

Quick Guide to ArcNLET-Py Vadose Zone Profile Output



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11/19/2025

VZMOD Module

- The VZMOD module generates an output profile file that contains detailed information about vadose-zone processes.
- These profile results provide valuable insights into how water and nutrients move and transform within the vadose zone.
- The text file includes,
 - Unsaturated soil water content
 - Correction factors of nitrification and denitrification rates
 - Concentrations of $\text{NH}_4\text{-N}$, $\text{NO}_3\text{-N}$, and $\text{PO}_4\text{-P}$

Geoprocessing [minimize] [maximize] [close]

← 3-VZMOD (Optional) (+)

Parameters Environments (?)

Types of contaminants
Nitrogen [v]

Single or multiple OSTDS
Single OSTDS [v]

Soil types
Clay [v]

Concentration of $\text{NH}_4\text{-N}$ [mg/L] 60

Concentration of $\text{NO}_3\text{-N}$ [mg/L] 1

Depth to water table [cm] 150

Output profile results (text file)
C:\Users\Wei\Results.txt [folder icon]

▸ Hydraulic Parameters

▸ **Nitrification Parameters**

▸ Denitrification Parameters

▸ $\text{NH}_4\text{-N}$ Adsorption Parameters

▸ Dispersion, Bulk Density and Temperature

VZMOD Module

- OSTDS shapefile
- Results.txt

	FID	Shape *	OSTDS_ID
1	0	Point	0
2	1	Point	1
3	2	Point	2
4	3	Point	3
5	4	Point	4
6	5	Point	5
7	6	Point	6
8	7	Point	7
9	8	Point	8
10	9	Point	9
11	10	Point	10

results.txt - Notepad

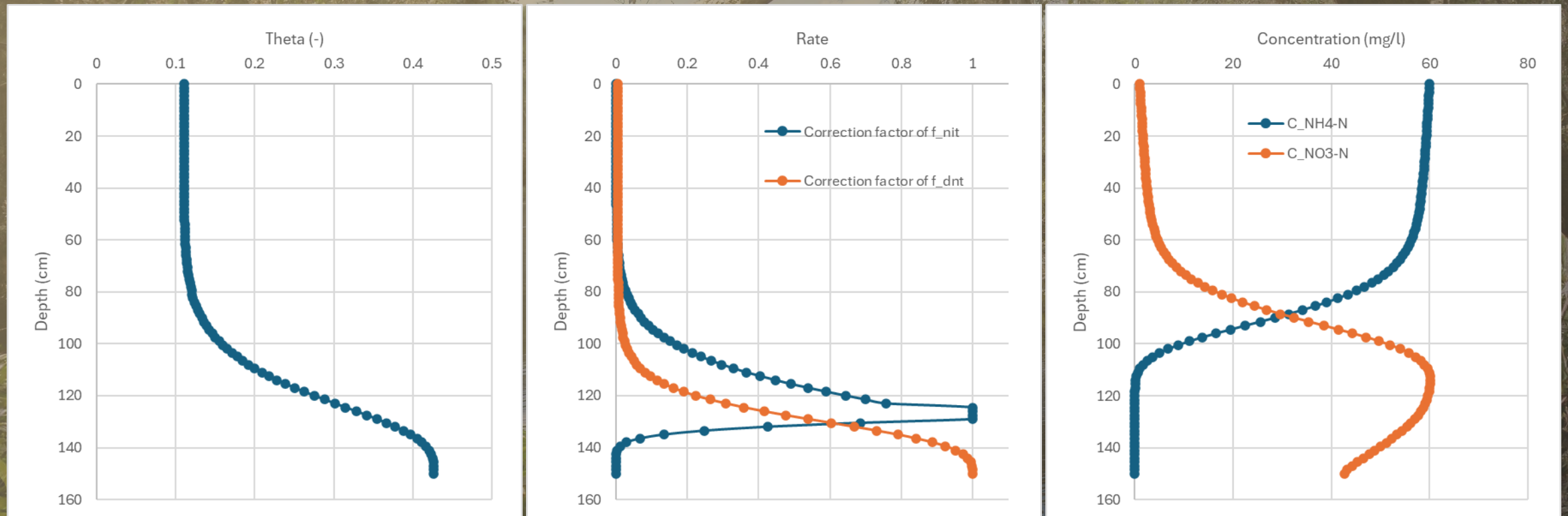
File Edit Format View Help

ArcMLET VZMOD Module

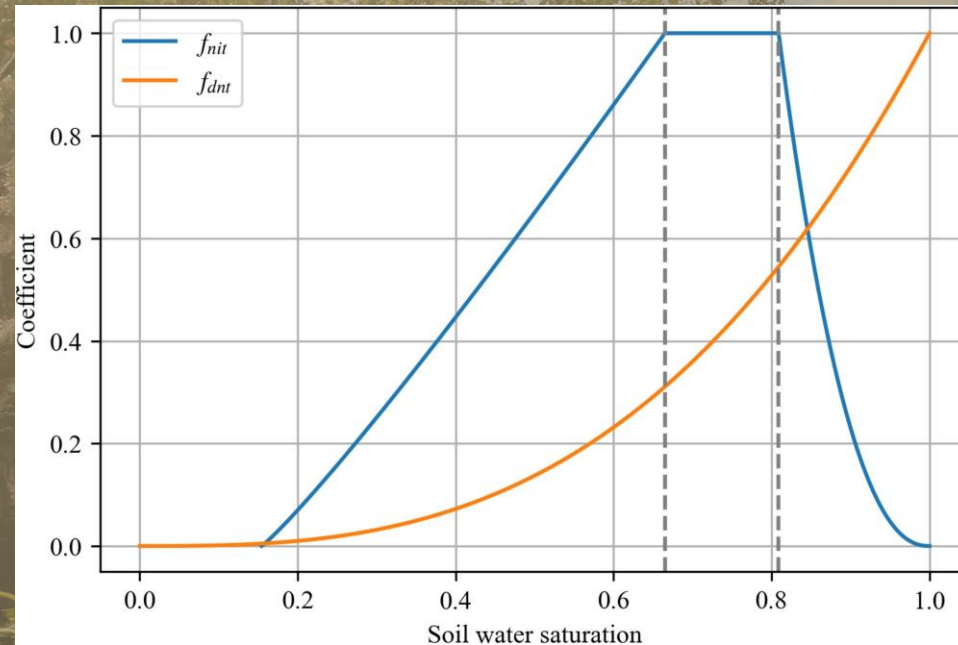
Calculating for septic tank 0

Depth(cm)	Theta	PSW_Nit	PSW_Dnt	C_NH4-N(mg/l)	C_NO3-N(mg/l)
0.00	0.111	0.001	0.005	59.992	1.008
1.50	0.111	0.001	0.005	59.944	1.056
3.00	0.111	0.001	0.005	59.896	1.104
4.50	0.111	0.001	0.005	59.848	1.152
6.00	0.111	0.001	0.005	59.799	1.201
7.50	0.111	0.001	0.005	59.751	1.249
9.00	0.111	0.001	0.005	59.702	1.298
10.50	0.111	0.001	0.005	59.653	1.347
12.00	0.111	0.001	0.005	59.604	1.396
13.50	0.111	0.001	0.005	59.554	1.445
15.00	0.111	0.001	0.005	59.505	1.495
16.50	0.111	0.001	0.005	59.454	1.545
18.00	0.111	0.001	0.005	59.404	1.596
19.50	0.111	0.001	0.005	59.352	1.647
21.00	0.111	0.001	0.005	59.301	1.699
22.50	0.111	0.001	0.005	59.248	1.751
24.00	0.111	0.001	0.005	59.194	1.805

VZMOD Module



VZMOD Module



Relations between correction factors for nitrification rate and denitrification rate with soil water saturation in sandy soil (McCray et al., 2010)

https://atmos.eoas.fsu.edu/~mye/VZMOD/users_manual.pdf

McCray, J., Geza, M.G., Lowe, K., Tucholke, M., Wunsch, A., Roberts, S., Drewes, J., Amador, J., Atoyan, J., Kalen, D., Loomis, G., Boving, T., Radcliffe, D., 2010. Quantitative tools to determine the expected performance of wastewater soil treatment units: guidance manual. Water Environment Research Foundation. Alexandria, VA.