



The GLOBE Program



Data Entry Range Checks

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Notes: Starred items (*) are required inputs. Underlined items are primary keys in the database. Data Types:

- Number (4,1): xxx.x
- Number (3): xxx
- Varchar2 (16): 16 character string

Time of Measurement:

Entry	Min	Max	Units	Missing	Data Type	Notes
<u>*Year</u>	1995	Current Year	None	N/A	Date	
<u>*Month</u>	January	December	None	N/A	Date	
<u>*Day</u>	1	31	None	N/A	Date	
<u>*Time</u>						
Hour	0		None	N/A	Date	UT
Minute	0	23				
Second	0	59				
	0	59				

Other Checks:

- Cannot be a future time

Air Temperature (AT):

Entry	Min	Max	Units	Data Type	Notes
Current	-65.0	55.0	degrees C	Number (3,1)	
Maximum	-65.0	55.0	degrees C	Number (3,1)	
Minimum	-65.0	55.0	degrees C	Number (3,1)	

Comments	N/A	N/A	N/A	Varchar2 (500)	
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Other Checks:

- Max/Mins have to be reported within the solar noon window (solar noon + or - 1 hr. 15 min.)
- Max >= Current >= Min (Max and Min can be equal)
- If no T current exists for yesterday, then no T max will be accepted for today
- If no T current exists for yesterday, then no T min will be accepted for today
- If T is greater or less than the record for the U.S. States, then an alert is displayed on the verification page

Precipitation (PR):

Entry	Min	Max	Units	Missing	Data Type	Notes
*Rain	0.0	1500.0	mm	-99.0	Number (5,1)	9999.9 total limit
Number of Days of Rain	1	7	None	N/A	Number (1)	
pH of Rain	3.0	12.0	None	-99.0	Number (3,1)	
pH of Rain -- Technique	0	3	None	0	Number (1)	0=Unchecked, 1=Paper, 3=pH Meter
*Daily Snowfall	0	2000	mm	-9	Number (4)	Three Samples, 6000 limit for total of all days
Daily Rain Equivalent of New Snow	0.0	500.0	mm	-99.0	Number (4,1)	
Number of Days of Snowfall	1	7	None	N/A	Number (1)	
Snow Pack	0	6000	mm	-9	Number (4)	Three Samples
Rain Equivalent of Snowpack	0.0	500.0	mm	-99.0	Number (4,1)	
pH of Melted Snow	3.0	12.0	None	-99.0	Number (3,1)	

pH of Melted Snow --Technique	0	3	None	0	Number (1)	0=Unchecked, 1=Paper, 3=pH Meter
Comments	N/A	N/A	N/A	XXXX	Varchar2 (500)	

Other Checks:

- Rain can't exceed the max daily times the number of Days of Accumulation
- "T" and "M" are acceptable values for Rainfall, and Melted Snow
- The precipitation measurements cannot overlap day (Days of Accumulation)
- **Daily Snow and Water Equivalent:**
 - Daily Water Equivalent to New Snow on Snowboard ratio: 1:1 to 1:100
 - If Daily Solid=T, Total must be T or >0 or M, Daily Liquid Equivalent must be T (filled in automatically if blank)
 - If Daily Solid=M, Total can be anything, Daily Liquid Equivalent must be M (filled in automatically if blank) or can be a number (if the snow melted in the rain gauge)
 - If Daily Solid=0, Total can be anything, Daily Liquid Equivalent must be 0 (filled in automatically if blank)
 - If Daily=number, Total must be >Daily
 - Daily Solid * Number of Days < 6000 mm
- **Total Snow and Water Equivalent:**
 - Total Water Equivalent to Total Solid Accumulation ratio: 1:1 to 1:100
 - If Total Solid=T, Total Liquid Equivalent must be T (filled in automatically if blank)
 - If Total Solid=M, Total Liquid Equivalent must be M (filled in automatically if blank)
 - If Total Solid=0, Total Liquid Equivalent must be 0 (filled in automatically if blank)
 - If Total=number, Total must be >Daily, Total Water Equivalent ratio must be 1:1 to 1:100 (null if blank), neither can be "T"
- If pH is entered, pH Technique is required
- Must have at least 3.5 mm of Liquid before one can measure pH
- Can't report both Rain and Snow on same day

Cloud Observations- Old (CO):

Entry	Min	Max	Units	Missing	Data Type	Notes
Cloud Cover	0	3	None	9	Number (1)	0=Clear, 1=Scattered, 2=Broken.

						3=Overcast
Cloud Type	000000000 0	111111111 1	None	XXXXXXXXXX X	Varchar 2 (10)	1=Cirrus, 2=Cirrocumulus, 3=Cirrostratus, 4=Altostratus, 5=Alto cumulus, 6=Cumulus, 7=Nimbostratus, 8=Stratus, 9=Stratocumulus, 10=Cumulonimbus
Comments	N/A	N/A	N/A	XXXX	Varchar 2 (500)	
Other Checks:						
<ul style="list-style-type: none"> None 						

Cloud Observations- GLOBE 2000 (CO):						
Entry	Min	Max	Units	Missing	Data Type	Notes
*Cloud Cover	10	16	None	N/A	Number (2)	10=None, 11=Clear, 12=Isolated, 13=Scattered, 14=Broken, 15=Overcast, 16=Obscured
Cloud Type	0	1	None	N/A	Number (1)	Possible Types: Cirrus, Cirrocumulus, Cirrostratus, Altostratus, Alto cumulus, Cumulus, Nimbostratus, Stratus, Stratocumulus, Cumulonimbus
Cloud Obscuration	0	1	None	N/A	Number (1)	Possible Types: Fog, Smoke.

						Haze, Volcanic Ash, Dust, Sand, Spray, Heavy Rain, Heavy Snow, Blowing Snow
Contrail Cover	0	5	None	N/A	Number (1)	0=Legacy (Unchecked) 1=None 2=0-10% 3=10-25% 4=25-50% 5=>50%
Contrail Type: Short-Lived	0	99	None	N/A	Number (2)	
Contrail Type: Persistent Non Spreading	0	99	None	N/A	Number (2)	
Contrail Type: Persistent Spreading	0	99	None	N/A	Number (2)	
Comments	N/A	N/A	N/A	XXXX	Varchar2 (500)	

Other Checks:

- Cloud Type will be either 1 (cloud type present) or 0 (cloud type not present)
- Cloud Obscuration will be either 1 (obscuration present) or 0 (obscuration not present)
- *Cloud Obscuration is required if a Cloud Cover of Obscured is checked
- No Cloud Types should be selected if Cloud Cover is Obscured
- Contrail Cover cannot be greater than Cloud Cover unless there are Short-Lived and/or Persistent Contrails present

Aerosols (AZ)/Water Vapor (WV):

Entry	Min	Max	Units	Missing	Data Type	Notes
<u>*Photometer ID</u>	N/A	N/A	None	N/A	Char(8)	
ChannelID	N/A	N/A	None	N/A	Char(1)	Either "R" for Red or "G" for Green - if Aerosols, "I" or "J" for Water Vapor IR, automatically entered
Sample Number	1	5	None	N/A	Number(1)	Automatically entered
Sunlight Voltage	0	5.0 or ET contant. whichever is the least	volts	N/A	Number (5,4)	Must be > dark voltage. Must be less than ET constant
Dark Voltage	-.005	0.0200	volts	N/A	Number (5,4)	Must be < sunlight voltage.
Sky Color	1	5	None	N/A	Number (1)	1=Deep Blue, 2=Blue, 3=Light Blue, 4=Pale Blue, 5=Milky
Sky Clarity	1	5	None	N/A	Number (1)	0= Not checked, 1=Unusually Clear, 2=Clear, 3=Somewhat Clear, 4=Very Hazy, 5=Extremely Hazy
AOT (Aerosol Optical Thickness)	-1	5	None	N/A	Number (4,3)	Warning displayed if AOT < 0; If AOT < 0.1, then Clear.
Transmission Pct	0	100	%	N/A	Number(4,1)	Calculated, not entered

*Air Temp	-65.0	55.0	degrees C		Number(3,1)	
*Barometric Pressure	500	1100	mb	N/A	Number (5,1)	

Other Checks:

- *UT Time is required (Hours, Minutes, Seconds - Required - Seconds default to 00).
- One measurement of both channels are required
- *Cloud Type is required
- *Cloud Cover is required
- Humidity is required on Water Vapor

Ozone (OZ) :

Entry	Min	Max	Units	Missing	Data Type	Notes
*Air Temp	-65.0	55.0	degrees C	N/A	Number(3,1)	
*Wind Direction	0	315	degrees	N/A	Number (4,1)	0, 45, 90, 135, 180, 225, 270, 315. (0 = North)
*Wind Direction Method	1	2	None	N/A	Number(1)	1 = GLOBE Instrument, 2 = Automated
Direction Source	1	1	None	N/A	Number(1)	"1" to indicate that 8 different directions can be chosen (N, NW, NE, S, etc)
Ozone Method	1	1	N/A	N/A	Number (1)	
*Ozone Concentration	0	250	ppb	N/A	Number (3)	

Other Checks:

- *UT Time is required (HH:MM)
- If "Take cloud and humidity data from Atmosphere Data Entry" is checked, then there has to already be data in the humidity and clouds tables within +/-30 minutes of the measurement time reported on this page
- The Read Time must be later than the Exposed Time by between 45 and 75 minutes.
- For clouds range checks - see Cloud Observations/CO
- For humidity checks - see Humidity/RH

Relative Humidity (RH):

Entry	Min	Max	Units	Missing	Data Type	Notes
*Dry Bulb Temperature	-65.0	55.0	degrees C	N/A	Number (3,1)	Usually the same as current air temp
Wet Bulb Temperature	-65.0	55.0	degrees C	N/A	Number (3,1)	*Required (and only accepted) for sling psychrometer method.
*Humidity Method	1	2	None	N/A	Number (1)	1=sling psychrometer, 2=digital hygrometer
Relative Humidity	0	100	%	N/A	Number (4,1)	*Required for hygrometer method; Calculated if sling: p22 = 1013.2 ** 0.190284 p23 = 8.4288E-5 * Site Elevation p24 = 1 /

						<p>0.190284</p> <p>pressure = (p22 - p23) ** p24 + .3</p> <p>Tk = DryBulb + 273.15</p> <p>Tw = Wet Bulb + 273.15</p> <p>Xwd = 21.4 - 5351 / Tk</p> <p>Xww = 21.4 - 5351 / Tw</p> <p>ewd = exp(Xwd)</p> <p>eww =exp(Xww)</p> <p>e = eww - pressure * (Tk - Tw) / 1555</p> <p>es = ewd</p> <p>humidity (finally) = 100 * (e/es)</p>
Dew point			degrees C	N/A	Number(3,1)	<p>Calculated only:</p> <p>Tk = Drybulb + 273.15;</p> <p>Es = 6.11 * 2.7183 ** (19.834 - (5417.7 / Tk))</p>

						$E_a = E_s * \text{Humidity} / 100$ $T_{dk} = -5417.7 / ((\log(E_a / 6.11)) - 19.834)$ $\text{Dewpoint} = T_{dk} - 273.15$
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Other Checks:

- Dry bulb must be greater than or equal to wet bulb for sling psychrometer
- If using the Digital Hygrometer, report the Current Temperature as the Dry Bulb Temperature

Barometric Pressure (PA):

Entry	Min	Max	Units	Missing	Data Type	Notes
*Station Pressure	500	1100	mb	N/A	Number (4)	To Sea Level = $((\text{stationp} - 0.3)^{0.190284} + .000084288 * \text{elev})^{1/0.190284}$
Sea Level Pressure	850	1100	mb	N/A	Number (4)	To Station = $(\text{sealevelp}^{0.190284} - 0.000084288 * \text{elev})^{1/0.190284} + 0.3$
Comments	N/A	N/A	N/A	XXXX	Varchar2 (500)	

Other Checks:

- Must specify on entry whether the barometric pressure is station or sea level
- Both values are stored in the database. Based off of what the student enters we calculate the other pressure based off of Standard Atmosphere.

Hydrology (SW):

Entry	Min	Max	Units	Missing	Data Type	Notes
Water Source State	0	4	None	0	Number (1)	0=Unchecked, 1=Frozen, 2=Dried, 3=Flooded, 4=Unreachable
Temperature	-2.0	40.0	degrees C	-99.0	Number (3,1)	
Comments	N/A	N/A	N/A	XXXX	Varchar2 (500)	

Transparency:

<u>Sample Number</u>	1	3	N/A	N/A	Number (1)	Stored automatically
Cloud Cover	10	16	None	9	Number (1)	10=No Clouds, 11=Clear, 12=Isolated, 13=Scattered, 14=Broken, 15=Overcast, 16=Obscured
Secchi Disk Depth (Disappear)	0.00	40.00	meters	-99.0	Number (4,2)	Three Samples
Secchi Disk Depth (Reappear)	0.00	40.00	meters	-99.0	Number (4,2)	Three Samples
Distance from observer to water surface	0.00 (TBD)	40.00 (TBD)	meters	-99.0	Number (4,2)	Three Samples
Disappear Depth > Depth of Water	0	1	N/A	0	Number (1)	Three Samples: 0=No, 1=Yes
Average	0.00	40.00	meters	-99.0	Number	Calculate

Secchi Disk Depth					(4,2)	(average of all 6 depth inputs - average distance from observer to water surface)
Turbidity Tube - Image Disappears Depth	0	250	centimeters	-9	Number (3)	Three Samples
Disappear Depth > Length of Tube Flag	0	1	N/A	0	Number (1)	Three Samples: 0=No, 1=Yes
Average Turbidity Tube Depth	0	250	centimeters	-9	Number (3)	Calculate
Dissolved Oxygen:						
Average Dissolved Oxygen for Water Sample	0.0	20.0	mg/L or ppm	-99.0	Number (3,1)	
Water pH:						
Average pH	3.0	12.0	None	-99.0	Number (3,1)	
pH Technique:	0	3	None	0	Number (1)	0=Unchecked, 1=Paper, 3=pH Meter
Alkalinity:						
Average Alkalinity of water sample	0	500	mg/L as CaCO3	-9	Number (3)	Entered
Number of Drops required for water sample -- Remove	0	99	None	-9	Number (2)	If your kit does not give Alkalinity directly
Range -- Remove	0	2	None	0	Number (1)	0=Unchecked, 1=Low Range, 2=High Range
Conductivity:						

Average Conductivity of water sample	0	2000	microSiemens/cm	-9	Number (4)	
Salinity:						
Tide Location	N/A	N/A	None	XXXX	Varchar2(32)	
Latitude	0.0000	90.0000	degrees		Number (6,4)	Calculated
Longitude	0.0000	180.0000	degrees		Number (7,4)	Calculated
Hour of High or Low Tide before Salinity measurement	0	23	UT	-9	Number (2)	High and Low Tide
Minute(s) of High or Low Tide before Salinity measurement	0	59	UT	-9	Number (2)	High and Low Tide
Type of Tide before Salinity measurement	0	2	None	0	Number (1)	High and Low Tide: 0=Unchecked, 1=High, 2=Low
Hour of High or Low Tide after Salinity measurement	0	23	UT	-9	Number (2)	High and Low Tide
Minute(s) of High or Low Tide before Salinity measurement	0	59	UT	-9	Number (2)	High and Low Tide
Type of Tide after Salinity measurement	0	2	None	0	Number (1)	High and Low Tide: 0=Unchecked, 1=High.

						2=Low
Temperature of water in the cylinder: Hydrometer method	0.0	40.0	degrees C	-99.0	Number (3,1)	
Specific Gravity of water sample: Hydrometer method	.998	1.0700	None	-99.0	Number (5,4)	
Salinity of water sample: Hydrometer method	0.0	60.0	ppt	-99.0	Number (3,1)	
Average Salinity of water sample: Hydrometer method	0.0	60.0	ppt	-99.0	Number (3,1)	
Average Salinity of water sample: Salinity Titration method	0.0	60.0	ppt	-99.0	Number (3,1)	
Salinity Method	0	2	None	0	Number (1)	Stored Automatically: 0=Undefined, 1=Hydrometer, 2=Titration
Nitrate:						
Average Nitrite + Nitrate	0.0	50.0	mg/L nitrite nitrogen + mg/L nitrate nitrogen or ppm	-99.0	Number (3,1)	
Average Nitrite	0.0	50.0	mg/L nitrite nitrogen or ppm	-99.0	Number (3,1)	
Calibration:						

Temperature of Distilled Water - Dissolved Oxygen	0.0	40.0	Degrees C	-99.0	Number (3,1)	
Average Dissolved Oxygen for Shaken Distilled Water	5.0	15.0	mg/L or ppm	-99.0	Number (3,1)	
Average Salinity of standard: Salinity Titration method	0.0	50.0	ppt	-99.0	Number (3,1)	
Average Alkalinity of baking soda	0	500	mg/L as CaCO3	-9	Number (3)	
Average Nitrate for 2 ppm standard	0.0	50.0	mg/L nitrate nitrogen (N) or ppm	-99.0	Number (3,1)	

Other Checks:

- If Water Source is Frozen, Dried, Flooded, or Unreachable, no other inputs are accepted
- If pH is entered, pH Technique is required
- If pH Technique is selected with no pH entered, pH Technique is set to Unchecked (0)
- See the Latitude/Longitude/Elevation section for more range checks

Soil Characterization (SC):

Entry	Min	Max	Units	Missing	Data Type	Notes
*Horizon Number (from top)	1	99	N/A	N/A	Number(2)	
*Horizon	0.0	197.0	centimeters	-99.0	Number	Horizon #1 must start

Depth: Top					(4,1)	at 0 cm.
*Horizon Depth: Bottom	3.0	200.0	centimeters	-99.0	Number (4,1)	Depths should not overlap
*Horizon Depth (Not stored in database)	3.0	200.0	centimeters	N/A	Number (4,1)	Bottom Depth - Top Depth
Comments	N/A	N/A	N/A	XXXX	Varchar2 (500)	

Soil Horizon Description:

Horizon	N/A	N/A	None	X	Varchar2 (1)	O, A, E, B, C, R
Moisture	0	3	None	0	Number (1)	0=Unchecked, 1=Dry, 2=Moist, 3=Wet
Structure	0	7	None	0	Number (1)	0=Unchecked, 1=Granular, 2=Blocky, 3=Platy, 4=Prismatic, 5=Columnar, 6=Single- grained, 7=Massive Note: "single-grained" structure can only have a "loose" consistence and vice versa. Fill in if not marked.
Main Color	N/A	N/A	None	XXXX	Varchar2 (11)	Hue: Value/Chroma (x.xx:x.x/x) Note: List of Musell Colors (accept Hue: Value/Chroma (saved format), Hue<sp>Value/Chroma , Hue/Value/Chroma, Hue: Value/Chroma)
Second Color	N/A	N/A	None	XXXX	Varchar2 (11)	Hue: Value/Chroma (x.xx:x.x/x) Note: List of Musell Colors (accept Hue: Value/Chroma (saved format), Hue<sp>Value/Chroma , Hue/Value/Chroma, Hue: Value/Chroma)

						If entered, Main Color must also be entered
Consistence	0	4	None	0	Number (1)	0=Unchecked, 1=Loose, 2=Friable, 3=Firm, 4=Extremely Firm Note: "single-grained" structure can only have a "loose" consistence and vice versa. Fill in if not marked.
Texture	0	12	None	0	Number (2)	0=Unchecked, 1=Sandy Clay, 2=Sandy Clay Loam, 3=Sandy Loam, 4=Silty Clay, 5=Silty Clay Loam, 6=Silt Loam, 7=Loamy Sand, 8=Sand, 9=Silt, 10=Clay, 11=Clay Loam, 12=Loam, 13=Organic
Rocks	0	3	None	0	Number (1)	0=Unchecked, 1=None, 2=Few, 3=Many
Roots	0	3	None	0	Number (1)	0=Unchecked, 1=None, 2=Few, 3=Many
Carbonates (Observed effervescence)	0	3	None	0	Number (1)	0=Unchecked, 1=None, 2=Slight, 3=Strong

Bulk Density:

<u>Sample Number</u>	1	3	N/A	N/A	Number (1)	Stored automatically
Volume of Sample (Pit Method)	58	1010	mL	-9	Number (3)	Three samples
Sample Depth: Top (Auger Method)	Horizon Top Depth (0.0)	Horizon Bottom Depth (200.0)	centimeters	-99.0	Number (4,1)	Three samples
Sample Depth:	Horizon Top	Horizon	centimeters	-99.0	Number (4,1)	Three samples

Bottom (Auger Method)	Depth (2.0)	Bottom Depth (200.0)				
Sample Depth (Auger Method) (Not saved to database)	3.0 only for Horizon 1	none	centimeters	-99.0	N/A	Three Samples: Top Depth
Diameter of Auger Hole (Auger Method)	3.0	10.0	centimeters	-99.0	Number (3,1)	Three samples
Volume of Sample (Auger Method)	21.2	1963.0	mL	-99.0	Number (5,1)	Three Samples: $\pi * (\text{diameter}/2 \text{ squared}) * \text{sample depth}$
Mass of Empty Container	10.0	800.0	grams	-99.0	Number (4,1)	Three samples: Note: Wet > Dry > Container
Mass of Wet Soil and Container	20.0	800.0	grams	-99.0	Number (4,1)	Three samples: Note: Wet > Dry > Container
Mass of Dry Soil and Container	20.0	800.0	grams	-99.0	Number (4,1)	Three samples: Note: Wet > Dry > Container
Mass of Rocks	0.0	800.0	grams	-99.0	Number (4,1)	Three samples
Volume of Water without Rocks	0	400	mL	-9	Number (3)	Three samples: Note: with Rocks >= without Rocks
Volume of Water with Rocks	0	900	mL	-9	Number (3)	Three samples: Note: with Rocks >= without Rocks
Volume of Rocks	0	500	mL	-9	Number (3)	Three samples Calculate
Bulk Density	0.10	3.00	$\text{g/mL} = \text{g/cm}^3$	-99.0	Number (3,2) to store the missing value	Three Samples entered and calculated: (net dry mass of soil - mass of rocks) / (volume of sample - volume of rocks) Note: If the entered Bulk Density is off the

						calculated value by >1%, display error message.
Average Bulk Density	0.10	3.00	g/mL = g/cm ³	-99.0	Number (3,2) to store the missing value	Calculated

Particle-Size Distribution 1996 Method (old GLOBE II):

<u>Sample Number</u>	1	3	N/A	N/A	Number (1)	Stored automatically
Total Sample Size	20	40	mL	-9	Number (2)	Three samples: 40 Second Reading <= 30 Minute Reading <= Total Sample Size
40 Second Reading	0	40	mL	-9	Number (2)	Three samples
30 Minute Reading	0	40	mL	-9	Number (2)	Three samples
%Sand	0.0	100.0	N/A	-99.0	Number (4,1)	Average 40 Second Reading/Total Sample Size * 100
%Silt	0.0	100.0	N/A	-99.0	Number (4,1)	(Average 30 Minute Reading - Average 40 Second Reading) / Average Total Sample Size * 100
%Clay	0.0	100.0	N/A	-99.0	Number (4,1)	100 - %Sand - %Silt

Particle-Size Distribution Hydrometer Method (GLOBE II.5):

<u>Sample Number</u>	1	3	N/A	N/A	Number (1)	Stored automatically
Distance from 500 mL line on cylinder to base of cylinder	10.0	40.0	centimeters	-99.0	Number (3,1)	Three samples
Temperature at which the Hydrometer is calibrated	0.0	99.9	degrees C	-99.0	Number (3,1)	-99.0=Unchecked, 15.5=60 degrees F (15.5 degrees C), xx.x=Other
Hydrometer	0.9993	1.0300	Specific	-99.0	Number	Three samples

Reading at 2 minutes and 24 hours			Gravity		(5,4)	(USDA standard for silt and clay left in suspension): Note: 2 minutes <= 24 hours
Temperature of Soil and Water at 2 minutes and 24 hours	15.5	45.0	degrees C	-99.0	Number (3,1)	Three samples
grams sand (USDA)	0.0	25.0	grams	-99.0	Number (3,1)	$25g - ((\text{Average USDA 2 Minute Hydrometer Reading} - 1.0024) / .00062 + (\text{Average Temperature} - 20) * .36) / 2$
% sand (USDA)	0.0	100.0	None	-99.0	Number (4,1)	$\text{grams sand (USDA)} / 25g * 100$
grams sand (ISSS)	0.0	25.0	grams	-99.0	Number (3,1)	VALUE NO LONGER USED: $25g - ((\text{Average USDA 12 Minute Hydrometer Reading} - 1.0024) / .00062 + (\text{Average Temperature} - 20) * .36) / 2$
% sand (ISSS)	0.0	100.0	None	-99.0	Number (4,1)	VALUE NO LONGER USED: $\text{grams sand (ISSS)} / 25g * 100$
grams clay	0.0	25.0	grams	-99.0	Number (3,1)	$((\text{Average USDA 24 Hour Hydrometer Reading} - 1.0024) / .00062 + (\text{Average Temperature} - 20) * .36) / 2$
% clay	0.0	100.0	None	-99.0	Number (4,1)	$\text{grams clay} / 25 * 100$
grams silt (USDA)	0.0	25.0	grams	-99.0	Number (3,1)	$25g - \text{grams clay} - \text{grams sand (USDA)}$
% silt (USDA)	0.0	100.0	None	-99.0	Number (4,1)	$\text{grams silt (USDA)} / 25g * 100$
grams silt (ISSS)	0.0	25.0	grams	-99.0	Number (3,1)	$25g - \text{grams clay} - \text{grams sand (ISSS)}$
% silt (ISSS)	0.0	100.0	None	-99.0	Number	$\text{grams silt (ISSS)} / 25g$

					(4,1)	* 100
Soil pH:						
<u>Sample Number</u>	1	3	N/A	N/A	Number (1)	Stored automatically
pH of distilled water before soil is added	1.0	14.0	N/A	-99.0	Number (3,1)	Three samples
pH of soil and water	1.0	14.0	N/A	-99.0	Number (3,1)	Three samples
pH Technique:	0	3	None	0	Number (1)	0=Unchecked, 1=Paper, 3=pH Meter
Average pH	1.0	14.0	None	-99.0	Number (3,1)	Calculated
Soil Fertility:						
<u>Sample Number</u>	1	3	N/A	N/A	Number (1)	Stored automatically
Nitrogen (N)	0	3	N/A	0	Number (1)	Three Samples: 0=Unchecked, 1=None, 2=Low, 3=Medium, 4=High
Phosphorous (P)	0	3	N/A	0	Number (1)	Three Samples: 0=Unchecked, 1=None, 2=Low, 3=Medium, 4=High
Potassium (K)	0	3	N/A	0	Number (1)	Three Samples: 0=Unchecked, 1=None, 2=Low, 3=Medium, 4=High
Average Nitrate Nitrogen (N)	0	3	N/A	0	Number (1)	Calculate Average
Average Phosphorous (P)	0	3	N/A	0	Number (1)	Calculate Average
Average Potassium (K)	0	3	N/A	0	Number (1)	Calculate Average
Particle Density:						
<u>Sample Number</u>	1	3	N/A	N/A	Number (1)	Stored automatically
Storage Container	0	3	N/A	0	Number (1)	Three Samples: 0=Unchecked.

						1=Plastic Bag, 2=Air Tight Container 3=Other
Water Temp	10	45	Degrees C	-99.0	Number (3,1)	Needed to calculate water density
Particle Density	.9	3	g/ml		Number (3,2)	
Porosity	0	100	%		Number (4,1)	Must have Bulk Density before can do Porosity

Other Checks:

- Minimum Hydrometer Reading = $(0 - (0.36 * (\text{Temperature}-20))) * 0.00062 + 1.0024$
- Maximum Hydrometer Reading = $(50 - (0.36 * (\text{Temperature}-20))) * 0.00062 + 1.0024$

Soil Moisture (SM):

Entry	Min	Max	Units	Missing	Data Type	Notes
<u>*Depth of Sample</u>	0	90	centimeters	N/A	Number (2)	Stored automatically: Star: 0-5, 10 Transect: 0-5 Depth: 0-5, 10, 30, 60, 90 Gypsum: 10, 30, 60, 90 Note: 0 is stored for 0-5
<u>Protocol</u>	0	8	N/A	N/A	Number (1)	Stored automatically: 0 Unchecked (deprecated) 1 Star Gravimetric 2 Transect Gravimetric 3 Hole Depth Gravimetric 4 Gypsum Block/Delmerhorst meter(deprecated) 5 Watermark Block/Delmerhorst meter 6 Other Block 7 Watermark Block/Irrrometer Watermark meter 8 Watermark Block/Spectrum Watchdog (logger)
Is soil	0	2	N/A	0	Number	0=Unchecked, 1=Yes, 2=No

saturated?					er (1)	
Comments	N/A	N/A	N/A	XXX X	Varchar2 (500)	
Gravimetric (Star, Transect, Depth):						
Sample Number (for Star and Transect)	1	3 for Star 13 for Transect	N/A	N/A	Number (2)	Stored automatically
Container ID	00	ZZ	None	-9	Varchar2 (2)	Unique for each depth Star: 3 samples per depth Transect: 13 total Depth and Gypsum: 1 per depth
Average Drying Time	0.0	120.0	Hours	-99.0	Number (4,1)	Hours and Minutes
Drying Method	0	4	None	0	Number (1)	0=Unchecked, 1=95-105 degree C oven, 2=Microwave, 3=75-95 degree C oven, 4=Other
Offset Distance from End of Transect (Transect)	0.0	100.0	meters	-99.0	Number (4,1)	in 5m increments
Weight of Wet Soil and Container	30.0	999.9	grams	-99.0	Number (5,1)	
Weight of Dry Soil and Container	30.0	999.9	grams	-99.0	Number (5,1)	
Weight of Empty	1.0	900.0	grams	-99.0	Number (4,1)	

Container						
Soil Water Content	0.0	99.9	g/g	-99.0	Number (3,1)	Entered and Calculated: (Wet Weight - Dry Weight)/ (Dry Weight - Can Weight) * 100
Average Soil Water Content	0.0	99.9	g/g	-99.0	Number (3,1)	Calculated (Sample 88)

Sensor:

Soil Moisture Meter Reading	0.0	99.9 for Delmhorst 999 for Other 200 for Irrrometer	None	-99.0	Number (3,1)	10, 30, 60, 90
Calibration Curve SWC	0.0	2.00	g/g	-99.0	Number (5,2)	10, 30, 60, 90
Date these gypsum blocks were installed	N/A	N/A		-9	Date	YYYYMM for 30 cm Depth

Other Checks:

- Weight of Wet >= Weight of Dry > Weight of Container
- If one weight is entered, all three must be entered in order to calculate Soil Water Content
- If the entered Soil Water Content is off the calculated value by >1%, display error message
- If Soil Water Content is entered, all three Weights must be entered
- If Soil Water Content from calibration curve is entered, the Soil Moisture Meter Reading must also be entered
- Soil Water Content from soil weights and from a calibration curve can both be entered
- If the SWC > 65, display warning message on Pass page

Method Depths (cm) Samples

- Star 0-5, 10 3 per depth
- Transect 0-5 1 per location + 1 triplicate (13 total)
- Depth 0-5, 10, 30, 60, 90 1 per depth
- Gypsum 10, 30, 60, 90 1 per depth

Soil Temperature (ST):

Entry	Min	Max	Units	Missing	Data Type	Notes
<u>Sample Number</u>	1	11	N/A	N/A	Number (2)	Set Automatically
<u>Site Code</u>	N/A	N/A	N/A	N/A	Char (2)	Set Automatically to SM or AT
*Hour	0	23	hours	N/A	Number (2)	
*Minutes	0	50	minutes	N/A	Number (2)	
*Depth	5	10	centimeters	N/A	Number (2)	Set Automatically to 5 or 10
*Temperature (at 5 cm and 10 cm)	-10.0	60.0	degrees C	N/A	Number (3,1)	All samples within 20 minutes of each other will be averaged.
Measurement Type	0	3	None	N/A	Number (1)	0=Unchecked, 1=Weekly, 2=Digital, 3=Both
Average Temperature (at 5 cm and 10 cm)	-10.0	60.0	degrees C	N/A	Number (3,1)	Calculated (Sample 88)
Soil Thermometer	0	3	None	0	Number (1)	0=Unchecked, 1=Digital, 2=Dial, 3=Other
Rain within last 24 hours?	0	2	None	0	Number (1)	0=Unchecked, 1=Yes, 2=No
Comments	N/A	N/A	N/A	XXXX	Varchar2 (500)	

This experiment is performed at a Soil Moisture or Atmospheric Study Site

Other Checks:

- If a temperature is entered, Measurement Type is required

- If Measurement Type is Weekly or Both, and the time entered is more than one hour off from the Local Solar Noon, the measurement must be Diurnal or sample should be redone

Soil Infiltration (SF):

Entry	Min	Max	Units	Missing	Data Type	Notes
*Sample Number	1	3	N/A	N/A	Number (1)	
Site Code	N/A	N/A	N/A	N/A	Char (2)	Set Automatically to SM or SC
Diameter of Inner Ring	10	100	centimeters	-9	Number (3)	Three Samples
Diameter of Outer Ring	10	100	centimeters	-9	Number (3)	Three Samples
Weight of Wet Soil and Container (Saturated Soil below rings (0-5 cm) at end of experiment)	30.0	999.9	grams	-99.0	Number (5,1)	
Weight of Dry Soil and Container (Saturated Soil below rings (0-5 cm) at end of experiment)	30.0	999.9	grams	-99.0	Number (5,1)	
Weight of Empty Container (Saturated Soil below rings (0-5 cm) at end of experiment)	1.0	900.0	grams	-99.0	Number (4,1)	
Soil Water	0.0	99.9	g/g	-99.0	Number	Entered and

Content (Saturated Soil below rings (0-5 cm) at end of experiment)					(3,1)	Calculated: (Wet Weight - Dry Weight)/ (Dry Weight - Can Weight) * 100
Flow Rate Max	0	400	mm/minute	-9	Number (3)	Max for all samples taken in one day (27 max measurements)
Flow Rate Min	0	400	mm/minute	-9	Number (3)	Min for all samples taken in one day (27 max measurements)
Comments	N/A	N/A	N/A	XXXX	Varchar2 (500)	Three Samples

Water Level Change:

*Heights above ground level: Upper Mark	20	900	millimeters	N/A	Number (3)	Three Samples
*Heights above ground level: Lower Mark	20	900	millimeters	N/A	Number (3)	Three Samples
Water Level Change (Not stored in database)	0	280	millimeters	N/A	Number (3)	Three Samples: Upper - Lower

Start Time and End Time (9 Measurements per Sample):

<u>Measurement Number</u>	1	9	N/A	N/A	Number (1)	Stored Automatically
*Hours	0	23	Hours	N/A	Number (2)	Start and End
*Minutes	0	59	Minutes	N/A	Number (2)	Start and End
*Seconds	0	59	Seconds	N/A	Number (2)	Start and End
Flow Rate	0	400	mm/minute	-9	Number (3)	water level change / (end time-start

						time)
Record your data for each of the 3 sets of Infiltration measurements you make						
This experiment is performed at either a Soil Moisture or Soil Characterization Study Site						
Other Checks:						
<ul style="list-style-type: none"> • Each time entry must be greater than the previous entry. • The difference between the final End Time and the first Start Time must be under 4 hours. • Only three samples of nine measurements allowed per day per study site 						

Surface Temperature (TX):

Entry	Min	Max	Units	Missing	Data Type	Notes
Sample Number	3	9	N/A	N/A	Number (2)	Set Automatically
*Hour	0	23	hours	N/A	Number (2)	
*Minutes	0	50	minutes	N/A	Number (2)	
*Temperature	-65	72.5	degrees C	N/A	Number (3,1)	
Snow Depth	10	2000	mm	N/A	Number (1)	If snow then a Trace is recorded if depth < 10 mm
Comments	N/A	N/A	N/A	XXXX	Varchar2 (500)	

This experiment is performed at a Land Cover Site or an Atmospheric Study Site						
Other Checks:						
<ul style="list-style-type: none"> • Cloud Observations are based off of the Cloud protocol 						

Land Cover/ LC:

Entry	Min	Max	Units	Missing	Data Type	Notes
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Genus of Dominant Vegetation	N/A	N/A	None	XXXX	Varchar2 (4)	Alphabetic
Genus of Co-Dominant Vegetation	N/A	N/A	None	XXXX	Varchar2 (4)	Alphabetic
Species of Dominant Vegetation	N/A	N/A	None	XXXX	Varchar2 (4)	Alphabetic
Species of Co-Dominant Vegetation	N/A	N/A	None	XXXX	Varchar2 (4)	Alphabetic
Height of Dominant Vegetation	4.99	99.99	meters	-99.0	Number (3,1)	Five Samples
Height of Co-Dominant Vegetation	4.99	99.99	meters	-99.0	Number (3,1)	Five Samples
Circumference of Dominant Vegetation	1/33 ratio to height	1500.0	centimeters	-99.0	Number (5,1)	Five Samples
Circumference of Co-Dominant Vegetation	1/25 ratio to height	1500.0	centimeters	-99.0	Number (5,1)	Five Samples
Green Biomass	0.0	5000.0	g/m2	-99.0	Number (5,1)	Three Samples
Brown Biomass	0.0	5000.0	g/m2	-99.0	Number (5,1)	Three Samples
Canopy Cover: Total of "+" and "-" squares	50	100	None	-9	Number (3)	
Ground Cover: Total green, brown, and "-" squares	50	100	None	-9	Number (3)	
Average Height	0.10	99.00	meters	-99.0	Number (4,2)	Calculate for Dominant and Co-Dominant

Average Circumference	1/25 ratio to height	1500.0	centimeters	-99.0	Number (5,1)	Calculate for Dominant and Co-Dominant
Average Green Biomass	0.0	5000.0	g/m2	-99.0	Number (5,1)	Calculate
Average Brown Biomass	0.0	5000.0	g/m2	-99.0	Number (5,1)	Calculate
%Canopy Cover	0.0	100.0	%	-99.0	Number (4,1)	(+'s) / ('s + -'s) * 100
%Green Ground Cover	0.0	100.0	%	-99.0	Number (4,1)	(g's) / (b's + g's + -'s) * 100
%Brown Ground Cover	0.0	100.0	%	-99.0	Number (4,1)	(b's) / (b's + g's + -'s) * 100
%Ground Cover	0.0	100.0	%	-99.0	Number (4,1)	%Green Ground Cover + %Brown Ground Cover
Comments	N/A	N/A	N/A		Varchar2 (500)	

Other Checks:

- If Genus is entered, Species must be entered and vice-versa
- If one entry for Canopy Cover is entered, both must be entered
- If one entry for Ground Cover is entered, all three must be entered
- Number of Canopy Cover squares does not have to equal the number of Ground Cover squares

Phenology:

Budburst:

Entry	Min	Max	Units	Missing	Data Type	Notes
Site Name	N/A	N/A	None	N/A	Varchar2 (32)	Alphanumeric

Atmospheric Site	ATM-01	ATM999	None	SCH-01	Char (6)	
Distance to Instrument Shelter	0	9999	meters	-99	Number (4)	
Direction to Instrument Shelter	0	8	None	XX	Varchar2 (2)	N, NE, E, SE, S, SW, W, NW
Elevation Difference (Atmosphere Site - Budburst Site)	-300	6000	m	-99.0	Number (5,1)	N, NE, E, SE, S, SW, W, NW
Type of Site where trees are located	0	3	None	XXX	Char (3)	BIO, LCN, OTH
Other Site Description	N/A	N/A	None	XXXX	Varchar2 (32)	Alphanumeric
Genus of Dominant Vegetation	N/A	N/A	None	XXXX	Char (4)	Alphabetic
Species of Dominant Vegetation	N/A	N/A	None	XXXX	Char (4)	Alphabetic
Common Name	N/A	N/A	None	XXXX	Varchar2 (32)	Alphabetic
Tree Label	1	5	None	-9	Number (1)	
Tree Height	0.0	99.0	meters	-99.0	Number (3,1)	
Tree Circumference	1.0	3000.0	cm	-99.0	Number (5,1)	
Date Budburst Observed	1998	Current Date	Date	N/A	Date	
Date before Budburst Observed	1998	Current Date	Date	N/A	Date	
Comments	N/A	N/A	N/A	XXXX	Varchar2 (500)	

Other Checks:

- If Genus is entered, Species must be entered and vice-versa
- See [Lat/Lon/Elevation](#) for other range checks

Phenology:

Lilacs:

Entry	Min	Max	Units	Missing	Data Type	Notes
First leaf date	> first leaf last observed date	Current date	N/A		Date	
Full leaf date	> full leaf last observed date	Current date	N/A		Date	
Full leaf date	> first leaf date	Current date	N/A		Date	
First bloom date	> first bloom last observed date	Current date	N/A		Date	
First bloom date	> full leaf date	Current date	N/A		Date	
Full bloom date	> full bloom last observed date	Current date	N/A		Date	
Full bloom date	> first bloom date	Current date	N/A		Date	
End bloom date	> end bloom last observed date	Current date	N/A		Date	
End bloom date	> full bloom date	Current date	N/A		Date	

Other Checks:

- Observations will not be accepted until the shrub has been in place for at least 6 months
- The phenophase date cannot be prior to the date that the shrub was planted

- No new data will be accepted for a shrub that has died

Phenology:

Green Up/Green Down:

Entry	Min	Max	Units	Missing	Data Type	Notes
LeafID	1	9	N/A	N/A	Number (1)	Once a leaf state is defined, one can not choose a leaf state that is before the one defined after the date of being defined
Leaf State	N/A	N/A	N/A	X	Number (1)	<p>GREEN UP Tree/Shrub D=Dormant S=Swelling B=Budburst G=Length(mm) L=Lost</p> <p>Grass D=No Shoot G=Length(mm) L=Lost</p> <p>GREEN DOWN C=Color S=Snow covered F=Fallen</p>
Leaf Length	0	999	mm	-9	Number (3)	> 0 only when "Length(mm)" chosen
Color	N/A	N/A	None	XXXX	Varchar2 (10)	<p>Hue:Value/Chroma (x.xx:x.x/x) 24 acceptable values: 5G:8/4, 5G:7/4, 5G:6/2, 5G:4/2, 5GY:3/2, 5GY:4/8, 2.5Y:8/6, 2.5Y:8/12, 5YR:7/12, 5GY:7/12, 5GY:6/10,</p>

						5GY:5/10, 2.5Y:6/6, 5Y:8/4, 7.5YR:8/4, 7.5YR:6/4, 7.5YR:5/4, 7.5YR:3/4, 5R:3/4, 2.5R:4/2, 2.5R:4/4, 2.5R:4/6, 2.5R:4/8, 2.5R:4/12,
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Phenology:

Hummingbird:

Entry	Min	Max	Units	Missing	Data Type	Notes
LeafID	1	9	N/A	N/A	Number (1)	Once a leaf state is defined, one can not choose a leaf state that is before the one defined after the date of being defined
Leaf State	N/A	N/A	N/A	X	Number (1)	GREEN UP Tree/Shrub D=Dormant S=Swelling B=Budburst G=Length(mm) L=Lost Grass D=No Shoot G=Length(mm) L=Lost GREEN DOWN C=Color S=Snow covered F=Fallen
Leaf Length	0	999	mm	-9	Number (3)	> 0 only when "Length(mm)" chosen
Color	N/A	N/A	None	XXXX	Varchar2 (10)	Hue:Value/Chroma (x.xx:x.x/x) 24 acceptable values:

						5G:8/4, 5G:7/4, 5G:6/2, 5G:4/2, 5GY:3/2, 5GY:4/8, 2.5Y:8/6, 2.5Y:8/12, 5YR:7/12, 5GY:7/12, 5GY:6/10, 5GY:5/10, 2.5Y:6/6, 5Y:8/4, 7.5YR:8/4, 7.5YR:6/4, 7.5YR:5/4, 7.5YR:3/4, 5R:3/4, 2.5R:4/2, 2.5R:4/4, 2.5R:4/6, 2.5R:4/8, 2.5R:4/12,
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Atmospheric Site Location:

Entry	Min	Max	Units	Missing	Data Type	Notes
Obstacles Distance of Site to Nearest Building or Tree	0	1000	meters	-9	Number (4)	
Height of Nearest Building or Tree	0.0	99.9	meters	-99.0	Number (3,1)	
Slope of Site	0	45	degrees	-9	Number (2)	
Direction of Slope	0	315	degrees	N/A	Number (4,1)	0, 45, 90, 135, 180, 225, 270, 315.
Height of top of rain gauge	0	999	cm	-9	Number (3)	
Height of bulb on max/min thermometer	0	999	cm	-9	Number (3)	
Height of Ozone measurement clip	0	999	cm	-9	Number (3)	
Surface Cover of Site	0	4	N/A	0	Number (1)	0=Unchecked, 1=Paved, 2=Bare Ground, 3=Short Grass, 4=Long Grass, 5=Sand, 6=Roof, 7=Other

Other Checks:

- See the Latitude/Longitude/Elevation and MUC sections for more range checks

Hydrology Site Location:

Entry	Min	Max	Units	Missing	Data Type	Notes
Water Type	0	1	None	0	Number (1)	0=Unchecked, 1=Salt, 2=Fresh
Place where Tides occur	N/A	N/A	None	XXXX	Varchar2(40)	
Moving Water Type	0	3	N/A	0	Number (1)	0=Unchecked, 1=Stream, 2=River, 3=Other
Moving Water Approximate Width	0.1	9999.9	meters	-99.0	Number (5,1)	
Standing Water Type	0	4	N/A	0	Number (1)	0=Unchecked, 1=Pond, 2=Lake, 3=Reservoir, 4=Other <4/99, 5=Bay, 6=Ditch, 7=Ocean, 8=Other >4/99
Standing Water Size	0	3	N/A	0	Number (1)	0=Unchecked, 1=<50m x 100m, 2=50m x 100m, 3=>50m x 100m
Standing Water Approximate Area	0.0001	99999	km2	-99.0	Number (9,4)	
Standing	0.1	740.0	meters	-99.0	Number	

Water Average Depth					(4,1)	
Location Type	0	5	N/A	0	Number (1)	0=Unchecked, 1=Outlet, 2=Bank, 3=Bridge, 4=Boat, 5=Inlet, 6=Pier
Turbidity	0	3	N/A	0	Number (1)	0=Unchecked, 1=Clear, 2=Turbid, 3=Don't Know
See Bottom	0	2	N/A	0	Number (1)	0=Unchecked, 1=Yes, 2=No
Channel/Bank Material	N/A	SRCV	N/A	XXXX	Varchar2 (4)	S=Soil, R=Rock, C=Concrete, V=Vegetated Bank
Bedrock	N/A	GLVM	N/A	XXXX	Varchar2 (5)	G=Granite, L=Lime Stone, V=Volcanics, M=Mixed Sediments, U=Don't Know - Can't mix "U" with any of the other choices
Dissolved Oxygen Kit Manufacturer	0	3	N/A	0	Number (1)	0=Unchecked, 1=LaMotte, 2=Hach, 3=Other
Dissolved Oxygen Kit Model Name	N/A	N/A	N/A	X	Varchar2 (16)	
Alkalinity Kit Manufacturer	0	3	N/A	0	Number (1)	0=Unchecked, 1=LaMotte, 2=Hach, 3=Other

Alkalinity Kit Model Name	N/A	N/A	N/A	X	Varchar (16)	
Nitrate Kit Manufacturer	0	3	N/A	0	Number (1)	0=Unchecked, 1=LaMotte, 2=Hach, 3=Other
Nitrate Kit Model Name	N/A	N/A	N/A	X	Varchar (16)	
Salinity Titration Kit Manufacturer	0	3	N/A	0	Number (1)	0=Unchecked, 1=LaMotte, 2=Hach, 3=Other
Salinity Titration Kit Model Name	N/A	N/A	N/A	X	Varchar (16)	

Other Checks:

- Cannot enter both Moving and Standing Water values
- See the Latitude/Longitude/Elevation section for more range checks

Soil Characterization Site Location:

Entry	Min	Max	Units	Missing	Data Type	Notes
Soil Sample Source	0	6	N/A	0	Number (1)	0=Unchecked, 1=Soil Pit, 2=Auger Hole, 3=10cm of the Soil Surface, 4=Excavation, 5=Road Cut, 6=Other
Slope of Site	0	45	degrees	-9	Number (2)	
Direction of Slope	0	315	degrees	N/A	Number (4,1)	0, 45, 90, 135, 180, 225, 270, 315.
Site Proximity	0	4	N/A	0	Number (1)	0=Unchecked, 1=Near the Soil Moisture

						Study Site, 2=Near the Surface Water Study Site, 3=In or Near the Biology Study Site, 4=Other
Parent Material	0	8	N/A	0	Number (1)	0=Unchecked, 1=Bedrock, 2=Glacial Deposit, 3=Volcanic Deposit, 4=Stream Deposit, 5=Wind Blown Sand, 6=Ancient Lake Deposit, 7=Don't Know, 8=Marine Deposit, 9=Colluvium, 10=Other

Other Checks:

- Average Soil Characteristics: okay to have just one entry for %soil/sand/clay
- See the Latitude/Longitude/Elevation sections for more range checks

Soil Moisture Site Location:

Entry	Min	Max	Units	Missing	Data Type	Notes
Distance of Site to Instrument Shelter	0	99999	meters	-9	Number (5)	
Direction of Site to Instrument Shelter	0	8	N/A	0	Number (1)	0=Unchecked, 1=N, 2=NE, 3=E, 4=SE, 5=S, 6=SW.

						7=W, 8=NW
Distance to nearest Soil Characterization Hole	0	99999	meters	-9	Number (5)	
Direction of Site to nearest Characterization Hole	0	8	N/A	0	Number (1)	0=Unchecked, 1=N, 2=NE, 3=E, 4=SE, 5=S, 6=SW, 7=W, 8=NW
Surface of Soil Site	0	6	N/A	0	Number (1)	0=Unchecked, 1=Natural, 2=Plowed, 3=Graded, 4=Backfill, 5=Compacted, 6=Other
Surface Cover	0	3	N/A	0	Number (1)	0=Unchecked, 1=Bare Soil, 2=Short Grass (< 10cm), 3=Long Grass (> 10cm)
Canopy Cover	0	3	N/A	0	Number (1)	0=Unchecked, 1=Open, 2=Some Trees Within 30m, 3=Canopy Overhead
% Sand (TBD)	0	100	%	-9	Number (3)	
% Silt (TBD)	0	100	%	-9	Number (3)	
% Clay (TBD)	0	100	%	-9	Number (3)	
Rocks (TBD)	0	3	None	0	Number (1)	0=Unchecked, 1=None, 2=Few, 3=Many
Roots (TBD)	0	3	None	0	Number (1)	0=Unchecked, 1=None, 2=Few, 3=Many

Other Checks:

- See the Latitude/Longitude/Elevation sections for more range checks

Lilac Site Location:

Entry	Min	Max	Units	Missing	Data Type	Notes
Shrub ID	1	9	N/A	N/A	Number (1)	
Distance to ATM Instrument Shelter	0	9999	meters		Number (6,1)	
Direction of Site to Instrument Shelter	0	8	N/A	0	Number (1)	0=Unchecked, 1=N, 2=NE, 3=E, 4=SE, 5=S, 6=SW, 7=W, 8=NW
Elevation Difference	-300.0	6000.0	meters		Number (5,1)	
Shrub Name	N/A	N/A	N/A		Varchar2 (32)	
Shrub Type	N/A	N/A	N/A		Number (1)	1=Colonial, 2=Common
Date shrub planted	1997	Current date	N/A		Date	Prior to 1997 indicates a mature plant- no data may be entered if 'Before 1997' is checked.
Height at planting	0	200	centimeters		Number (3)	

Other Checks:

- An Atmospheric site where precipitation measurements are taken must be chosen

Green Up / Green Down Site Location (GRN):

Entry	Min	Max	Units	Missing	Data Type	Notes
Distance of Site to Instrument Shelter	0	10000	meters	-9	Number (5)	
Direction of Site to Instrument Shelter	0	8	N/A	0	Number (1)	0=Unchecked, 1=N, 2=NE, 3=E, 4=SE, 5=S, 6=SW, 7=W, 8=NW
Elevation difference between Site and Instrument Shelter	-99999	+99999	meters	-9	Number (5,1)	
Type of Vegetation	N/A	N/A	None	XXXX	Char (1)	T=Tree, G=Grass, S=Shrub
Genus	N/A	N/A	None	XXXX	Char (4)	Alphabetic
Species	N/A	N/A	None	XXXX	Char (4)	Alphabetic
Common Name	N/A	N/A	None	XXXX	Varchar2 (32)	Alphabetic

Other Checks:

- Type of Site is required
- Species is left blank for Grasses
- See the Latitude/Longitude/Elevation sections for more range checks

Latitude/Longitude/Elevation:

Entry	Min	Max	Units	Missing	Data Type	Notes
Data Source	0	2	None	0	Number (1)	0=Unchecked, 1=GPS, 2=Other
*Latitude	0.0000	90.0000	degrees	-99.0	Number (6,4)	Calculated
*Longitude	0.0000	180.0000	degrees	-99.0	Number	Calculated

					(7,4)	
*Minutes	0.00	59.00	minutes	-99.0	Number (4,2)	
*Elevation	-300.0	6000.0	meters	-99.0	Number (5,1)	

Other Checks:

- Minutes are required if degrees are entered
- Name, Site Type, and Data Source are required if Latitude and Longitude are entered
- If either Latitude or Longitude is entered, they both must be entered
- If Latitude and Longitude, or Elevation are missing, put up a message reminding them to enter that information later
- For Study Sites, beyond 100 km distance from school location a warning message is displayed if they have javascript enabled for the school to accept the distance or not
- Entered Elevation is used to compute a Geoid Corrected Elevation. This Geoid - Corrected Elevation becomes the default elevation for the site

MUC:

Entry	Min	Max	Units	Missing	Data Type	Notes
Classification	0000	9999	None	XXXX	Varchar2 (4)	
Name	N/A	N/A	N/A	X	Varchar2 (64)	
MUC Source	N/A	N/A	N/A	N/A	Char(1)	G=Ground Observation, M=Map Derivation, X=External Site, A=Anderson Derived (filled in automatically)

Other Checks:

- MUC Name not required even if MUC Classification entered
- See [MUC Classification](#).

General

- SchoolID, Site ID, Date Measured, Hour Measured are recorded for each entry
- At least one value per data entry page must be entered
- For numeric entries, only numbers are allowed
- A Study Site Location must be chosen for each data entry
- If they enter more digits after the decimal point than the database allows, it is rounded off