



Legacy soil P

A mass balance approach in a 10- year mining experiment

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Experiment stream valley

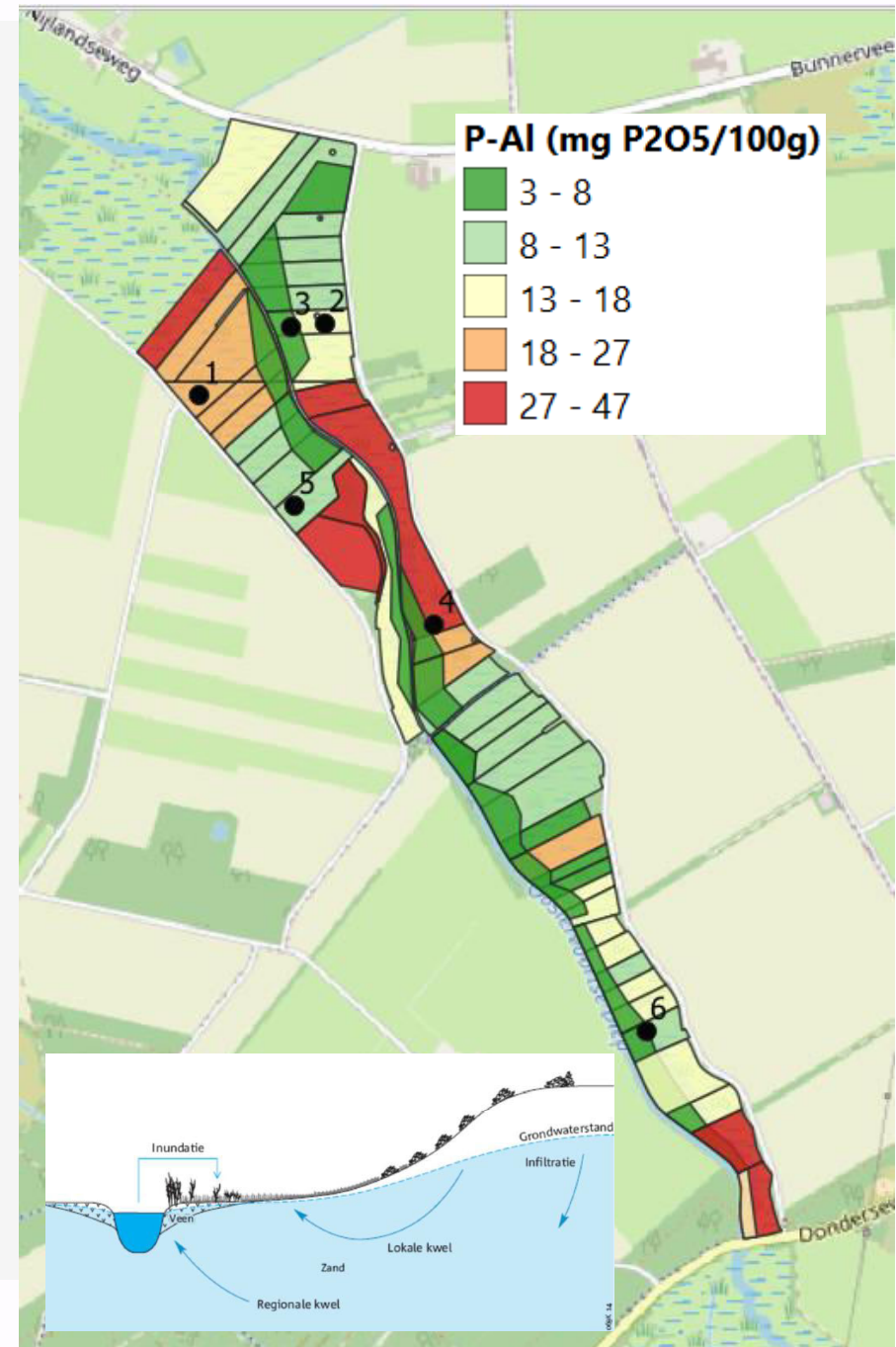
75ha mining experiment 2008 – 2021: 50 topsoil samples

6 locations, 10 years,

- 2 treatments: without and with N and K application

Locations vary in:

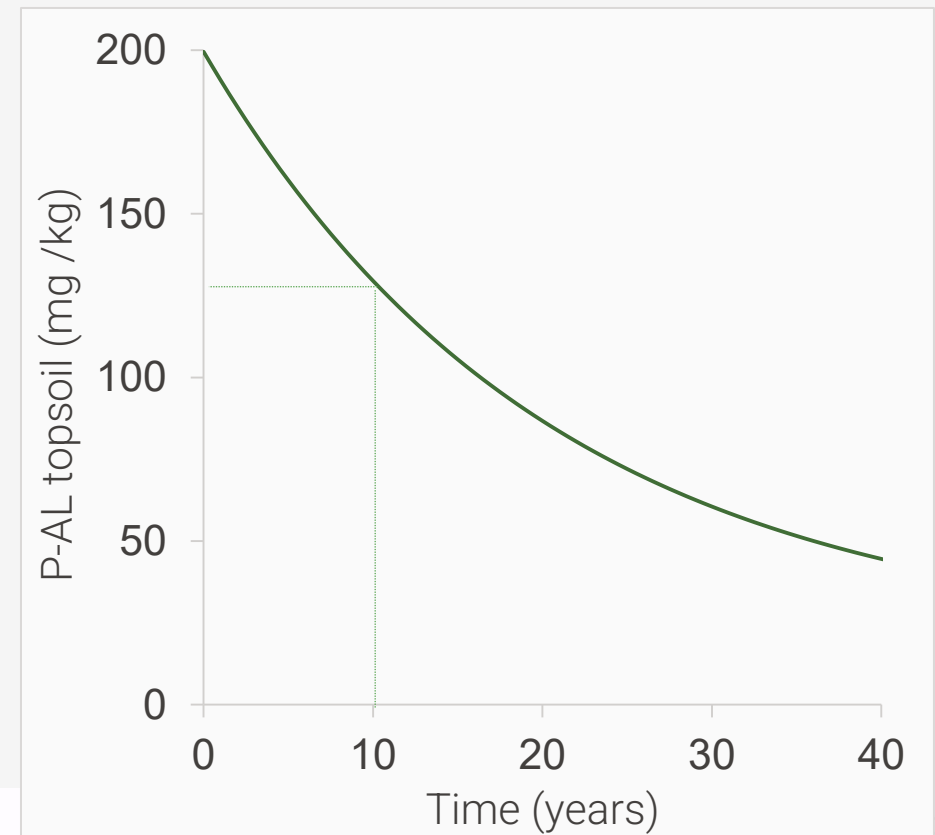
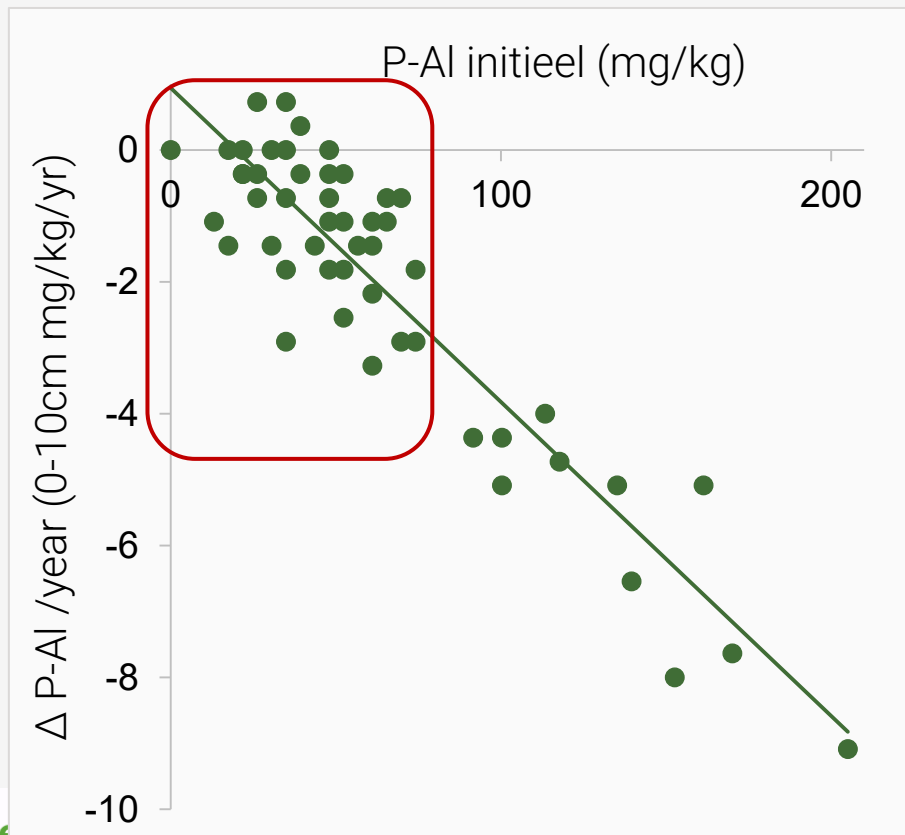
- Topsoil removal (2 locations)
- Moisture conditions (1 wet, 2 moist, 3 dry)
- Available and legacy P in topsoil and soil profile
- Soil type (1 peat, rest sand)



Decrease available P stream valley (75 ha, 12 yrs)

In 75 ha: P-mining leads to a decrease in available P in the topsoil

Rate of decrease is linearly related to initial available soil P and decreases over time

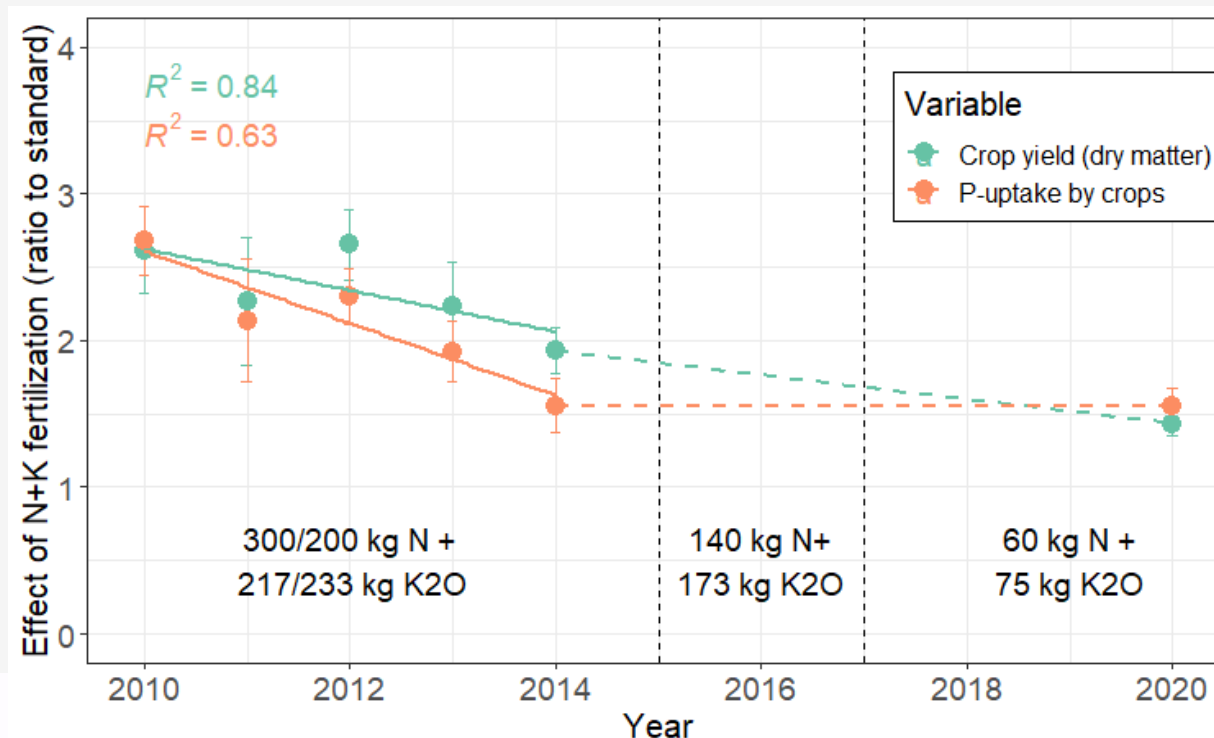


Difference with and without N&K fertiliser

Yield and P-removal are on average 2x as high with N en K fertiliser

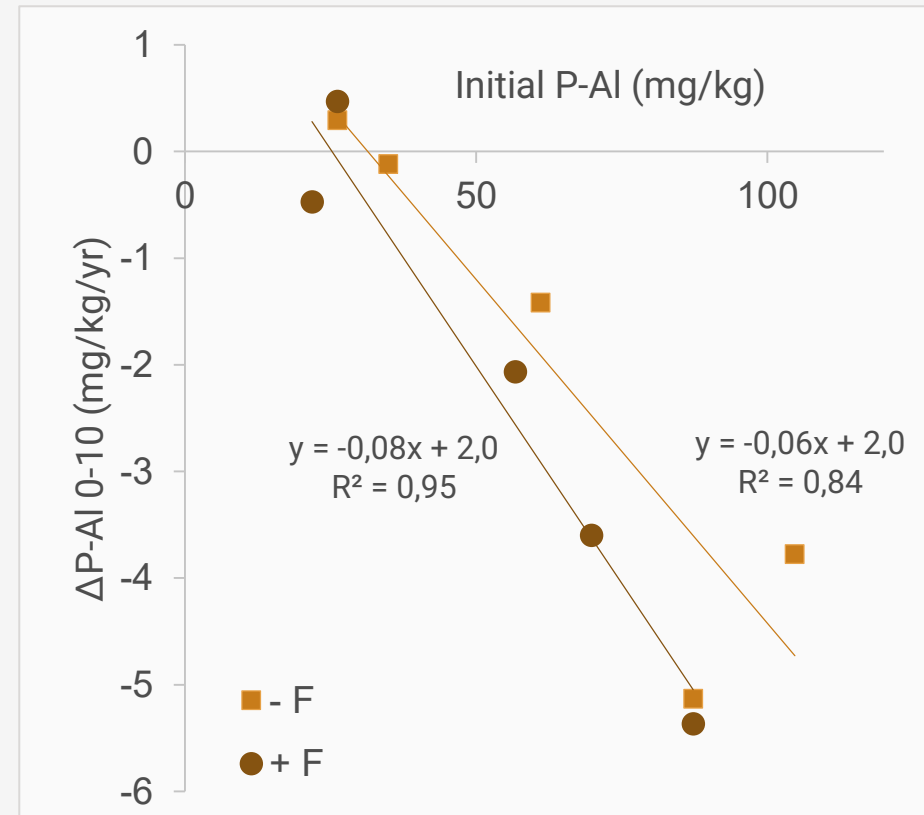
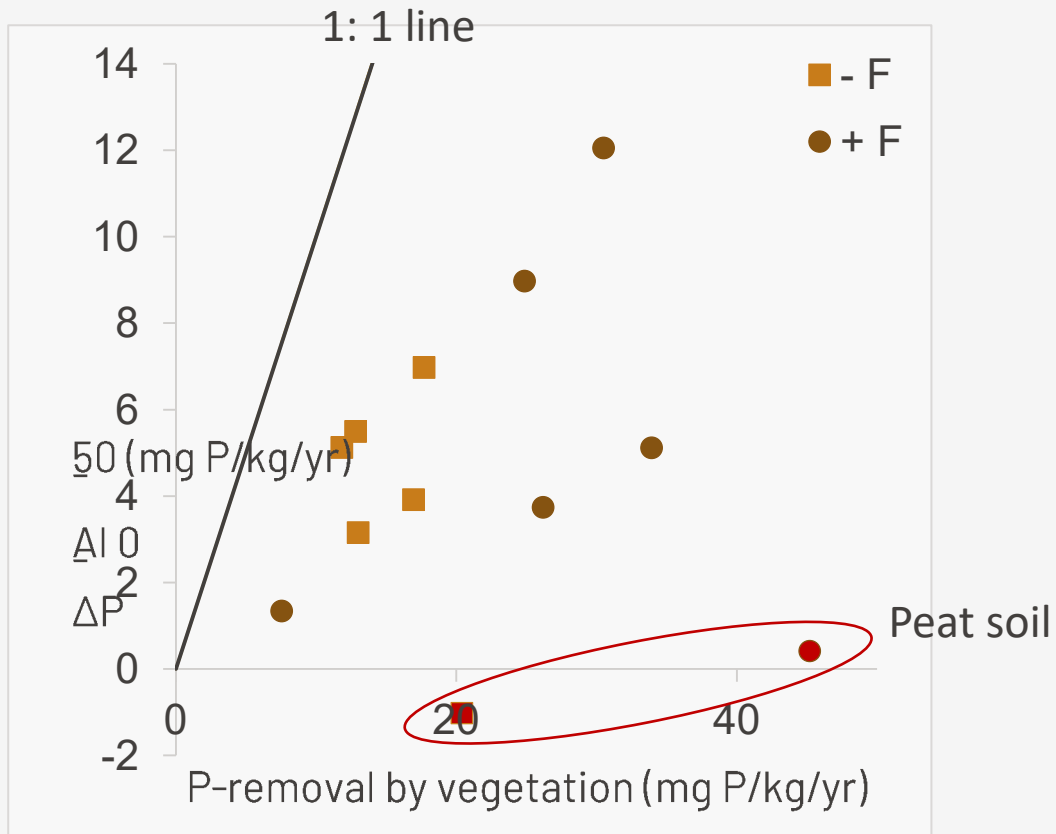
Effectiveness of fertiliser decreases over time mainly due to:

- a decrease in P-content of the grass
- not in yield (6 ton/ha -F and 12 ton/ha + F)



Mass balance available P

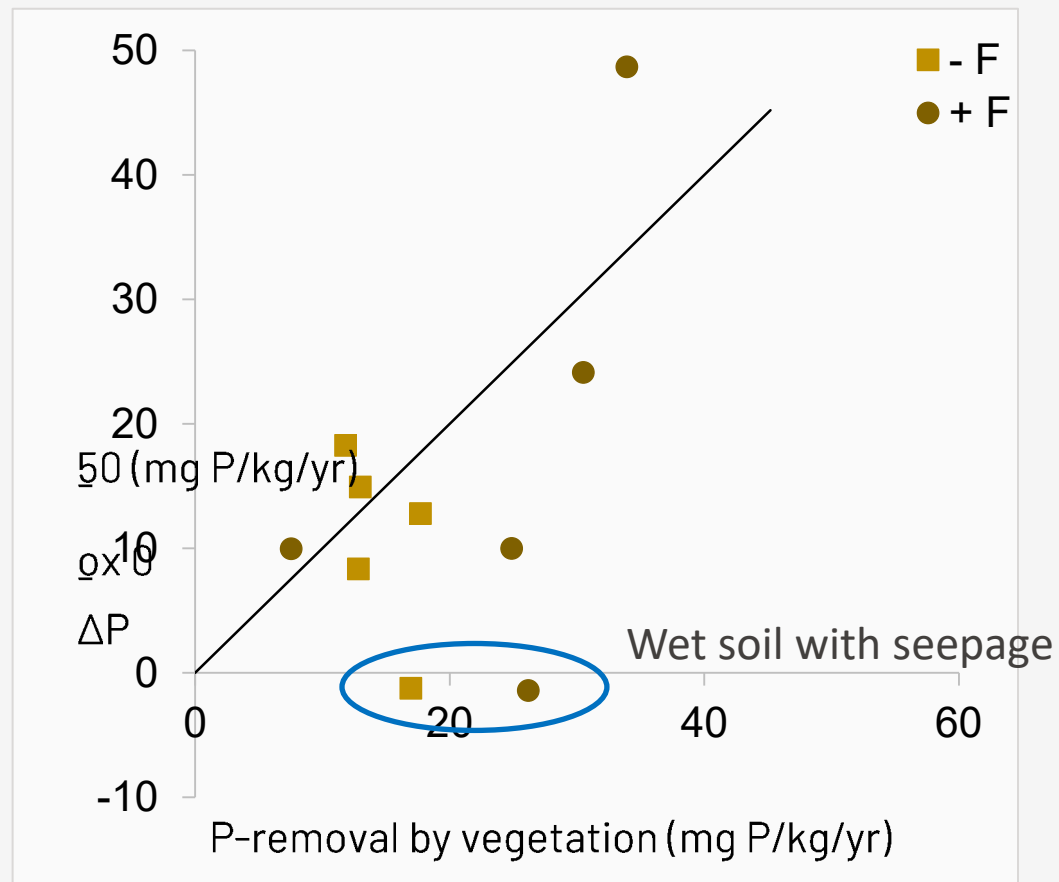
Sandy soils: decrease in available P (0-50cm) is a factor 2,5 – 7 lower than P-removal
Rate of decrease is a function of initial available P-content



Mass balance P-reserves (P-ox)

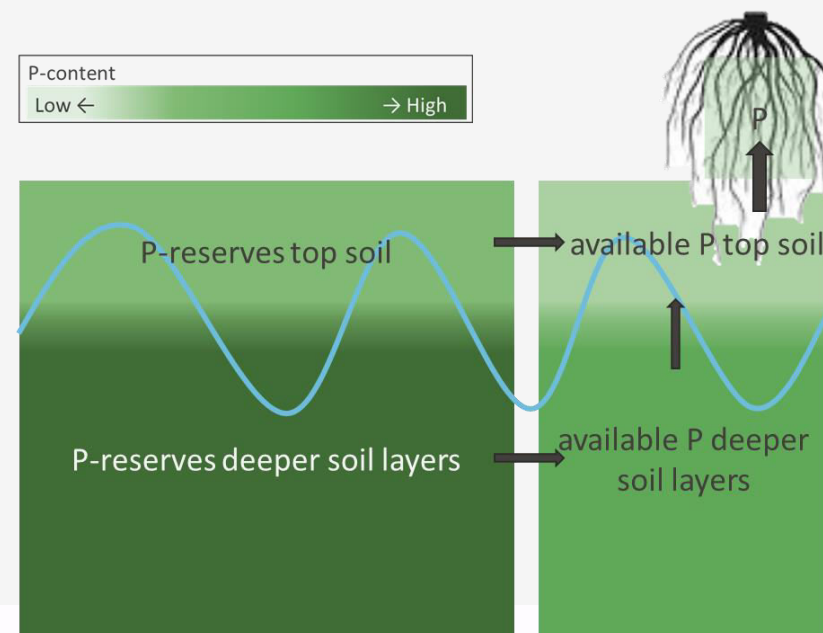
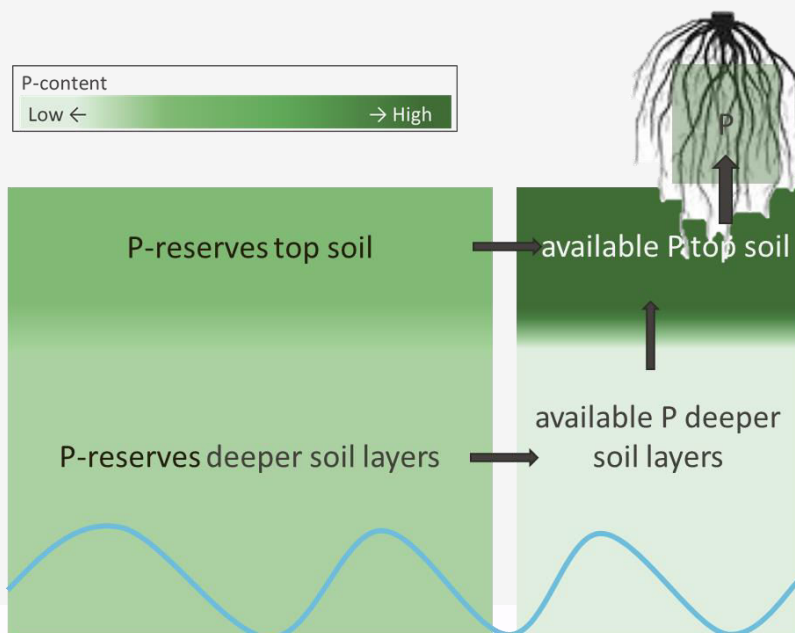
Decrease in available soil P reserves (P-ox) is of the same order of magnitude as the total P removal. Exceptions:

- Peat soil (not shown)
- Wet soil with seepage



Conclusions

- Effectiveness of mining P to remove legacy P depends on soil type and hydrological setting
- Effective on dry sandy soils with low buffering capacity from P reserves + deeper soil layers
- Development of interesting vegetation takes time >10 years
- Vary in measures within stream valley to create diversity



Questions or interested to know more details?

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