UPDATES

July 22, 2024

Notes

- TGUS maybe performs as well alone as any model
  - 93-94% predicting accuracy

Investigating detection limit

Results - binary classification accuracy (detected or nondetected)

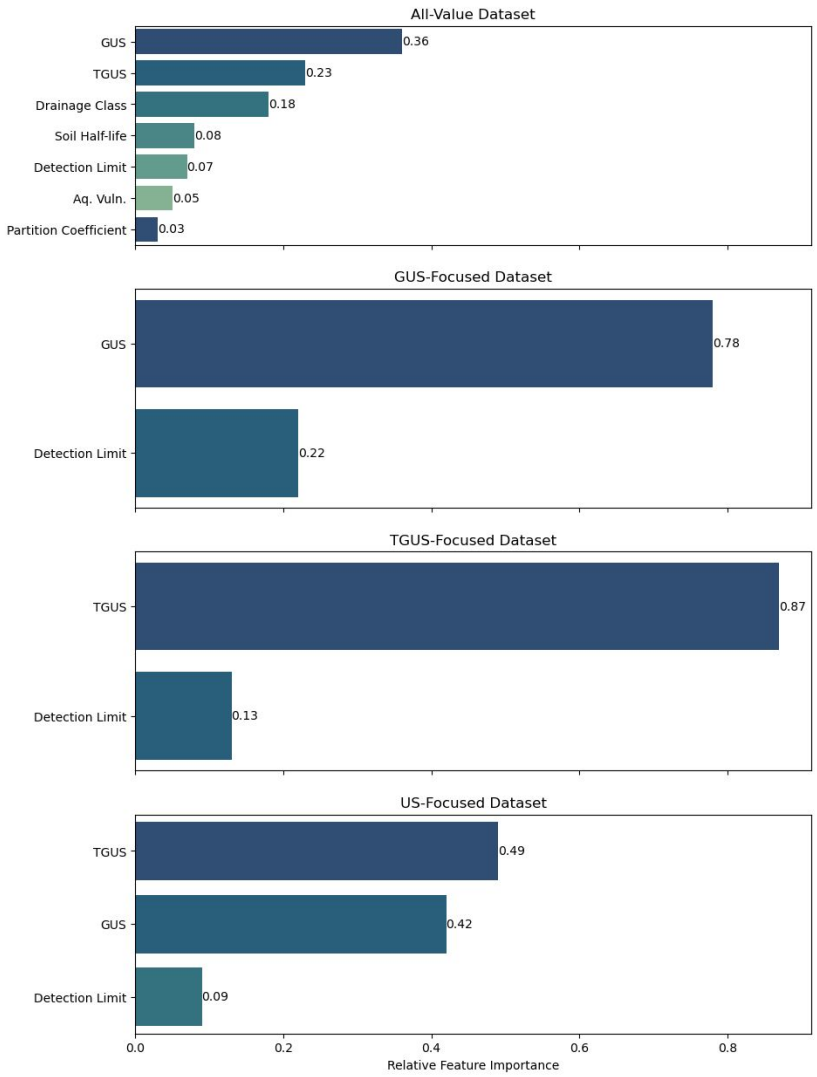
- **All**: GUS, TGUS, drainage class, aquifer vulnerability, soil half-life, koc, detection limit
- **GUS Focus**: GUS, detection limit
- **TGUS Focus**: TGUS, detection limit
- **US Focus**: GUS, TGUS, detection limit

	Avg. Train %	Avg. Validation %	Avg. Test %	Best Sc. Train %	Best Sc. Validation %	Best Sc. Test %
All	97.2	96.5	94.3	96.6	97.4	98.7
GUS Alone	92.6	95.5	92.4	91	94.9	98.7
TGUS Alone	97	95.3	93.5	97.4	93.6	98.7
US Focus	96.9	96.1	93.4	96.2	96.2	97.5

- same performance in testing outcomes
- **GUS Focus** worse in training
- GUS just as good with detection limit, aquifer vulnerability, or drainage class?

Feature Importances (FI)

- same effect on GUS vs TGUS with detection limit



Minerals - sand %

Results - binary classification accuracy (detected or nondetected)

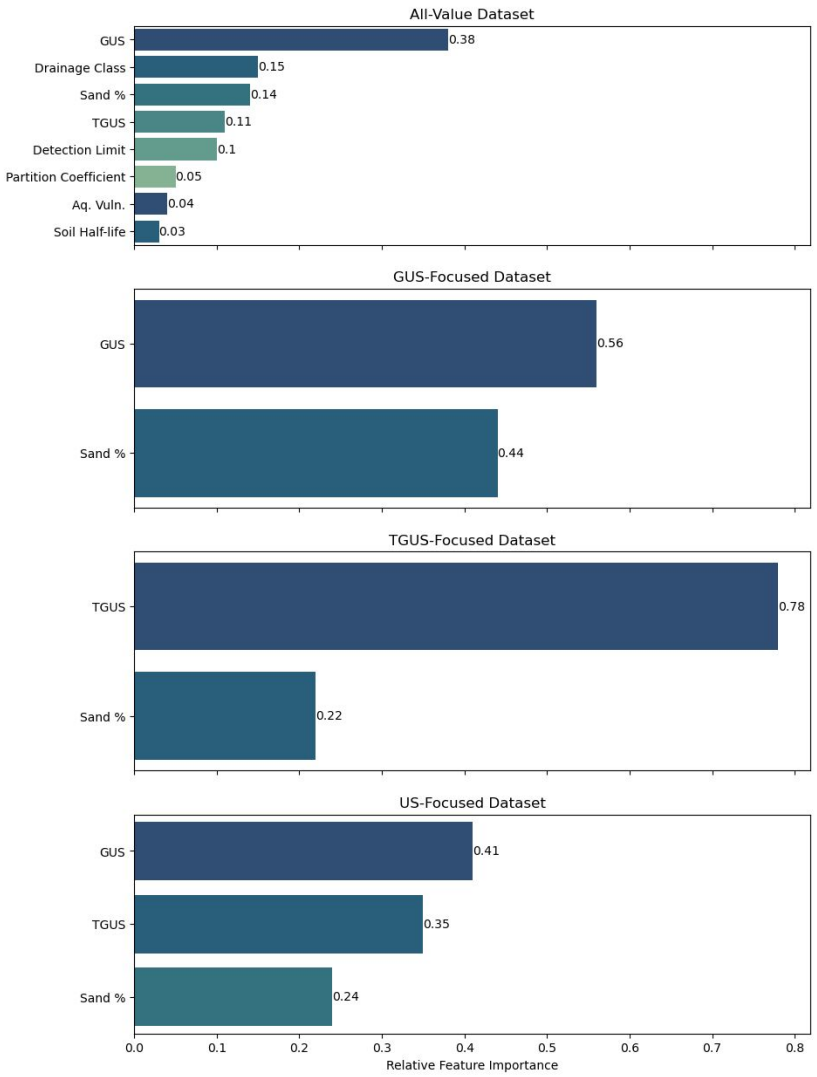
- **All**: GUS, TGUS, drainage class, aquifer vulnerability, soil half-life, koc, detection limit, sand %
- **GUS Focus**: GUS, sand %
- **TGUS Focus**: TGUS, sand %
- **US Focus**: GUS, TGUS, sand %

	Avg. Train %	Avg. Validation %	Avg. Test %	Best Sc. Train %	Best Sc. Validation %	Best Sc. Test %
All	97.6	96.2	93.7	97	93.6	100
GUS Alone	96.7	96.3	93.8	96.6	97.4	98.7
TGUS Alone	97.6	96	93.8	97	96.2	98.7
US Focus	97.5	96.1	93.6	97.4	93.6	98.7

- sand % only improves **GUS Focus**
- TGUS capturing sand %

Feature Importances (FI)

- TGUS capturing sand % (recall last updates)



Minerals - silt %

Results - binary classification accuracy (detected or nondetected)

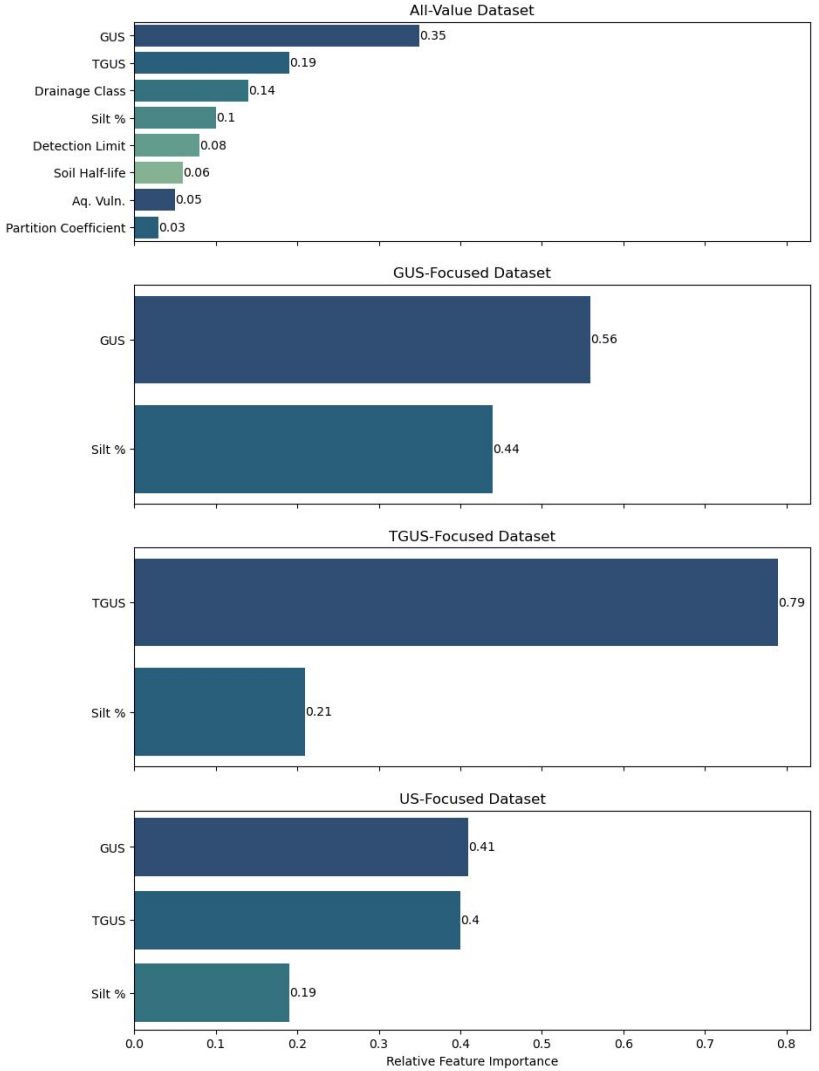
- **All**: GUS, TGUS, drainage class, aquifer vulnerability, soil half-life, koc, detection limit, silt %
- **GUS Focus**: GUS, silt %
- **TGUS Focus**: TGUS, silt %
- **US Focus**: GUS, TGUS, silt %

	Avg. Train %	Avg. Validation %	Avg. Test %	Best Sc. Train %	Best Sc. Validation %	Best Sc. Test %
All	97.6	96.2	93.6	97.4	92.3	98.7
GUS Alone	96.7	96.5	93.6	95.7	96.2	97.5
TGUS Alone	97.5	96.4	93.2	97	93.6	98.7
US Focus	97.5	96.4	94.3	97.9	94.9	97.5

- silt % only improves **GUS Focus**
- TGUS capturing silt %

Feature Importances (FI)

- TGUS capturing silt %
- similar to sand but perhaps less



Minerals - clay %

Results - binary classification accuracy (detected or nondetected)

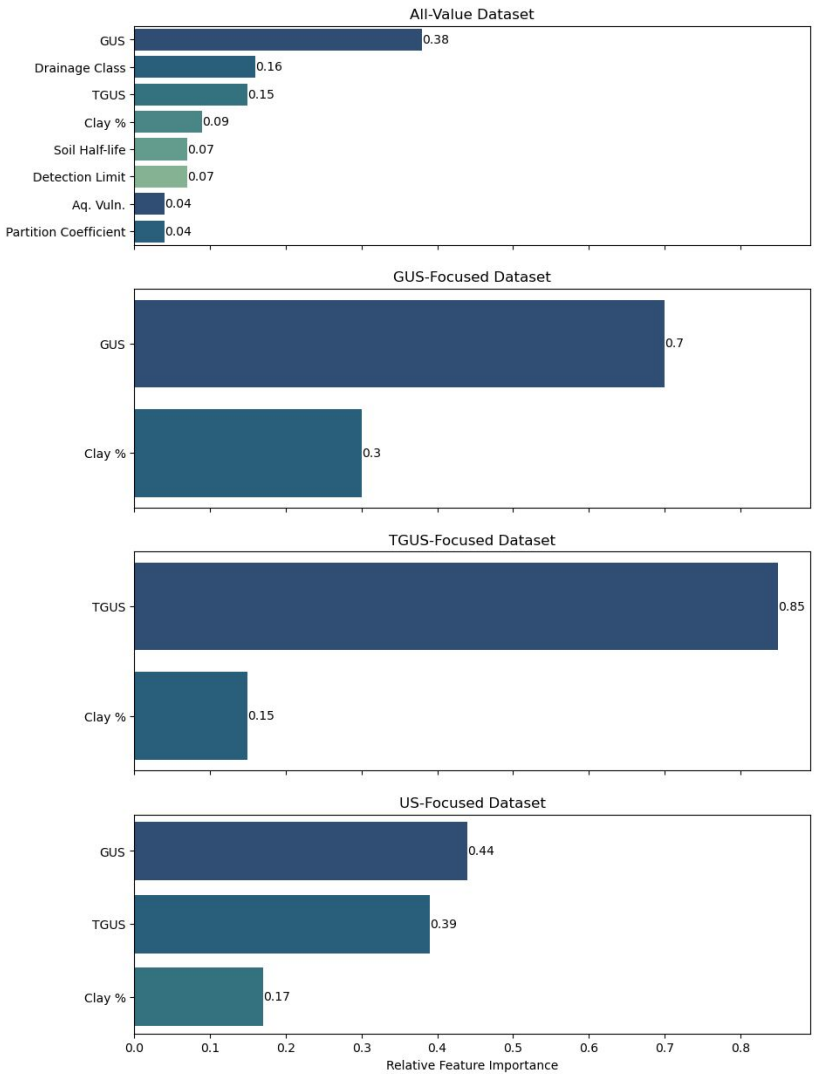
- **All**: GUS, TGUS, drainage class, aquifer vulnerability, soil half-life, koc, detection limit, clay %
- **GUS Focus**: GUS, clay %
- **TGUS Focus**: TGUS, clay %
- **US Focus**: GUS, TGUS, clay %

	Avg. Train %	Avg. Validation %	Avg. Test %	Best Sc. Train %	Best Sc. Validation %	Best Sc. Test %
All	97.6	95.9	93.4	97	93.6	100
GUS Alone	94.9	94.2	91.7	93.6	92.3	98.7
TGUS Alone	97.3	95.5	93.3	96.6	96.2	98.7
US Focus	97.5	95.9	93.4	97.4	93.6	98.7

- improves **GUS Focus** but not as much as other soil %'s
- TGUS capturing clay %

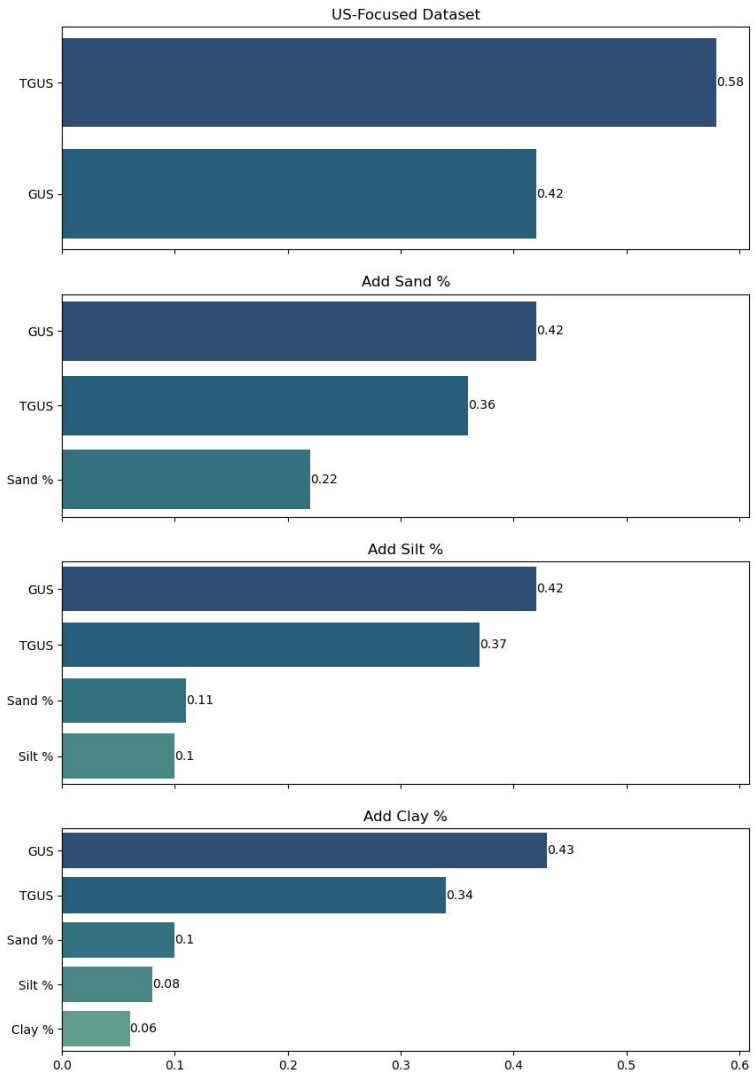
Feature Importances (FI)

- TGUS capturing clay %



Verification of Mineral Effects

- GUS remains unchanged
- TGUS capturing all mineral sizes - no improvement
- **TGUS is as good alone as any model**



Moving Forward

- present to DEC/final report?
- more features to try? (upgradient results)
- visualize tree/decision surfaces better
- verify results