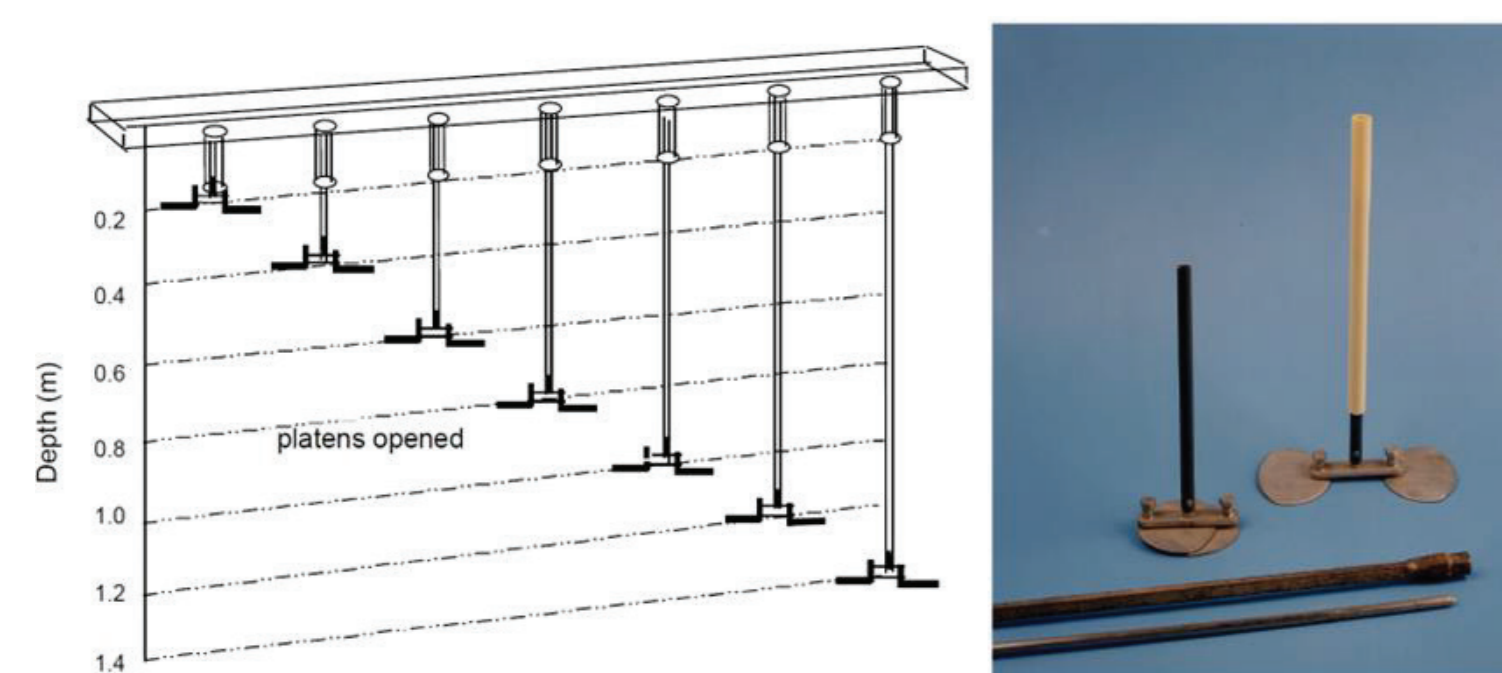


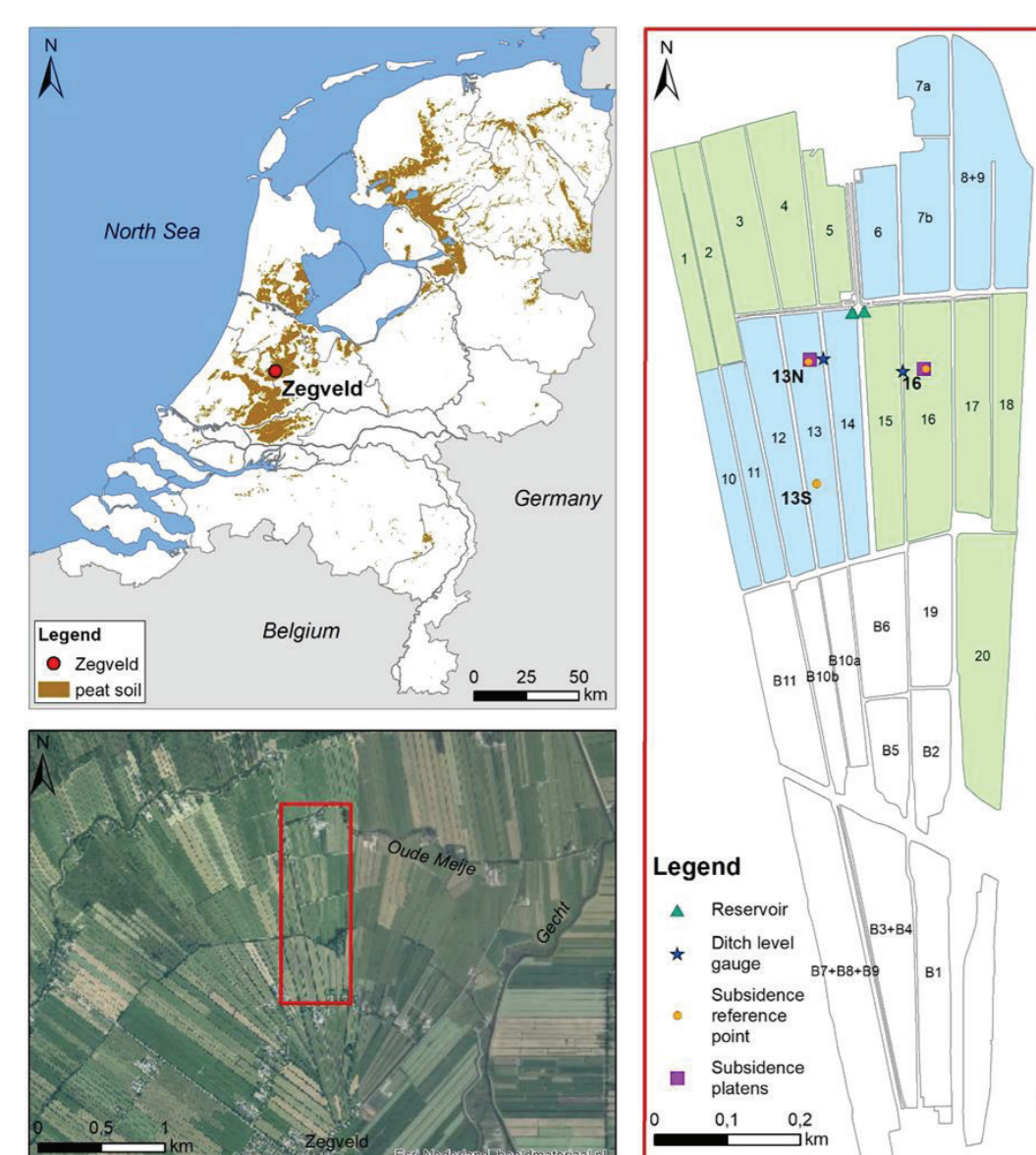
Introduction

Subsidence platens as method to:

- Measure long term subsidence
- Determine contribution depth intervals → processes (oxidation, shrinkage, consolidation, creep)
- Determine C-stock and CO₂ emission (In combination with C-profile)



Subsidence platens



Location of study area and map of measurement locations

Zegveld

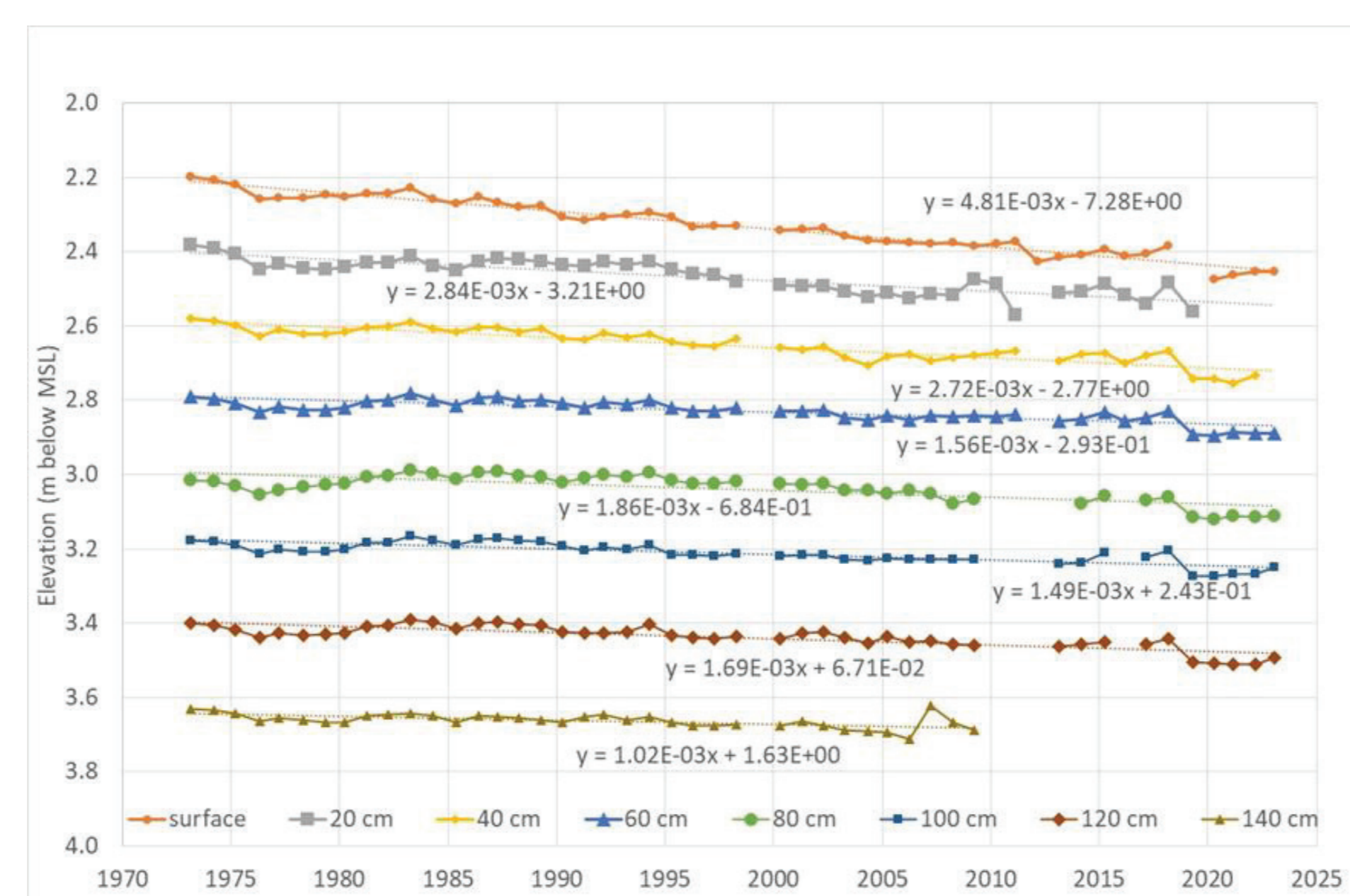
- 6 m wood-sedge peat
- Two ditch water levels; -55 cm (Parcel 16), -25cm (Parcel 13)
- 50+ years of yearly measurements

Method

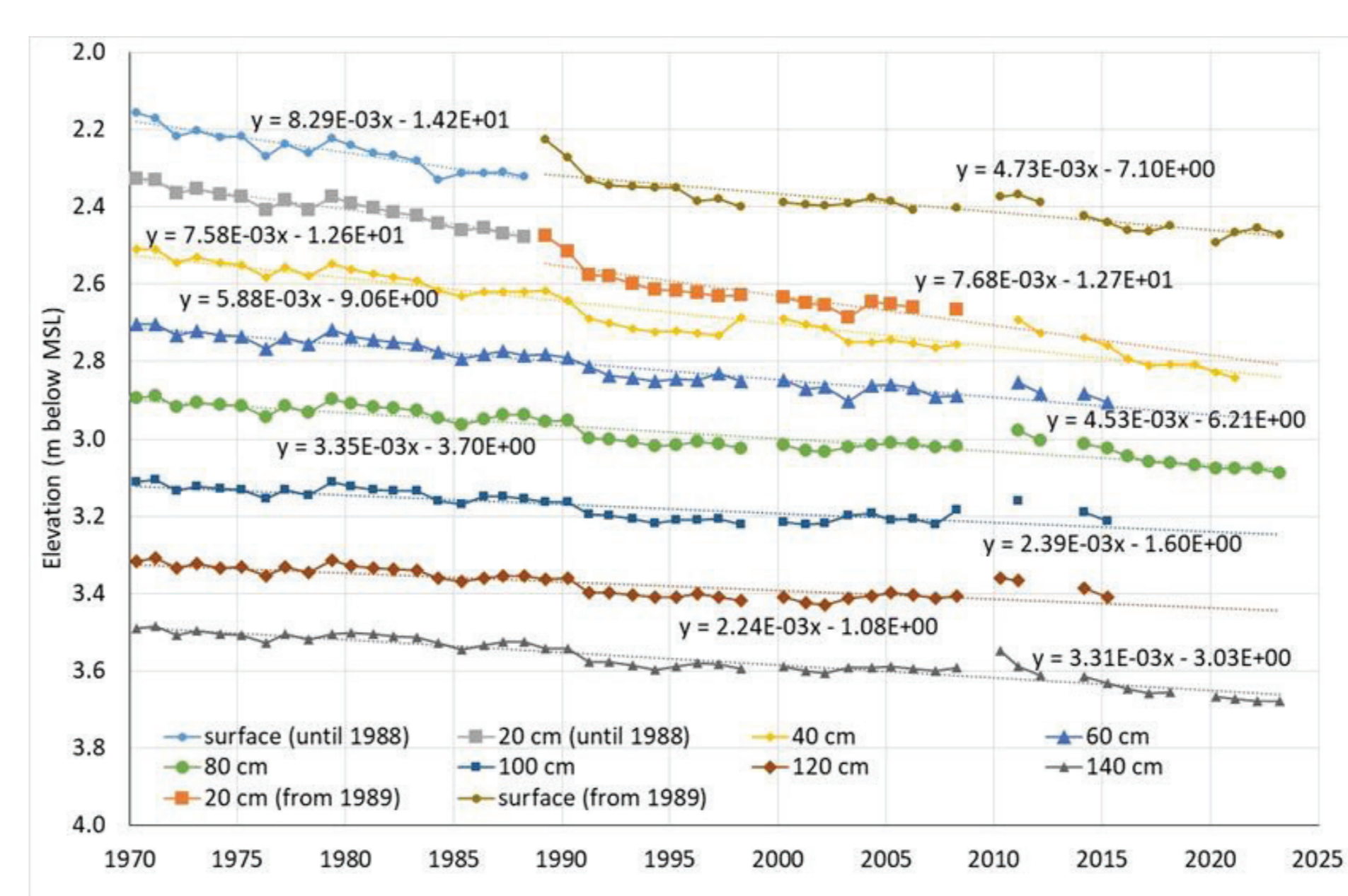
- Yearly levelling of subsidence platens in spring (to minimise effect of yearly fluctuations)
- Regression equations for platens at different depths
- Thickness of layers over time
- C-profile made in 1973, 1995 and 2021, density & C-content

Results

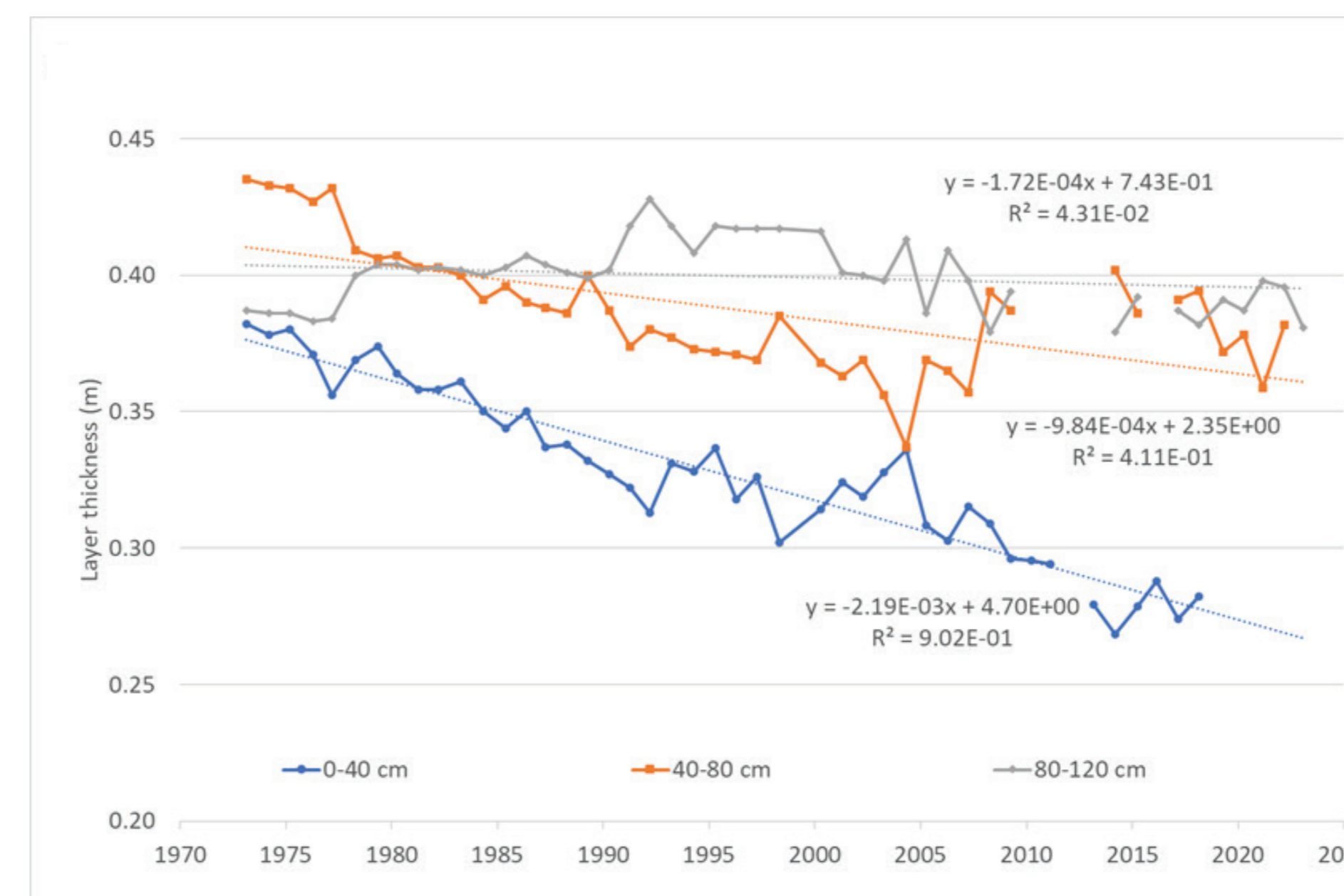
- P13 average surface subsidence 4.8 mm/yr, for P16 this is 5.8 mm/yr
- Using value of 2259 kg CO₂ ha⁻¹ yr⁻¹ (Van den Akker et al 2008) for CO₂ emission per mm land subsidence, we obtain 10.6 t CO₂ ha⁻¹ yr⁻¹ for P13, and 13.1 t CO₂ ha⁻¹ yr⁻¹ for P16.
- In P13 top 40 cm contributes most to subsidence, in P16 the 40-100 cm layer
- P16 indication of subsidence slowing down, P13 hardly
- C-profile resulted in average yearly CO₂-emission of 10.7 – 14.1 ton.ha⁻¹ for P13 and 18.8-19.6 ton.ha⁻¹ for P16 (Van den Akker et al 2021).



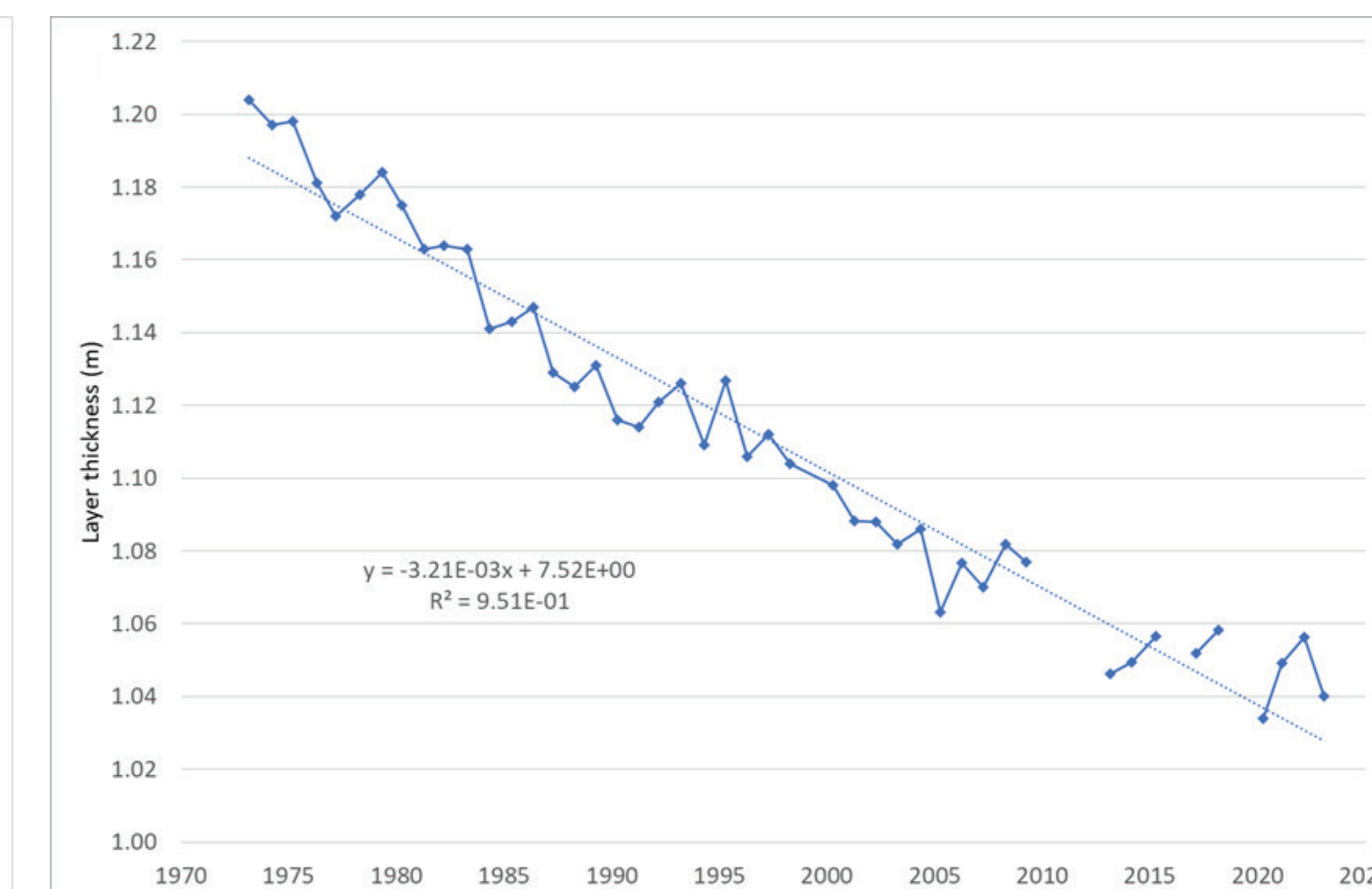
Elevation of subsidence platens over time, P13



Elevation of subsidence platens over time, P16



Change in thickness of layers 0-40, 40-80 and 80-120 cm over time, P13



Change in thickness of layer 0-120 cm over time, P13

Conclusions

- Surface subsidence rate smaller for higher ditch water level
- Subsidence at all depths, ongoing after 50 years
- 30-40% of subsidence below lowest GWL → consolidation & creep
- 60-70% oxidation, shrinkage
- Slightly lower, but reasonable, estimated CO₂ emissions based on subsidence than on C-profiles

References

- Van den Akker, J.J.H., Kuikman, P.J., De Vries, F., Hoving, I., Pleijter, M., Hendriks, R.F.A., Wolleswinkel, R.J., Simões, R.T.L., Kwakernaak, C., 2008. Emission of CO₂ from agricultural peat soils in the Netherlands and ways to limit this emission. Proc. 13th Int. Peat Congress, Tullamore, Ireland. IPS, Jyväskylä, Finland. ISBN 0951489046. pp 645-648.
- Van den Akker, J.J.H., Massop, H.T.L., Gerritsen, P., Gerritsen, F., Van Houwelingen, K.M., 2021. Evaluation of 50 years subsidence monitoring of a peat meadow parcel to compare several methods to determine CO₂ emissions. PO446, Eurosoil Conference, Geneva