Today

- Moisture and temperature
- Soil orders
- Learning a new language

Moisture regimes

- Aquic
- Udic
- Ustic
- Aridic
- Xeric

Temperature

- Classifications based on soil T at 50 cm depth
- Consideration differences between summer and winter averaged

Temperature

- Include terms like:
  - Frigid, Mesic, Hyperthermic
  - Cold, Moderate, Hot
  - ISO (greek meaning same)
  - Isofrigid, Isomesic, Isothermic

Soil Orders

Focus: Order

Recognize terms for other groupings

Order
Entisols

Baby soils
- Some development of A horizon
- Something can be preventing soil development
  - Too much water
  - Too little water
  - Frequent deposition of parent material

Diverse group
- Alluvial areas (fertile)
- Sandy areas (infertile)
- Slopes (erosion > soil formation)

Inceptisols

Little bit older (soil adolescents)
- Some development of B horizon
  - Cambic (some change)
- Waiting to fit into other orders

Hazelton, PA
- Farms and forests
- Sloping to level
- Temp 51
- Precip 48”
Hazelton
Loamy, skeletal siliceous subactive mesic typic Dystrochrept
- Loamy, skeletal - particle size
- Siliceous - mineral class
- Mesic - temperature
- Typic - subgroup (normal or typical)
- Dystro - great group
- Ochr - suborder
- Ept - order (Inceptisols)

Hazelton
Loamy, skeletal siliceous subactive mesic typic Dystrochrept
- Siliceous - high Si
- Ochr - ochric epipedon
- Mesic - 5-15 F
- Dys - low base saturation
- Ept - inceptisol

Andisols
- Defined by:
  - Volcanic ash as a parent material
  - Weathers into allophane
    - Type of clay
    - Amorphous
    - Ability to absorb P

Tokul, WA
- Timber
- Precip 60”, Temp 50F
- Cemented till (Fe, Al, OM)

Tokul, WA
- Amorphic, mesic Aquic Vitrixerands
- Amorphic - amorphous clays
- Mesic - moderate climate
- Aquic - it does rain here
- Vitri - glass, volcanic glass
- Xer - annual dry season (however short)
- Ands - andisols
Gelisols
Baby, it’s cold outside
• Layer of permafrost
  – Material that remains frozen for at least 2 years
  – Within 100 cm of soil surface

Vertisols

Vertisols
Characterized by
• Type of clay
  – They have highly reactive clay: montmorillonite (we will get to clays next)
  – Clays are rich in Ca and Mg (color)
  – Shrink and swell with drying and wetting

What happens
• Seasonal dry periods
  – Deep cracks develop in soil
  – As rain returns, soils swell
• Friction, movement from top to bottom
• Plastic
• Slickenslides

Cryoturbation
• Movement of soil material due to frost heaves

So don’t
• Build a house
  – Seasonal earthquakes
• Difficult to manage for agriculture
Houston Black, TX

- Used for agriculture and in urban areas
- Usually wet, when dry has cracks up to 4” wide and 12” deep

Houston Black,
Fine, smectitic thermic Udic
Haplusterts

- Smectitic, type of clay
- Thermic - it's hot in TX
- Udic - humid
- Hapl - minimum horizon
- Ust - hot and dry in summer
- Ert - vertisol

Histisols

Characterized by

- First and foremost: Organic matter
- Organic matter accumulates faster than it decomposes
- What slows OM decomposition?
  - Water and cold temperatures
  - Wet areas, wetlands
  - Colder climates

This means

- High water holding capacity
- When they are drained-
  - Rate of decomposition will increase
  - Soil subsidence

Aridisols
Characterized by

- Water deficiency
  - This leads to
    - Salt accumulation
    - Not very much growth
    - Not very much weathering
- Can have different types of salt in B
  - Calcic, gypsic, salic, natric

Most prevalent

- Require irrigation
- Proper management to assure salts do not enter root zone

Mivida, UT

- Rangeland
- Temp 50F Precip 10"°

Mivida
Coarse, loamy mixed Superactive
mesic Ustic Haplocalcid

- Coarse, loamy - particle size
- Mixed mineralogical
- Mesic - moderate temp
- Ustic - moist / dry
- Haplo- minimum horizon
- Calc - presence of calcic horizon
- Id - aridisol

Spodosols

Defining characteristics

- Spodic horizon - dark colored horizon of illuviation under (Bs, Bh)
- Albic horizon - bleached horizon of eluviation (E)
General characteristics

- Form in areas of high precipitation
- Acidic, easily weathered parent material
- Soils are well drained and acidic

Estelle
Alaska state soil

- Birch and Spruce
- Mean Temp 35F
- Mean precipitation 18"

Estelle
loamy, skeletal, mixed Andic Haplocryods

- Formed over ashy loess (14-24”), over gravelly till
- Andic - volcanic ash
- Haplo - minimum horizon
- Cry - cold
- Od - spodosol

Turnbridge
Vermont state soil

- Deciduous, coniferous, meadows
- Mean Temp 44F
- Mean precipitation 40"

Turnbridge
Coarse, Loamy isotic, frigid, typic Haplorthods

- Glacial till - phyllite, schist, gneiss
- Haplo - minimum horizon
- orth - common
- Od - spodosol

Myakka
Florida state soil

- Indian for big waters
- Sandy marine deposits
- Flatwoods, floodplains
- Temp 72F
- Precip 50-60”
**Myakka**  
Sandy, siliceous hypothermic  
Aeric Alaquods  
- Siliceous - high in Si  
- Hypothermic - hot  
- Aeric - aerated  
- Al - albic washed out  
- Aqu - wet

**Defining characteristics**  
- Thick (60-80 cm), black, high OM A horizon - mollic epipedon  
- >50 % exchange sites have base forming cations (Ca, Mg, K)

**This means**  
- Developed under grasslands  
- Most productive farmlands  
- Use of these soils for agriculture has resulted in loss of A horizon

**Drummer, IL**  
- Prime ag land  
- Temp 50F, Precip 29-40”

**Drummer**  
Fine, silty mixed superactive mesic typic Endoaquolls  
- Particle size  
- Temperature  
- Endo -just means other  
- Aqu- wet  
- Olls - mollisols
Alfisols

San Joaquin, CA
- Ag soils
- Precip 15” Temp 61F

Ultisols
- Very weathered soils
  - Clay mineral weathering
  - Movement of clays through the profile
  - Loss of base forming cations (Ca, Mg, K)
  - Ochric or umbric epipedon (A)
    - Not very rich in OM, if it is, not rich in bases
  - Argillic or kandic B (clay accumulation)
  - B horizon has less than 35% of its exchange sites filled with bases
    - rest have Al, H

San Joaquin
Fine mixed active thermic
Abruptic Durixerals
- Mixed - mostly granite
- Thermic - warm
- Abruptic - abrupt horizon
- Duri - Duripan
- Xer - dry
- Als - alfisols

This means
Generalities

- Warm areas
- Relatively moist areas
- Fairly infertile - require management
- Acidic
- Loss of base forming cations (Ca, Mg, K)
- This color

Sassafras, MD

- Marine and alluvial deposits
- “Soil Hall of Fame”

Sassafras
Fine loamy siliceous semiactive
mesic typic Hapludults

- Siliceous - acid, Si
- Pale - old
- Ud - humid
- Ults - ultisols

Oxisols

Oldest of them all

- Most weathered
  - Fe and Al oxides are dominant minerals
  - Primary minerals, Si, bases have weathered out of the profile
- Homogenous through the profile

Formed in

- Areas of high temperature and rainfall
- Not fertile, acidic, very stable
  - Require management for agriculture
  - Good for construction
Bayamon, PR

- Sugarcane and pineapple
- Clay and marine sediments
- Temp 78F Precip 65"

Bayamon

Very fine kaolinitic isohypothermic typic Hapludox

- Kaolinitic - low activity
- Fe Al oxide clay
- Isohypothermic - very hot, all the time
- Ud - hot and humid
- Ox - oxisol