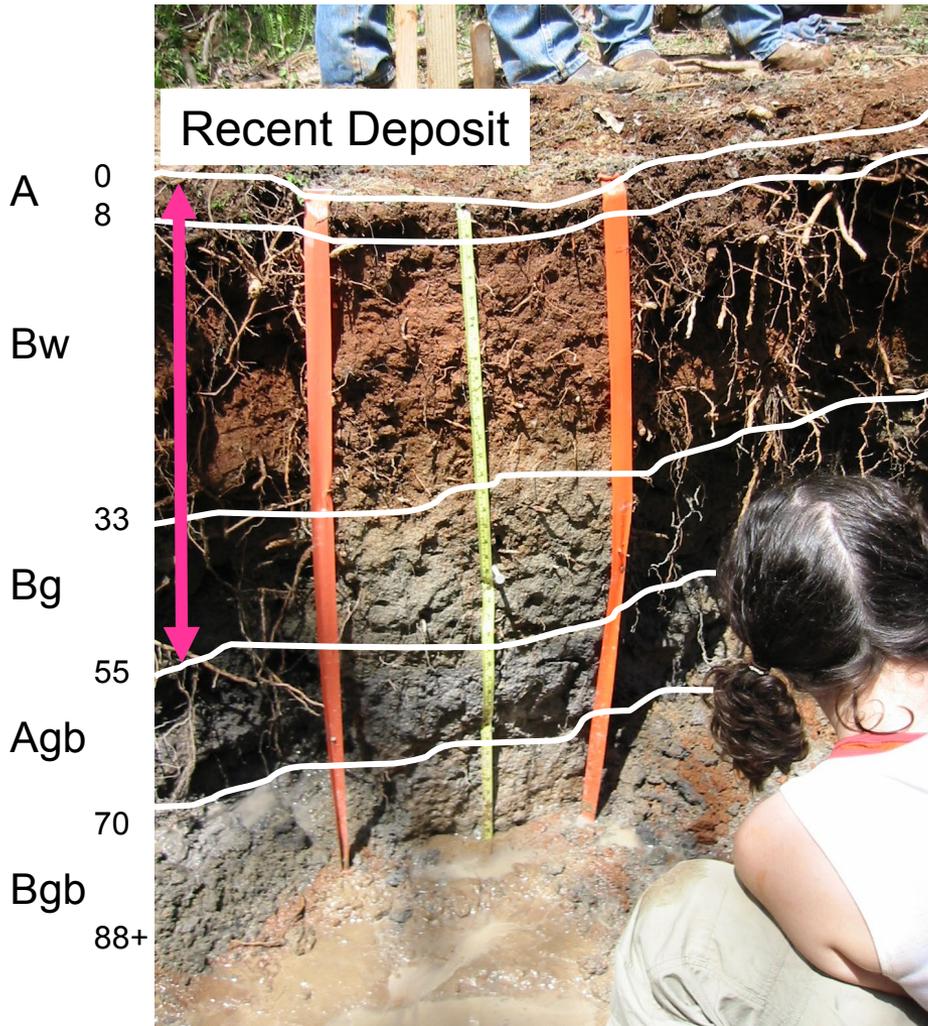
There is an argillic (2ABtgb and 2Btgb) horizon under the recent deposit.

We classify the soil from the surface. The second mollic epipedon is not used, except to confirm an irregular decrease in carbon. The argillic horizon is used to place the soil at the great group level.

classify

This soil is a Mollisol, an Argixeroll, almost an Endoaquoll.

# A soil with no mantle and no buried soil (4)



Epipedon—ochric. All textures are loams or silt loams. Base saturation is <50% throughout.

The recent deposit is thick, but there is no mantle because the lower 7.5 cm of the recent deposit above 55 cm is part of a diagnostic cambic (Bw and Bg) horizon.

A second ochric epipedon (Agb) and a second cambic (Bgb) horizon are under the recent deposit.

We classify the soil from the surface. The buried Agb horizon is not used, except to confirm an irregular decrease in carbon. The second cambic horizon is not used because it duplicates the upper cambic horizon as far as classification is concerned.

This soil is an Inceptisol, an Endoaquept.

classify