

Quick Guide to ArcNLET-Py Vadose Zone Profile Output



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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 NH₄-N, NO₃-N, and PO₄-P

Geoprocessing 3-VZMOD (Optional) Parameters Environments

Types of contaminants Nitrogen

Single or multiple OSTDS Single OSTDS

Soil types Clay

Concentration of NH₄-N [mg/L] 60

Concentration of NO₃-N [mg/L] 1

Depth to water table [cm] 150

Output profile results (text file) C:\Users\Wei\Results.txt

Hydraulic Parameters
Nitrification Parameters
Denitrification Parameters
NH₄-N Adsorption Parameters
Dispersion, Bulk Density and Temperature

VZMOD Module

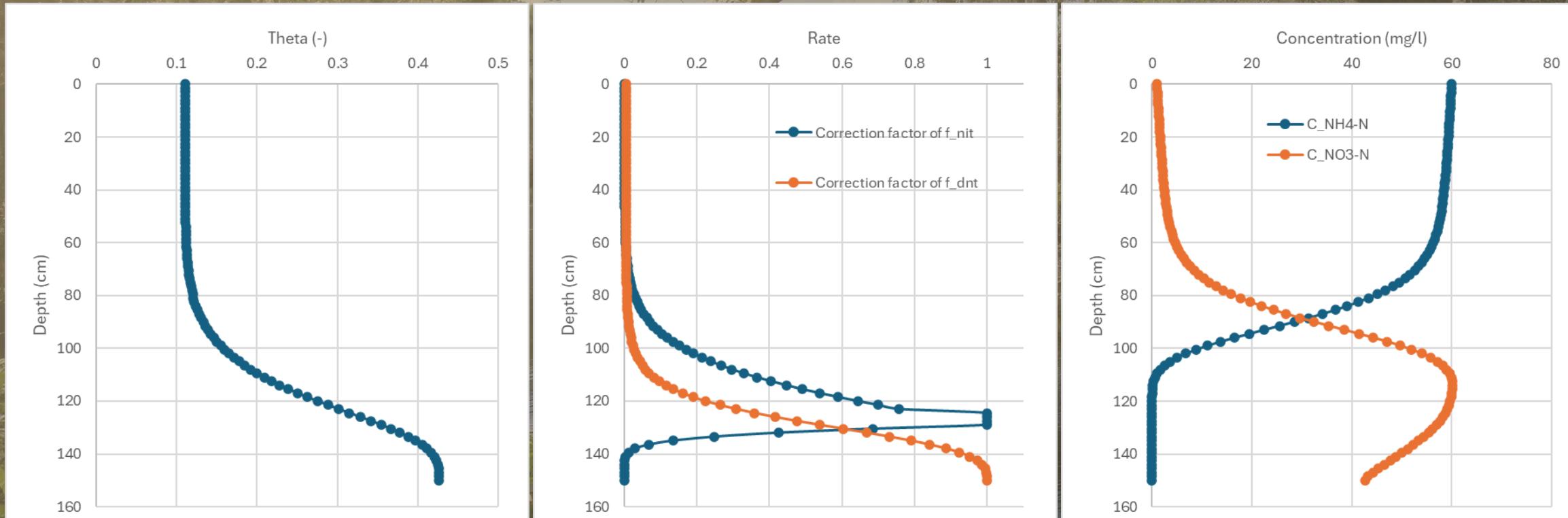
- OSTDS shapefile

	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

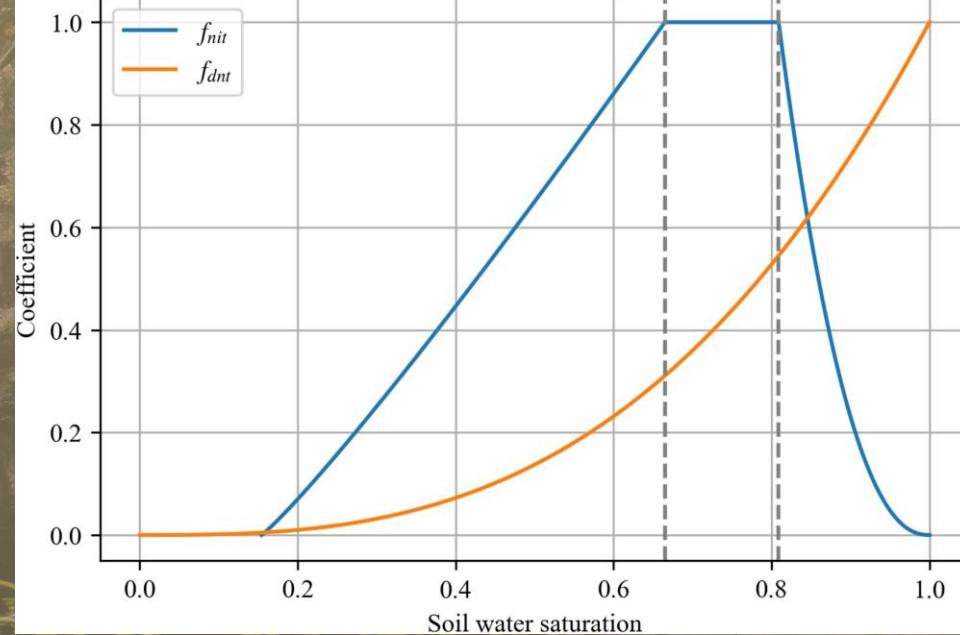
- Results.txt

Calculating for septic tank 0						
Depth(cm)	Theta	PSW_Nic	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



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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.