



A detailed palaeosol record of Middle and Upper Pleistocene from the central part of the Volyn' Upland (the NW Ukraine)



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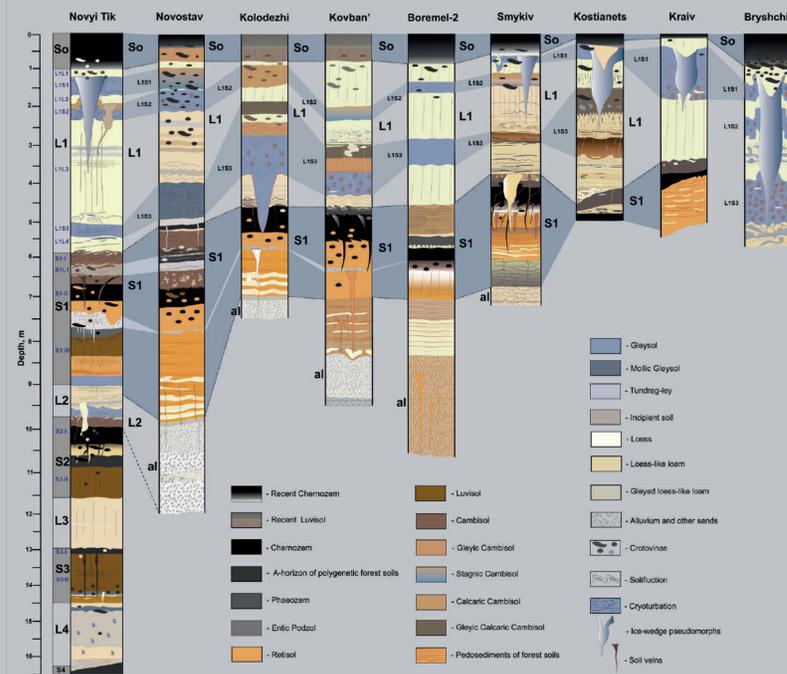
Introduction

The Volyn' Upland is a "loess island" in the middle of the European loess belt. In the previously studied sections of this region, the Pleistocene palaeosols are mainly polygenetic; therefore, the pedocomplexes comprise no more than two soils. The study of the sections located both on the slopes of the river valleys and in the buried gullies, contributed to detailed stratigraphy of the pedocomplexes.



Map adapted from Lehmkuhl et al., 2021

Three pedocomplexes have been distinguished in the sections, which, according to palaeopedological and palynological data, were tentatively correlated with MIS 5, 7 and 9, respectively.



Pedocomplex III (S3, MIS 9)

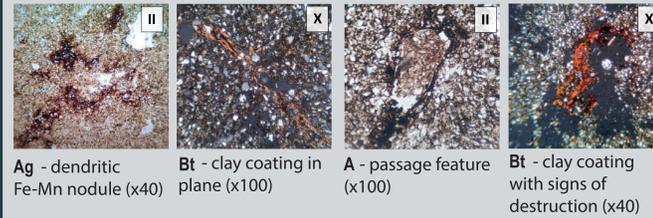
Novyi Tik



The lower pedocomplex (S3, MIS 9) comprises two soils. The lower soil (S3-II) is a Luvisol with multi-phased clay coatings in the Bt horizon. However, micro-morphology detects a clear primary A horizon with abundant coprolites. The upper soil (S3-I) has a well-developed A horizon and Ag horizon in the depression. However, clay coatings in the Bt horizon testify to the clay translocation.

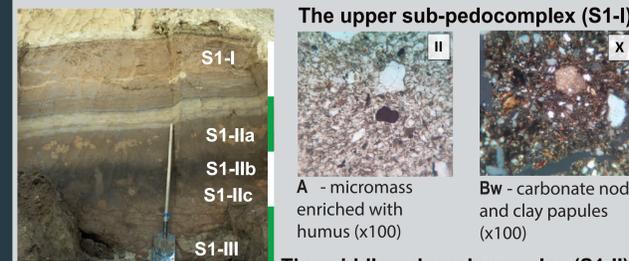
The upper soil (S3-I)

The lower soil (S3-II)

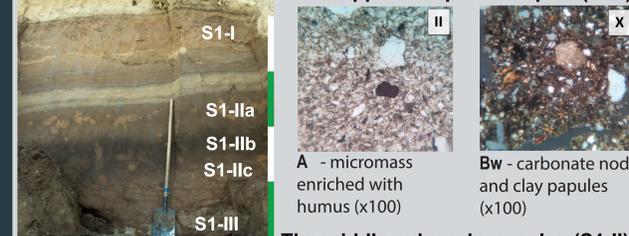


Pedocomplex I (S1, MIS 5)

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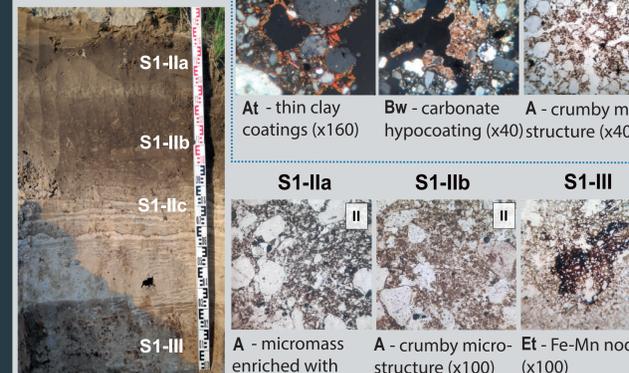


The upper sub-pedocomplex (S1-I)



The middle sub-pedocomplex (S1-II)

Boremel-2



S1-IIa: A - thin clay coatings (x160)
S1-IIb: Bw - carbonate hypocoating (x40)
S1-IIc: A - crumby micro-structure (x40)

S1-Ila: A - micromass enriched with humus, crumby microstructure (x100)
S1-Ilb: A - crumby micro-structure (x100)
S1-Ill: Et - Fe-Mn nodule (x100)

Pedocomplex II (S2, MIS 7)

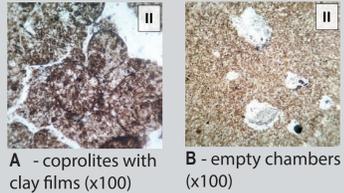
Novyi Tik



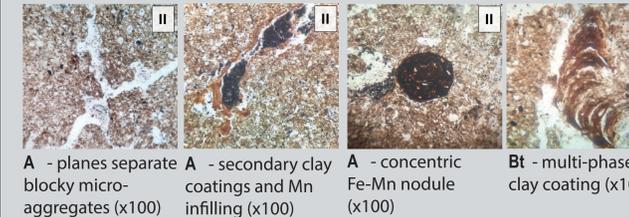
The upper soil (S2-Ia)



The upper soil (S2-Ib)



The lower soil (S2-II)



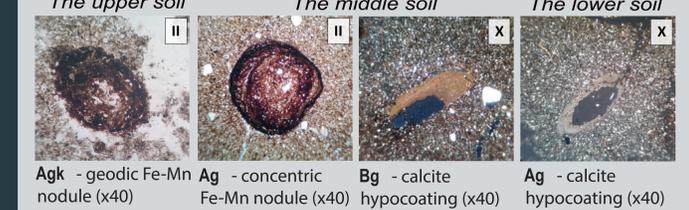
Loess I (L1, MIS 2-4)

Three Gleysols have been distinguished in the upper thick loess unit (L1, MIS 2-4). The lower Gleysol (MIS 3) is better developed and mostly polygenetic; in places the soil turns into a pedocomplex consisting of two or three soils: the lower Gleysol, the middle Gleyic Cambisol and the upper Calcic Cambisol. The middle Gleysol appears to be polygenetic, as evidenced by palynology and micromorphology. Large ice-wedge pseudomorphs are associated with the upper Gleysol, which makes it possible to interpret soil as tundra-gley.

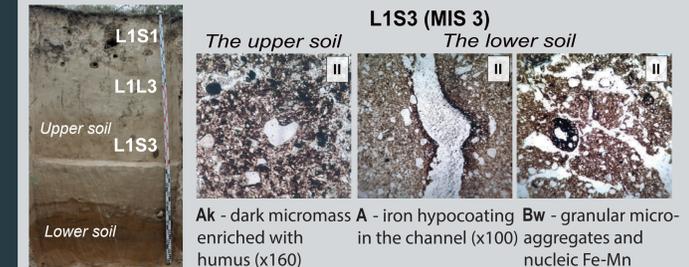
Kovban'



L1S3 (MIS 3)
The upper soil: Agk - iron hypo-coatings (x40)
The middle soil: Agk - parallel striated b-fabric (x40)
The lower soil: Agk - calcite hypocoating (x40)

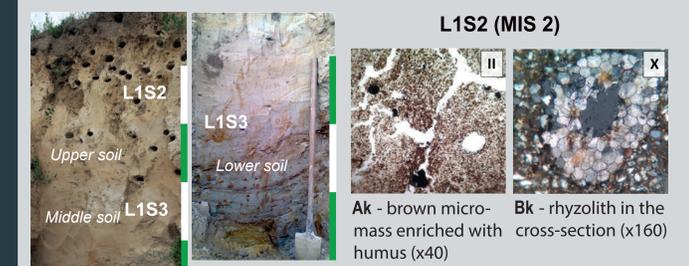


Kostianets



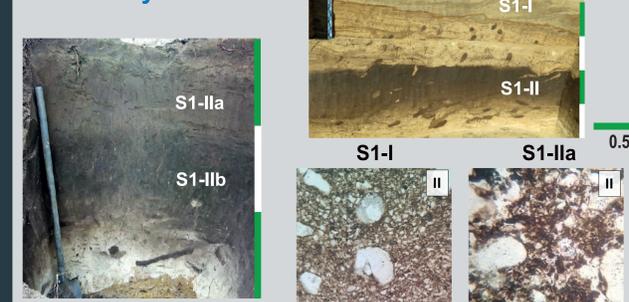
L1S3 (MIS 3)
The upper soil: Ak - dark micromass enriched with humus (x160)
The lower soil: A - iron hypocoating in the channel (x100), Bw - granular micro-aggregates and nucleic Fe-Mn nodule (x40)

Kolodezhi



L1S2 (MIS 2)
The upper soil: Ak - brown micromass enriched with humus (x40)
The middle soil: Agk - rhyzolith in the cross-section (x100)
The lower soil: Agk - striated b-fabric (x100), Bgk - calcite hypocoatings in the channels (x40)

Novyi Tik



S1-I: A - massive micro-structure (x100)
S1-Ia: A - crumby micro-structure (x100)
S1-Ib: Bt - clay coatings (x64)
S1-Ic: Bt - clay coatings (x100)
S1-Illa: S1-Illb: S1-Illc: S2