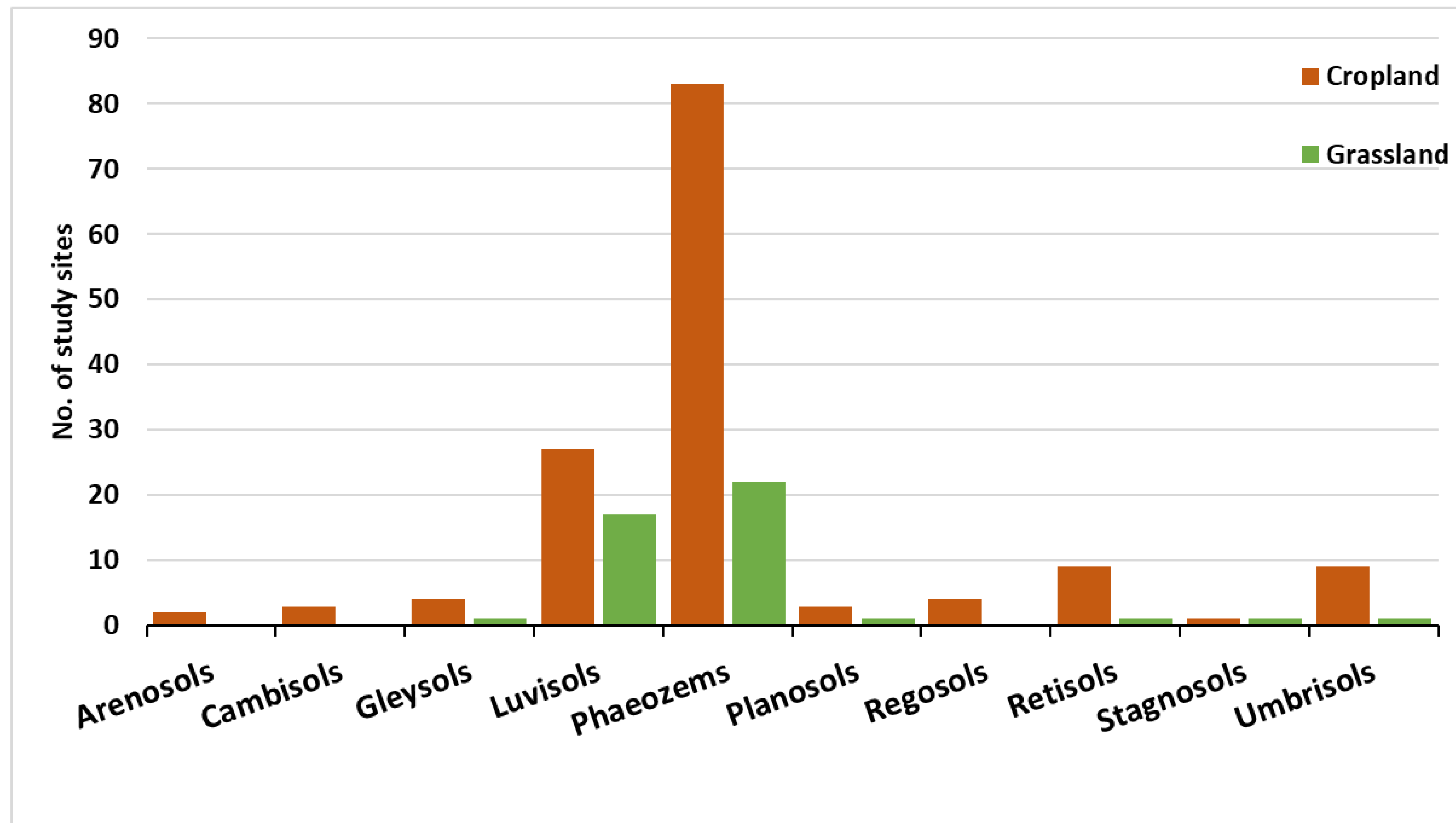
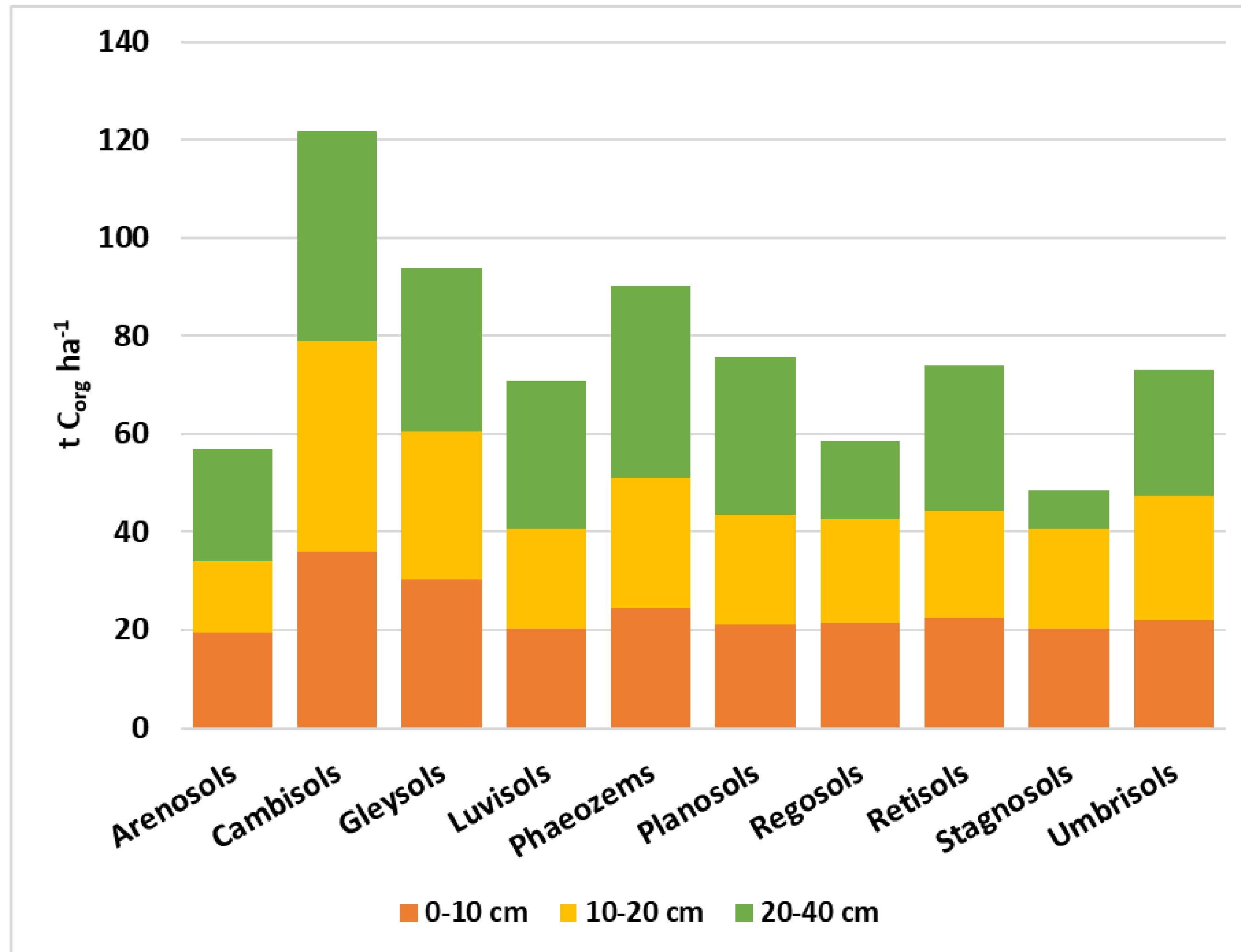


Activity 2.1. Soil carbon stock on agricultural land in automorphic soils, including evaluation of modeled soil carbon stock change data

Soil types in our study sites according to the WRB classification



Organic C stock in cropland



Statistically significant differences:

Phaeozems vs Luvisols

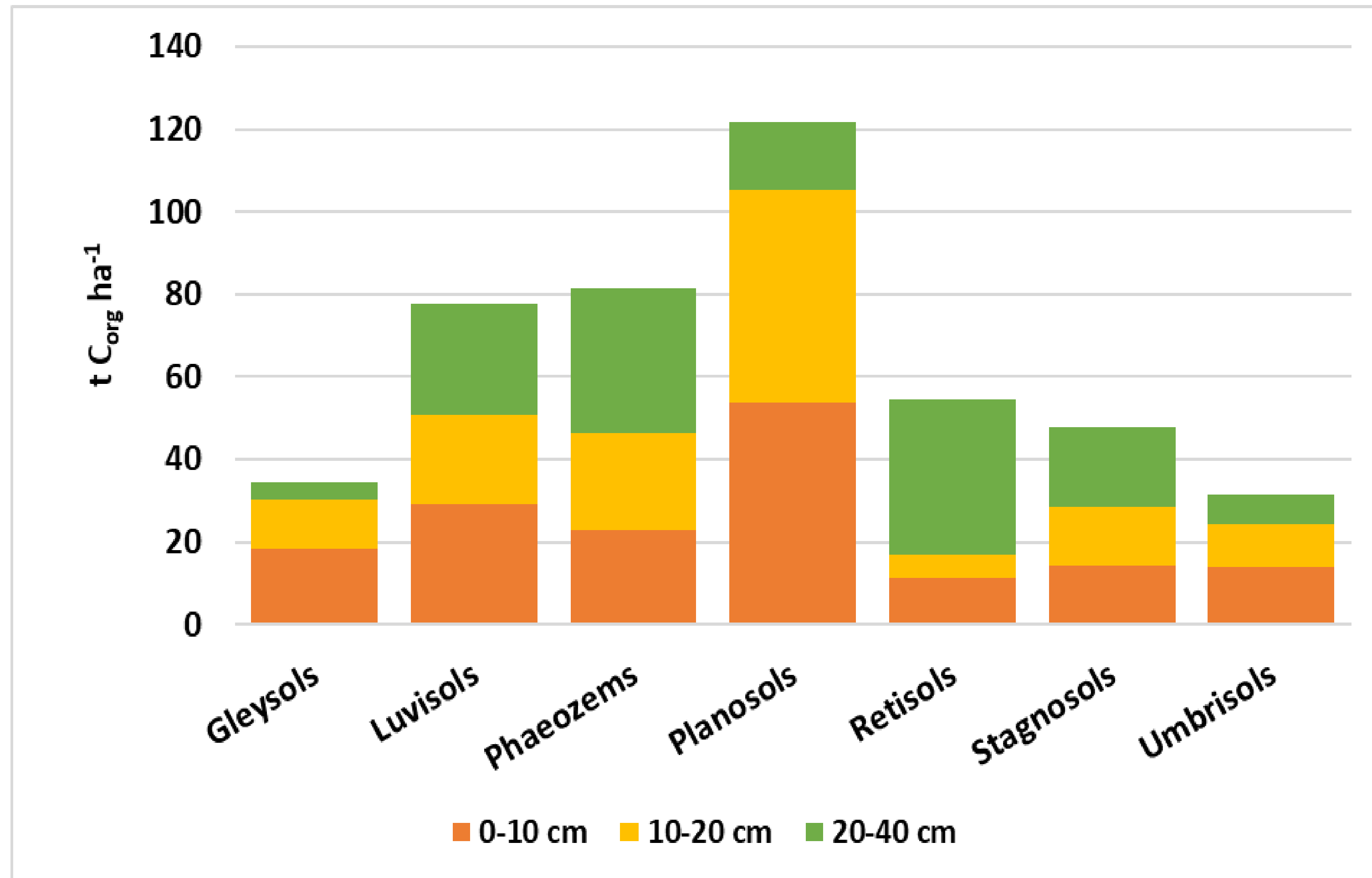
- 0-10 cm, $p=0.041$
- 10-20 cm, $p=0.0015$
- 20-40 cm, $p=0.018$

Cambisols vs Luvisols

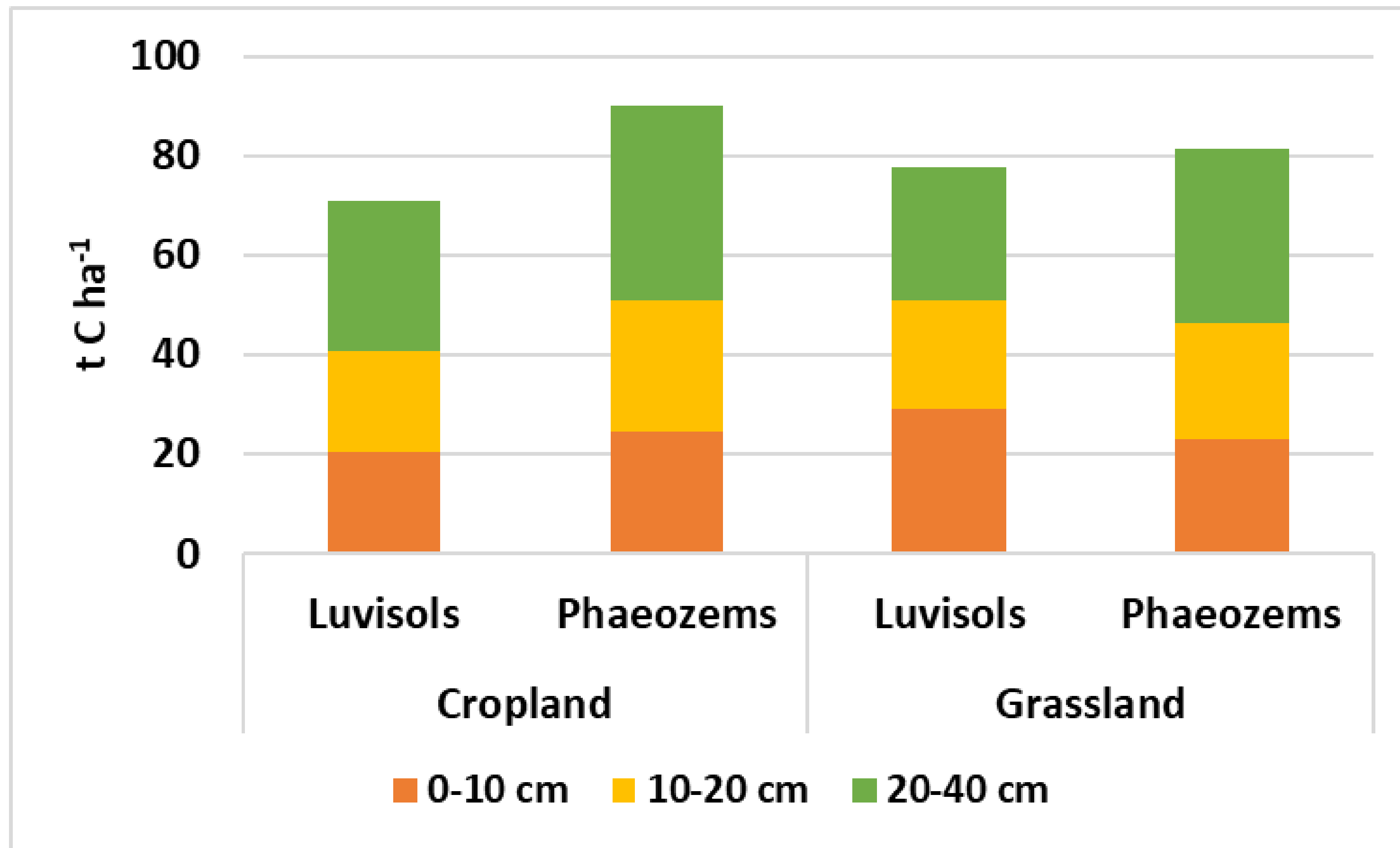
- 10-20 cm, $p=0.0090$



Organic C stock in grassland



Cropland vs Grassland

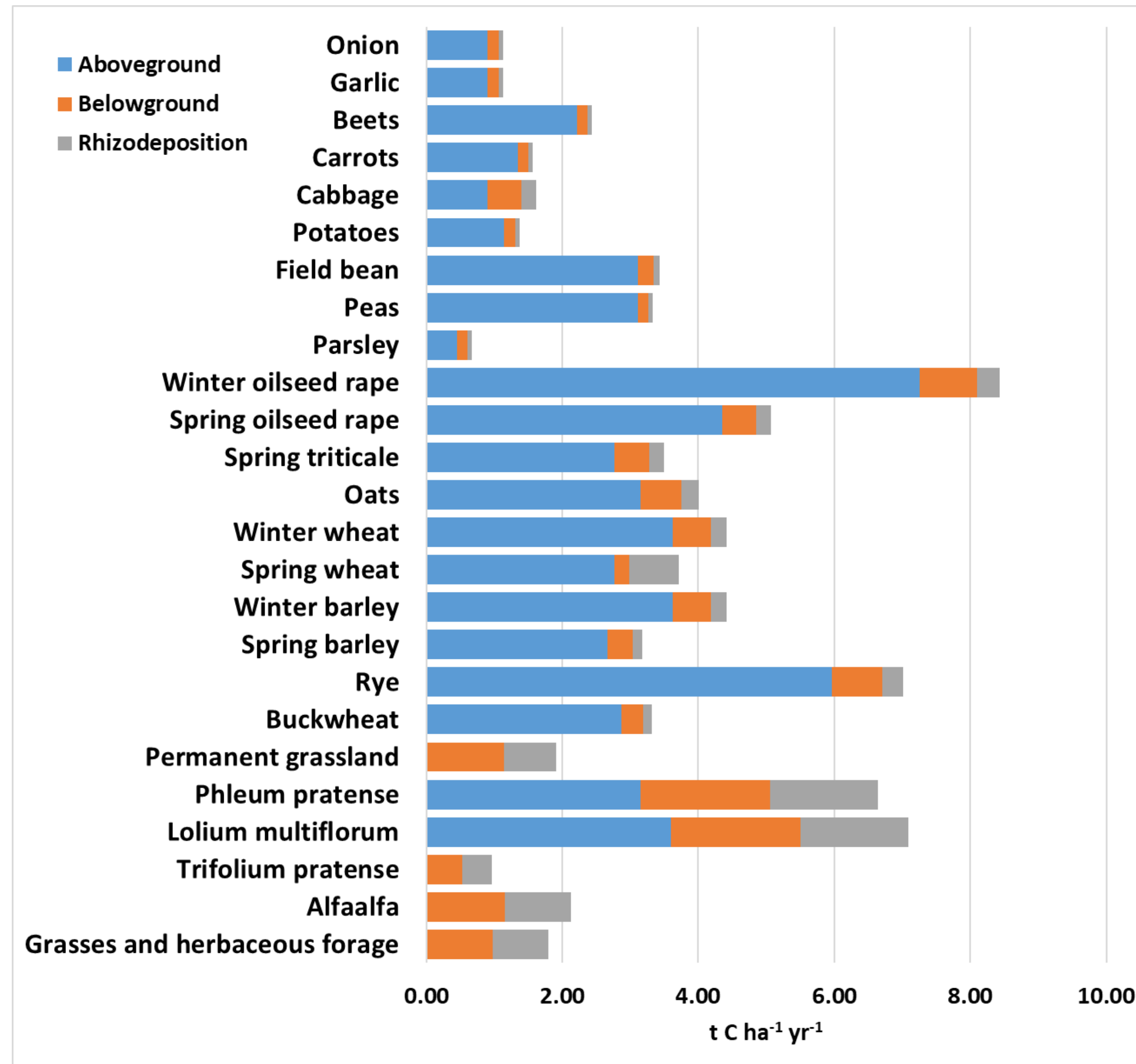


Statistically significant differences:

Luvisols, 0-10 cm, $p=0.011$



C input with crop residues



Soil carbon stock change modelling

Model version: Yasso20

Input data:

- Soil C input sources (count not limited in R script):
 - Litter:
 - Aboveground litter;
 - Belowground litter;
 - Aboveground harvesting residues
 - Belowground harvesting residues;
 - Soil amendments (fertilizers).
 - C fractions of input sources:
 - A;W;E;N;H*
- Meteorological conditions:
 - Monthly mean temperature;
 - Annual precipitation.

*

A - hydrolysable in acid (for example, sulfuric acid), celluloses.

W – polar solvent soluble (water), sugars.

E - soluble in a non-polar solvent (ethanol or dichloromethane), wax-like compounds.

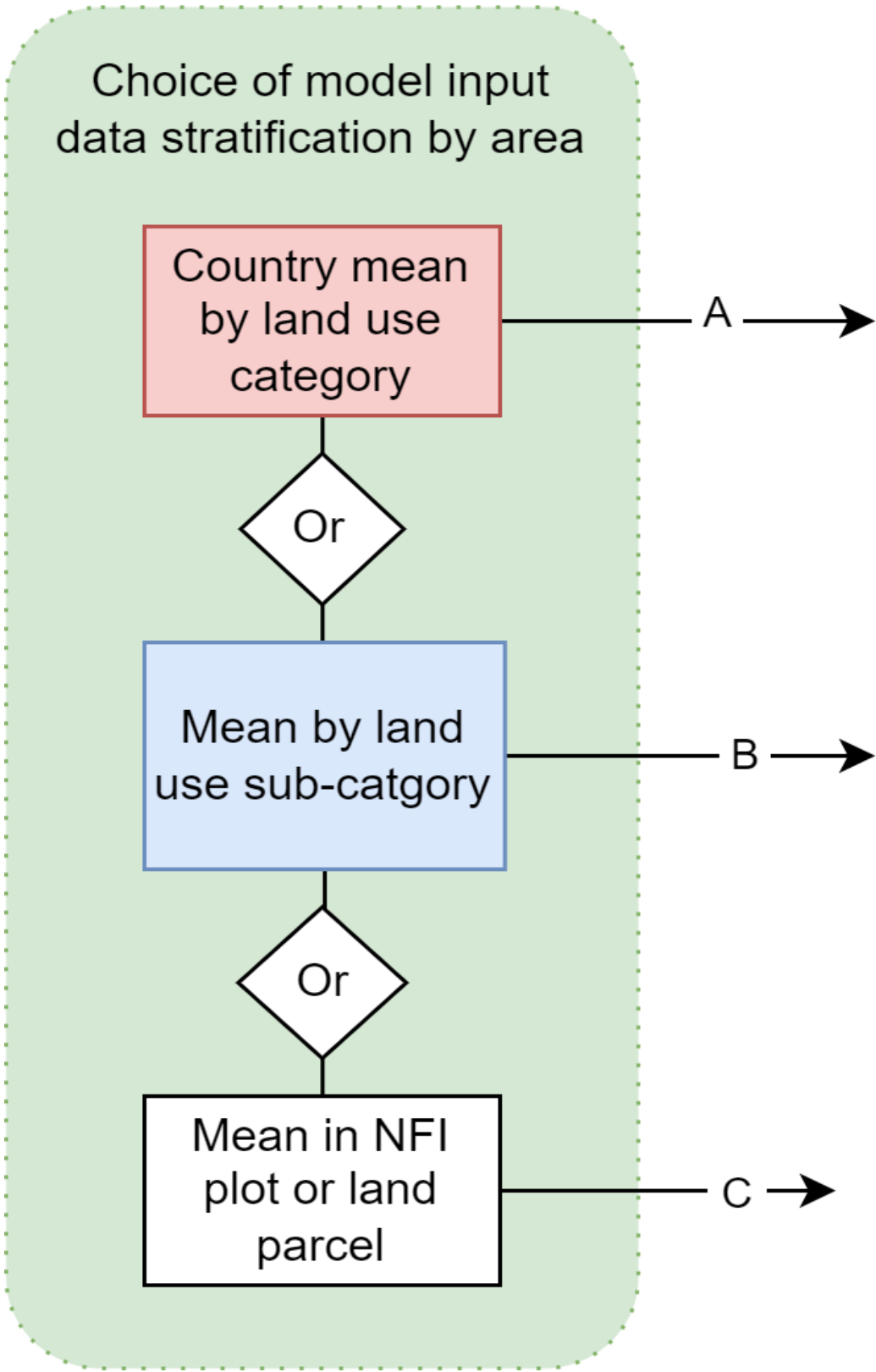
N - non-soluble and non-hydrolysable residue, lignin-like compounds.

H - long-lived, stable soil organic carbon, humus.

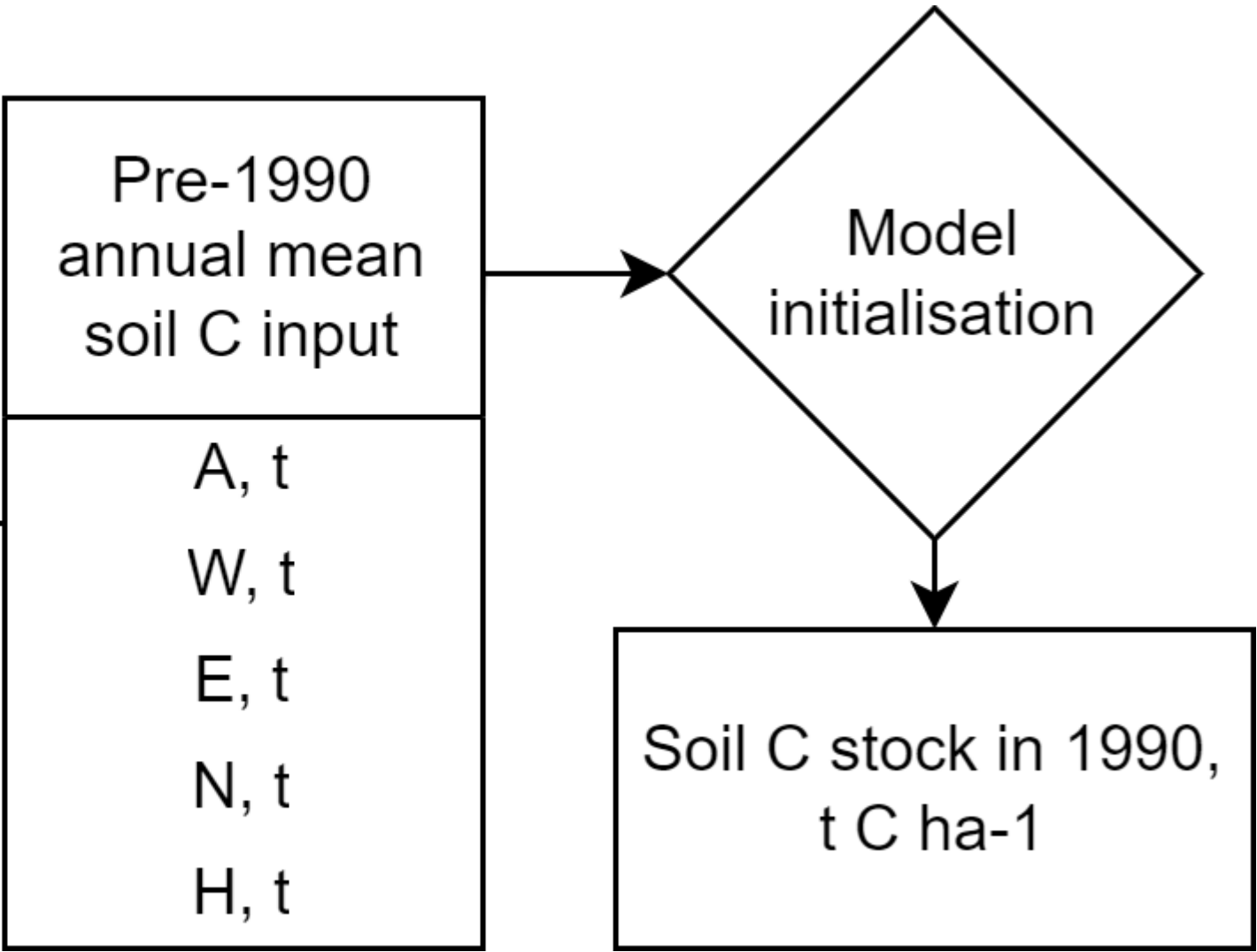


Soil carbon stock change modelling

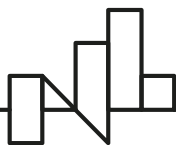
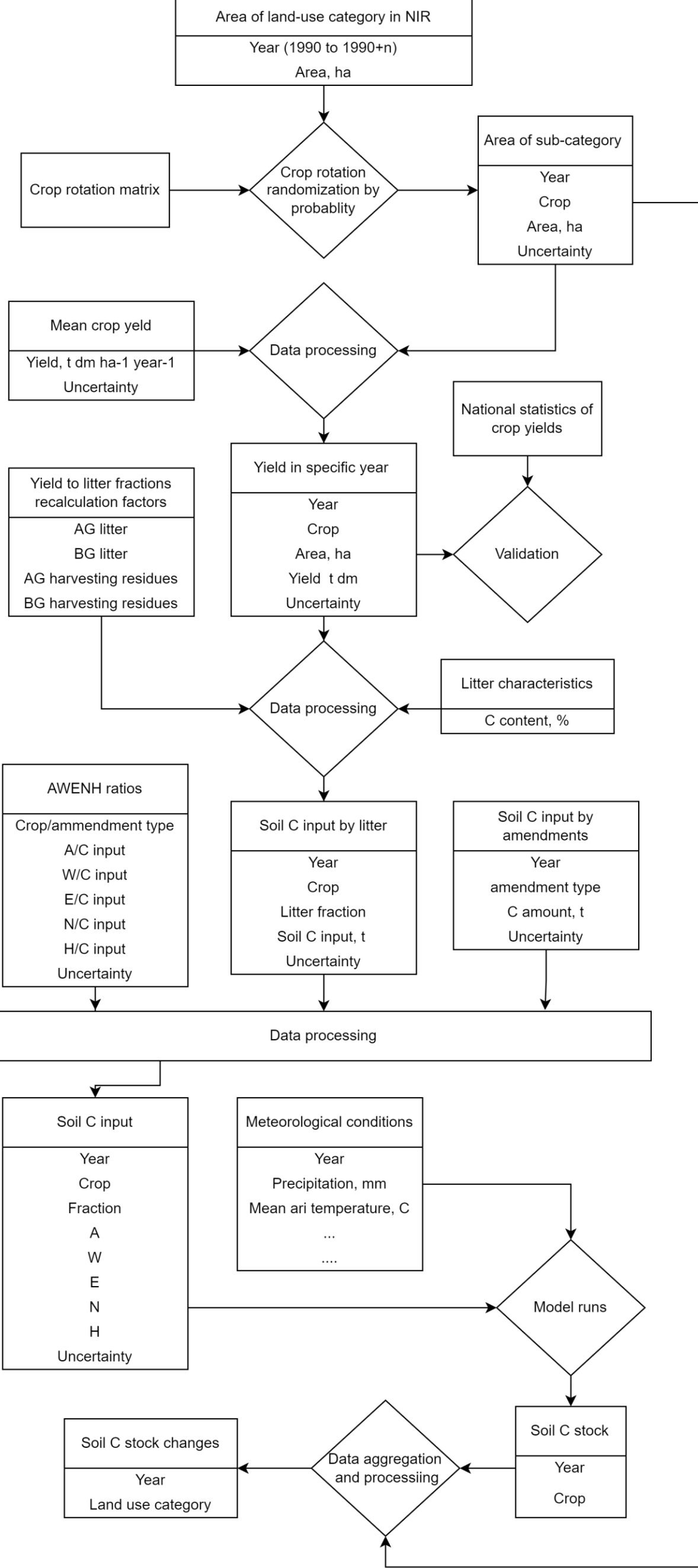
Input data stratification:



Model Initialization:



Modelling workflow →



Soil carbon stock change modelling

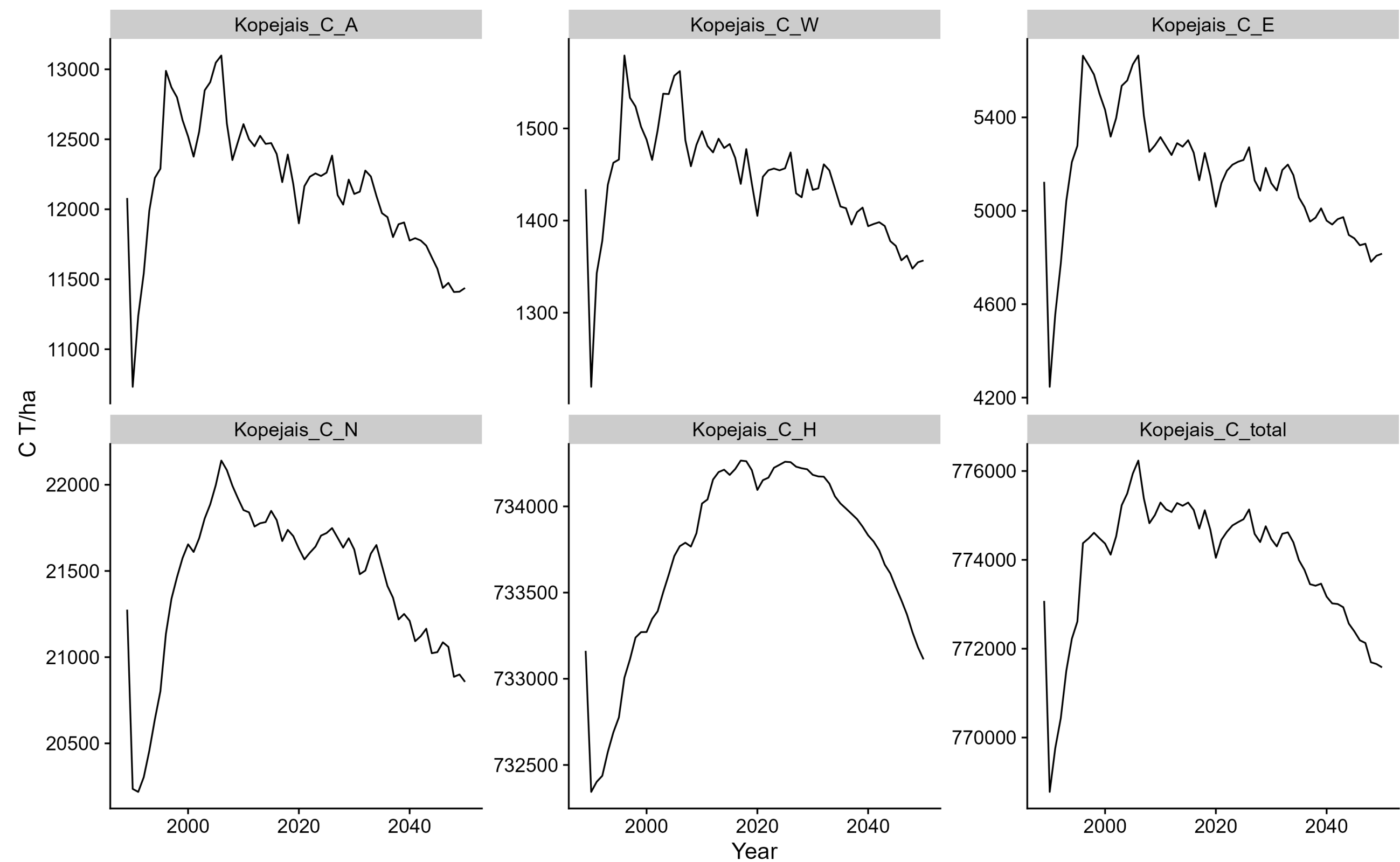
User-friendly spreadsheet to R data handling

	A	B	C	D	E	F	G	H	I	J	K	L	M	
1	Data input						Precipitation, mm	Yield calculation						
2	Year	Crop	Reagion	Total agricultural area, ha	Crop area share	Uncertainty of crop area share, %	Precipitation, mm	Crop area, ha	Uncertainty of crop area, ha	Mean yield, t dm ha-1 year-1	Uncertainty of mean yield, %	Yield, t dm year-1	Combined uncertainty of yield, %	Y
3	Year	Crop	Region	Total_area	Crop_area_share	Crop_area_share_uncertainty	prec	Crop_area	Crop_area_uncertainty	Mean_yield	Mean_yield	Crop_yield	Combined_yield_uncertainty, %	C
4	1990	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	861	200	40	100	30	20000	36	
5	1991	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	688	200	40	100	30	20000	36	
6	1992	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	663	200	40	100	30	20000	36	
7	1993	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	687	200	40	100	30	20000	36	
8	1994	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	688	200	40	100	30	20000	36	
9	1995	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	703	200	40	100	30	20000	36	
10	1996	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	568	200	40	100	30	20000	36	
11	1997	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	713	200	40	100	30	20000	36	
12	1998	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	758	200	40	100	30	20000	36	
13	1999	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	675	200	40	100	30	20000	36	
14	2000	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	646	200	40	100	30	20000	36	
15	2001	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	809	200	40	100	30	20000	36	
16	2002	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	612	200	40	100	30	20000	36	
17	2003	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	621	200	40	100	30	20000	36	
18	2004	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	682	200	40	100	30	20000	36	
19	2005	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	643	200	40	100	30	20000	36	
20	2006	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	591	200	40	100	30	20000	36	
21	2007	Kultūra 1	Kurzeme un Zemgale	1000	0.2	20	793	200	40	100	30	20000	36	
		Rīka apraksts	Data_input	Fixed_variables	Meteo_annual	Meteo_monthly	Yasso_input_1	Yasso_input_2						



Soil carbon stock change modelling

Graphical model output:



.csv output:

	A	B	C	D	E	F	G	H	
1	Year	Crop	Aboveground litter C_A	Belowground litter C_A	Aboveground harvesting residues C_A	Belowground harvesting residues C_A	Kopejais C_A	Aboveground litter C_W	Belowground litter C_W
2	1989	Kultūra 1	3020,1	3020,1	3020,1	3020,1	12080,6	358,5	
3	1990	Kultūra 1	2682,8	2682,8	2682,8	2682,8	10731,1	304,9	
4	1991	Kultūra 1	2809,5	2809,5	2809,5	2809,5	11238,1	335,7	
5	1992	Kultūra 1	2885,8	2885,8	2885,8	2885,8	11543,1	344,5	
6	1993	Kultūra 1	2997,5	2997,5	2997,5	2997,5	11990,0	359,7	
7	1994	Kultūra 1	3056,1	3056,1	3056,1	3056,1	12224,3	365,7	
8	1995	Kultūra 1	3072,4	3072,4	3072,4	3072,4	12289,6	366,6	
9	1996	Kultūra 1	3247,3	3247,3	3247,3	3247,3	12989,1	394,8	
10	1997	Kultūra 1	3217,7	3217,7	3217,7	3217,7	12870,6	383,3	
11	1998	Kultūra 1	3199,9	3199,9	3199,9	3199,9	12799,7	381,0	
12	1999	Kultūra 1	3159,2	3159,2	3159,2	3159,2	12636,8	375,5	
13	2000	Kultūra 1	3130,1	3130,1	3130,1	3130,1	12520,4	372,0	

