TECHNICAL NOTES

May 15, 1998

MO-1 Technical Note Number 3

Re: Classification - Vertic Subgroup Placement

In the Keys to Soil Taxonomy the Vertic subgroup criteria occurs high in the subgroup keys. The Vertic placement criteria is some form of cracking and slickensides or wedge-shaped aggregates OR a linear extensibility of 6.0 cm or more between the mineral soil surface and 100 cm or a densic, lithic or paralithic contact.

The first criteria is observable in the field. The second criteria is an engineering test of linear extensibility. This linear extensibility for soils dominated by smectitic clays can be approximated by multiplying the horizon thickness in centimeters by a Coefficient of Linear Extensibility (COLE) value. The range in values are associated with shrink-swell classes used on SOI-5 and LEP in the horizon table in NASIS; see pg 618-22.

Shrink-swell	LEP	COLE	Smectitic Value
Low	0.0 - 2.9	0.00 - 0.03	.03
Moderate	3.0 - 5.9	0.04 - 0.06	.06
High	6.0 - 8.9	0.07 - 0.09	.09
Very High	9.0 - 30.0	0.10 -	.12

The calculation for a soil series or pedon should be based on the official series description pedon or model pedon for the survey.

Example 1

Depth	(cm)	Texture	Shrink-swell	LEP	COLE	Smectitic Value
0-12	(12)	L	LOW	1.5	0.00-0.03	.03
12-30	(18)	L	MODERATE	4.5	0.04-0.06	.06
30-50	(20)	CL	MODERATE	5.0	0.04-0.06	.06
50-100	(50)	C	HIGH	7.5	0.07-0.09	.09
100-125	(25)	C	HIGH	8.0	0.07-0.09	.09
125-135	(10)	R	-	-	-	-

Thickness		Value		LE
12	x	.03	=	0.36
18	x	.06	=	1.08
20	x	.06	=	1.20
50	x	.09	=	4.50
100 cm				7.14

Therefore it is assumed that the LE for the upper 100 cm of this profile is 7.1 cm and would quality as Vertic.

Example 2

Depth	(cm)	Texture	Shrink-swell	LEP	COLE	Smectitic Value
0-12	(12)	L	LOW	1.5	0.00-0.03	.03
12-30	(18)	L	MODERATE	4.5	0.04-0.06	.06
30-80	(50)	C	HIGH	7.5	0.07-0.09	.09
80-90	(10)	R	-	-	-	-

Thickness		Value		LE
12	x	.03	=	0.36
18	x	.06	=	1.08
50	x	.09	=	4.50
80 cm				5.94

Therefore it is assumed that the LE for this profile is 5.9 and would not qualify as Vertic. This soil profile had bedrock at 80 cm or 32 inches; had bedrock been at 35 inches, the pedon would have qualified as Vertic. Soil series that are in a fine, smectitic family and that are 20 to 40 inches deep to bedrock or densic material may or may not qualify as Vertic depending on the depth to bedrock and thickness of horizons.

Summary:

- Soils that are in a fine family and over 40 inches deep will typically be Vertic if the fine textured horizons are relatively thick.

- Soils that are in a fine family and 20 to 40 inches deep will be more variable as to Vertic or non-Vertic.

- Depend on depth to bedrock or densic material and thickness of horizons. Pedon selection is critical for the classification.