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*Supplement of*

## **Forest conversion to poplar plantation in a Lombardy floodplain (Italy): effects on soil organic carbon stock**

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Table S1. Soil profile descriptions at poplar plantation (PP) and natural forest (NF) sites. Taxonomy of soil profiles according to IUSS Working Group WRB, 2007.

Legend for structure, rock fragments and roots: vf: very fine; f: fine; m: medium; c: coarse; vc: very coarse.

Profiles	Horizons	Colour (moist)	Mottles	Rock fragments	Structure	Roots
a) PP						
1 Haplic Regosol (Humic, Eutric, Siltic)	Ap1 (0-12 cm)	2.5Y 3.5/2		few, vf-f	granular, f	many, vf
	Ap2 (12-44 cm)	2.5Y 4/2	7.5YR 4/6, common	few, vf-f	massive	few, vf-f
	C (44-60 cm)	2.5Y 4.5/3		few, vf-f	massive	few, vf
2 Haplic Regosol (Eutric, Siltic)	Ap1 (0-11 cm)	2.5Y 3.5/2		absent	granular, m	many, vf-f
	Ap2 (11-45 cm)	2.5Y 4/2		absent	massive	few, vf-m
	Ap3 (45-55 cm)	2.5Y 4/2	7.5YR 4/6, common	absent	massive	few, vf
	C (55-62 cm)	2.5Y 5/3.5		absent	massive	absent
3 Haplic Regosol (Eutric, Endoskeletal, Arenic)	Ap1 (0-18 cm)	2.5Y 3.5/2		absent	granular, m	common, vf-f
	Ap2 (18-45 cm)	2.5Y 4/2		absent	massive	few, f
	C1 (45-65 cm)	2.5Y 6/4		absent	single grain	few, f
	C2 (65-70 cm)	2.5Y 6/4		many, vf-f	single grain	absent
4 Haplic Arenosol (Eutric)	Ap1 (0-12 cm)	2.5Y 4/2		common, vf-f	single grain	common, vf-f
	Ap2 (12-47 cm)	2.5Y 4/2.5		common, f-m	single grain	few, m
	C (47-65 cm)	2.5Y 6/3.5		common, f-m	single grain	few, m
b) NF						
5 Haplic Regosol (Humic, Eutric, Arenic)	A1 (0-8 cm)	10YR 2/2		absent	granular, m	many, vf-f
	A2 (8-13 cm)	10YR 3/2		absent	subang. blocky, vc	common, vf-f
	CA (13-32 cm)	2.5Y 4.5/4		absent	single grain	few, vf-m
	C (32-62 cm)	2.5Y 5/4		absent	single grain	few, vf-m
6 Haplic Regosol (Humic, Eutric, Arenic)	A1 (0-8 cm)	10YR 3/2		absent	granular, f	common, vf-c
	A2 (8-25 cm)	10YR 3.5/2		absent	subang. blocky, m	common, vf-c
	C (25-60 cm)	2.5Y 6/3.5		absent	single grain	few, vf-c
7 Haplic Regosol (Eutric, Arenic)	A1 (0-10 cm)	10YR 3.5/2		absent	granular, c	common, vf-f
	A2 (10-20 cm)	2.5Y 4/3		absent	subang. blocky, m	few, vf-f
	C (20-60 cm)	2.5Y 5.5/4		absent	single grain	few, f-c
8 Haplic Regosol (Humic, Eutric, Arenic)	A1 (0-6 cm)	10YR 3/1.5		absent	granular, m	many, vf-f
	A2 (6-17 cm)	10YR 4/2.5		absent	subang. blocky, m	many, vf-f
	CA (17-41 cm)	2.5Y 4.5/3		absent	massive	few, vf-f
	C (41-60 cm)	2.5Y 5/3		absent	single grain	few, vf-m
9 Haplic Regosol (Humic, Eutric, Arenic)	A (0-4 cm)	10YR 3.5/2		absent	granular, m	common, vf-f
	AC (4-25 cm)	2.5Y 4/4		absent	subang. blocky, c	few, f-c
	CA (25-42 cm)	2.5Y 4.5/4		absent	single grain	few, f-c
	C (42-60 cm)	2.5Y 5/4		absent	single grain	few, f-vc

Table S2. Soil properties at a) poplar plantation (PP) and b) natural forest (NF) sites. Taxonomy of soil profiles according to IUSS Working Group WRB, 2007.

Profiles	Horizons	pH <sub>w</sub>	Organic C [g kg <sup>-1</sup> ]	Total N [g kg <sup>-1</sup> ]	C:N	Bulk density [g cm <sup>-3</sup> ]	Sand 2–0.05 mm [%]	Silt 0.05–0.002 mm [%]	Clay <0.002 mm [%]	Text. class	CEC [cmol(+) kg <sup>-1</sup> ]
a) PP											
1 Haplic Regosol (Humic, Eutric, Siltic)	Ap1 (0-12 cm)	6.3	14.3	1.3	10.8	1.11	51.3	37.9	10.8	L	7.54
	Ap2 (12-44 cm)	5.8	9.0	0.8	11.3	1.23	22.4	62.5	15.1	SiL	9.89
	C (44-60 cm)	5.6	-	0.6	16.4	1.24	30.8	56.9	12.3	SiL	8.06
2 Haplic Regosol (Eutric, Siltic)	Ap1 (0-11 cm)	6.5	15.2	1.2	12.5	1.07	32.8	55.8	11.4	SiL	7.91
	Ap2 (11-45 cm)	6.2	6.1	0.7	8.6	1.32	28.7	57.7	13.0	SiL	6.58
	Ap3 (45-55 cm)	6.3	5.8	0.5	13.3	1.36	16.8	69.1	14.1	SiL	7.96
	C (55-62 cm)	6.3	3.7	0.5	8.9	1.39	6.4	80.4	14.0	SiL	7.89
3 Haplic Regosol (Eutric, Endoskeletal, Arenic)	Ap1 (0-18 cm)	6.3	11.3	1.0	11.0	1.18	54.1	34.8	11.1	SL	7.08
	Ap2 (18-45 cm)	6.1	4.2	0.3	13.3	1.39	76.5	16.3	7.2	LS	5.36
	C1 (45-65 cm)	6.8	0.9	0.0	-	1.49	93.2	3.9	2.9	S	2.19
4 Haplic Arenosol (Eutric)	Ap1 (0-12 cm)	7.0	6.4	0.4	15.0	1.36	86.1	9.7	4.2	LS	2.07
	Ap2 (12-47 cm)	6.4	2.2	0.2	13.3	1.46	82.5	14.5	3.0	LS	1.85
	C (47-65 cm)	7.0	0.9	-	-	n.d.	98.0	2.0	0.0	S	2.61

Profiles	Horizons	pH <sub>w</sub>	Organic C [g kg <sup>-1</sup> ]	Total N [g kg <sup>-1</sup> ]	C:N	Bulk density [g cm <sup>-3</sup> ]	Sand 2–0.05 mm [%]	Silt 0.05–0.002 mm [%]	Clay <0.002 mm [%]	Text. class	CEC [cmol(+) kg <sup>-1</sup> ]
b) NF											
5	A1 (0-8 cm)	5.5	48.4	2.9	16.6	1.01	52.8	36.4	10.8	SiL	17.09
Haplic Regosol (Humic, Eutric, Arenic)	A2 (8-13 cm)	4.6	11.3	0.8	13.8	1.34	66.7	24.4	8.9	SiL	6.03
	CA (13-32 cm)	4.7	4.9	0.3	18.5	1.50	78.3	15.5	6.2	L	3.61
	C (32-62 cm)	5.9	0.8	0.1	11.1	1.58	88.2	8.4	4.0	S	3.31
	6	A1 (0-8 cm)	5.6	34.9	2.6	13.5	1.10	46.8	42.0	11.2	L
Haplic Regosol (Humic, Eutric, Arenic)	A2 (8-25 cm)	4.7	13.2	1.1	11.8	1.35	54.6	35.2	10.2	SL	5.11
	C (25-60 cm)	6.3	1.0	0.1	11.1	1.58	92.9	4.0	3.1	LS	2.78
	7	A1 (0-10 cm)	5.8	34.7	2.6	13.5	1.10	22.4	60.8	16.8	S
Haplic Regosol (Eutric, Arenic)	A2 (10-20 cm)	5.5	7.3	0.7	9.5	1.47	54.9	35.7	9.4	SiL	2.87
	C (20-60 cm)	6.5	1.2	0.1	6.7	1.58	90.7	6.3	3.0	SiL	2.13
	8	A1 (0-6 cm)	6.2	49.8	3.2	15.6	0.99	26.2	59.5	14.3	L
Haplic Regosol (Humic, Eutric, Arenic)	A2 (6-17 cm)	5.5	25.3	2.0	12.5	1.14	31.2	55.7	13.1	S	10.09
	CA (17-41 cm)	5.8	8.2	0.7	11.4	1.45	39.1	48.9	12.0	L	3.95
	C (41-60 cm)	6.5	1.8	0.2	10.0	1.56	90.8	6.1	3.1	SL	3.34
	9	A (0-4 cm)	4.9	103.1	7.6	13.6	0.62	43.1	44.1	12.8	LS
Haplic Regosol (Humic, Eutric, Arenic)	AC (4-25 cm)	4.5	21.3	1.7	12.3	1.20	46.8	46.0	7.2	S	9.44
	CA (25-42 cm)	5.3	2.9	0.2	14.0	1.54	78.5	16.3	5.2	SiL	4.12
	C (42-60 cm)	5.7	1.1	0.0	-	1.58	91.0	6.9	2.1	SiL	1.67

**Table S3.** Soil coring: correlation matrix between soil properties for NF (a) and PP (b).

L: organic layer; 1: 0-10 cm and 0-15 cm layer at NF and PP, respectively; 2: 10-55 cm and 15-55 cm layer at NF and PP, respectively; 3: 55-100 cm layer

C: organic carbon (%); N: total nitrogen (%); CN: C:N ratio; pH: pH in water; S: sand content (%); Si: silt content (%); C: clay content (%); BD: bulk density (g cm<sup>-3</sup>)

Significant correlations (p<0.05) are in bold. At NF n=90; at PP n=70, soil texture n=20 for 3<sup>rd</sup> layer

a) NF	CL	C1	C2	C3	NL	N1	N2	N3	CNL	CN1	CN2	CN3	pH1	pH2	pH3	S1	S2	S3	Si1	Si2	Si3	C1	C2	C3	BD1	BD2
CL	1.00																									
C1	0.20	1.00																								
C2	<b>-0.24</b>	<b>0.35</b>	1.00																							
C3	<b>-0.25</b>	<b>0.29</b>	<b>0.69</b>	1.00																						
NL	<b>0.75</b>	0.15	<b>-0.28</b>	<b>-0.29</b>	1.00																					
N1	0.17	<b>0.99</b>	<b>0.34</b>	<b>0.22</b>	0.15	1.00																				
N2	<b>-0.29</b>	<b>0.30</b>	<b>0.99</b>	<b>0.70</b>	<b>-0.33</b>	<b>0.29</b>	1.00																			
N3	<b>-0.30</b>	<b>0.25</b>	<b>0.68</b>	<b>0.97</b>	<b>-0.30</b>	0.20	<b>0.70</b>	1.00																		
CNL	0.13	0.00	0.13	0.16	<b>-0.55</b>	-0.04	0.14	0.12	1.00																	
CN1	<b>0.30</b>	<b>0.42</b>	0.15	<b>0.31</b>	0.11	<b>0.29</b>	0.07	<b>0.23</b>	0.17	1.00																
CN2	<b>0.40</b>	<b>0.25</b>	<b>-0.28</b>	<b>-0.22</b>	<b>0.40</b>	0.18	<b>-0.40</b>	<b>-0.28</b>	-0.12	<b>0.58</b>	1.00															
CN3	0.17	-0.11	-0.30	-0.27	0.29	-0.16	-0.34	-0.33	-0.30	0.11	<b>0.48</b>	1.00														
pH1	<b>-0.38</b>	-0.11	<b>0.30</b>	<b>0.31</b>	<b>-0.54</b>	-0.10	<b>0.36</b>	<b>0.31</b>	<b>0.36</b>	-0.18	<b>-0.54</b>	-0.26	1.00													
pH2	<b>-0.28</b>	-0.13	<b>0.27</b>	<b>0.40</b>	<b>-0.50</b>	-0.14	<b>0.33</b>	<b>0.37</b>	<b>0.40</b>	-0.11	<b>-0.46</b>	-0.29	<b>0.85</b>	1.00												
pH3	-0.10	-0.14	0.06	0.15	<b>-0.26</b>	-0.15	0.10	0.10	<b>0.24</b>	-0.08	<b>-0.31</b>	-0.11	<b>0.46</b>	<b>0.67</b>	1.00											
S1	<b>0.23</b>	0.20	<b>-0.54</b>	<b>-0.35</b>	<b>0.24</b>	0.19	<b>-0.56</b>	<b>-0.40</b>	-0.10	0.18	<b>0.38</b>	0.19	0.00	-0.05	-0.08	1.00										
S2	<b>0.35</b>	-0.05	<b>-0.72</b>	<b>-0.49</b>	<b>0.39</b>	-0.08	<b>-0.77</b>	<b>-0.55</b>	-0.18	<b>0.23</b>	<b>0.58</b>	0.35	<b>-0.39</b>	<b>-0.33</b>	-0.16	<b>0.79</b>	1.00									
S3	0.14	<b>-0.38</b>	<b>-0.49</b>	<b>-0.70</b>	<b>0.24</b>	<b>-0.36</b>	<b>-0.51</b>	<b>-0.75</b>	<b>-0.23</b>	-0.17	<b>0.21</b>	<b>0.49</b>	<b>-0.28</b>	<b>-0.28</b>	0.07	<b>0.31</b>	<b>0.60</b>	1.00								
Si1	<b>-0.22</b>	-0.18	<b>0.52</b>	<b>0.32</b>	<b>-0.22</b>	-0.17	<b>0.54</b>	<b>0.37</b>	0.08	<b>-0.21</b>	<b>-0.38</b>	-0.19	-0.02	0.03	0.07	<b>-1.00</b>	<b>-0.77</b>	<b>-0.29</b>	1.00							
Si2	<b>-0.35</b>	0.04	<b>0.72</b>	<b>0.49</b>	<b>-0.40</b>	0.07	<b>0.76</b>	<b>0.55</b>	0.19	<b>-0.24</b>	<b>-0.59</b>	-0.33	<b>0.39</b>	<b>0.35</b>	0.17	<b>-0.81</b>	<b>-1.00</b>	<b>-0.59</b>	<b>0.79</b>	1.00						
Si3	-0.13	<b>0.41</b>	<b>0.48</b>	<b>0.71</b>	<b>-0.23</b>	<b>0.39</b>	<b>0.50</b>	<b>0.76</b>	<b>0.23</b>	0.19	-0.19	<b>-0.48</b>	<b>0.27</b>	<b>0.27</b>	-0.08	<b>-0.28</b>	<b>-0.57</b>	<b>-1.00</b>	<b>0.25</b>	<b>0.56</b>	1.00					
C1	<b>-0.25</b>	<b>-0.24</b>	<b>0.55</b>	<b>0.45</b>	<b>-0.35</b>	<b>-0.29</b>	<b>0.56</b>	<b>0.49</b>	<b>0.23</b>	0.07	<b>-0.30</b>	-0.17	0.14	<b>0.23</b>	0.14	<b>-0.75</b>	<b>-0.74</b>	<b>-0.44</b>	<b>0.69</b>	<b>0.73</b>	<b>0.41</b>	1.00				
C2	<b>-0.26</b>	0.09	<b>0.62</b>	<b>0.39</b>	<b>-0.23</b>	0.11	<b>0.65</b>	<b>0.44</b>	0.05	-0.13	<b>-0.45</b>	<b>-0.43</b>	<b>0.27</b>	0.16	0.03	<b>-0.51</b>	<b>-0.83</b>	<b>-0.57</b>	<b>0.48</b>	<b>0.78</b>	<b>0.54</b>	<b>0.65</b>	1.00			
C3	<b>-0.22</b>	0.01	<b>0.45</b>	<b>0.49</b>	<b>-0.29</b>	0.01	<b>0.48</b>	<b>0.54</b>	<b>0.22</b>	-0.03	<b>-0.34</b>	<b>-0.37</b>	<b>0.29</b>	<b>0.33</b>	0.07	<b>-0.55</b>	<b>-0.74</b>	<b>-0.78</b>	<b>0.51</b>	<b>0.73</b>	<b>0.74</b>	<b>0.66</b>	<b>0.67</b>	1.00		
BD1	-0.13	<b>-0.94</b>	<b>-0.37</b>	<b>-0.28</b>	-0.02	<b>-0.93</b>	<b>-0.33</b>	<b>-0.25</b>	-0.10	<b>-0.37</b>	-0.14	0.19	0.04	0.07	0.09	-0.12	0.12	<b>0.39</b>	0.11	-0.11	<b>-0.42</b>	0.17	-0.15	-0.06	1.00	
BD2	<b>0.27</b>	<b>-0.35</b>	<b>-0.84</b>	<b>-0.62</b>	<b>0.28</b>	<b>-0.33</b>	<b>-0.83</b>	<b>-0.61</b>	-0.06	-0.18	<b>0.23</b>	0.23	<b>-0.26</b>	-0.19	0.03	<b>0.47</b>	<b>0.65</b>	<b>0.49</b>	<b>-0.45</b>	<b>-0.65</b>	<b>-0.48</b>	<b>-0.44</b>	<b>-0.55</b>	<b>-0.41</b>	<b>0.36</b>	1.00

**b) PP**

	C1	C2	C3	N1	N2	N3	CN1	CN2	CN3	pH1	pH2	pH3	S1	S2	S3	Si1	Si2	Si3	C1	C2	C3	BD1	BD2
C1	1.00																						
C2	<b>0.78</b>	1.00																					
C3	<b>0.57</b>	<b>0.65</b>	1.00																				
N1	<b>0.98</b>	<b>0.81</b>	<b>0.60</b>	1.00																			
N2	<b>0.80</b>	<b>0.98</b>	<b>0.66</b>	<b>0.84</b>	1.00																		
N3	<b>0.58</b>	<b>0.66</b>	<b>0.99</b>	<b>0.62</b>	<b>0.67</b>	1.00																	
CN1	<b>-0.96</b>	<b>-0.76</b>	<b>-0.62</b>	<b>-0.95</b>	<b>-0.78</b>	<b>-0.63</b>	1.00																
CN2	<b>-0.76</b>	<b>-0.95</b>	<b>-0.61</b>	<b>-0.80</b>	<b>-0.94</b>	<b>-0.63</b>	<b>0.77</b>	1.00															
CN3	<b>-0.57</b>	<b>-0.65</b>	-1.00	<b>-0.60</b>	<b>-0.66</b>	<b>-0.99</b>	<b>0.62</b>	<b>0.61</b>	1.00														
pH1	<b>-0.25</b>	-0.24	0.01	<b>-0.26</b>	<b>-0.24</b>	0.05	<b>0.27</b>	0.22	-0.01	1.00													
pH2	<b>-0.42</b>	<b>-0.30</b>	-0.01	<b>-0.45</b>	<b>-0.33</b>	-0.04	<b>0.40</b>	<b>0.25</b>	0.01	<b>0.37</b>	1.00												
pH3	<b>-0.50</b>	<b>-0.45</b>	<b>-0.65</b>	<b>-0.56</b>	<b>-0.48</b>	<b>-0.71</b>	<b>0.62</b>	<b>0.48</b>	<b>0.65</b>	-0.04	0.30	1.00											
S1	<b>-0.73</b>	-0.49	-0.28	<b>-0.76</b>	-0.54	-0.30	<b>0.86</b>	<b>0.73</b>	0.28	0.02	0.30	0.47	1.00										
S2	<b>-0.81</b>	<b>-0.69</b>	-0.43	<b>-0.86</b>	<b>-0.73</b>	-0.46	<b>0.91</b>	<b>0.87</b>	0.43	0.08	0.48	<b>0.63</b>	<b>0.89</b>	1.00									
S3	<b>-0.63</b>	<b>-0.70</b>	<b>-0.90</b>	<b>-0.69</b>	<b>-0.73</b>	<b>-0.93</b>	<b>0.74</b>	<b>0.76</b>	<b>0.90</b>	-0.10	0.35	<b>0.79</b>	0.51	<b>0.69</b>	1.00								
Si1	<b>0.76</b>	0.52	0.32	<b>0.78</b>	<b>0.58</b>	0.34	<b>-0.87</b>	<b>-0.74</b>	-0.32	-0.03	-0.34	-0.49	<b>-1.00</b>	<b>-0.89</b>	-0.55	1.00							
Si2	<b>0.83</b>	<b>0.71</b>	0.42	<b>0.87</b>	<b>0.74</b>	0.46	<b>-0.91</b>	<b>-0.88</b>	-0.42	-0.13	-0.53	<b>-0.62</b>	<b>-0.88</b>	<b>-1.00</b>	<b>-0.68</b>	<b>0.89</b>	1.00						
Si3	<b>0.65</b>	<b>0.70</b>	<b>0.88</b>	<b>0.71</b>	<b>0.73</b>	<b>0.92</b>	<b>-0.75</b>	<b>-0.77</b>	<b>-0.88</b>	0.10	-0.38	<b>-0.81</b>	-0.53	<b>-0.71</b>	<b>-1.00</b>	<b>0.57</b>	<b>0.70</b>	1.00					
C1	0.32	0.11	-0.18	0.31	0.13	-0.16	-0.48	-0.37	0.18	0.09	0.12	-0.16	<b>-0.75</b>	<b>-0.63</b>	-0.09	<b>0.70</b>	<b>0.60</b>	0.10	1.00				
C2	0.49	0.40	0.40	0.53	0.45	0.43	<b>-0.70</b>	<b>-0.64</b>	-0.40	0.36	-0.02	<b>-0.62</b>	<b>-0.78</b>	<b>-0.82</b>	<b>-0.63</b>	<b>0.76</b>	<b>0.78</b>	<b>0.64</b>	<b>0.76</b>	1.00			
C3	0.49	<b>0.65</b>	<b>0.90</b>	0.52	<b>0.66</b>	<b>0.91</b>	<b>-0.58</b>	<b>-0.65</b>	<b>-0.90</b>	0.07	-0.06	<b>-0.59</b>	-0.31	-0.45	<b>-0.91</b>	0.34	0.43	<b>0.89</b>	-0.01	0.49	1.00		
BD1	<b>-0.97</b>	<b>-0.77</b>	<b>-0.59</b>	<b>-0.96</b>	<b>-0.80</b>	<b>-0.61</b>	<b>0.99</b>	<b>0.78</b>	<b>0.59</b>	<b>0.25</b>	<b>0.40</b>	<b>0.63</b>	<b>0.85</b>	<b>0.91</b>	<b>0.71</b>	<b>-0.87</b>	<b>-0.91</b>	<b>-0.73</b>	-0.48	<b>-0.68</b>	-0.53	1.00	
BD2	<b>-0.77</b>	<b>-0.97</b>	<b>-0.61</b>	<b>-0.81</b>	<b>-0.96</b>	<b>-0.63</b>	<b>0.78</b>	<b>0.98</b>	<b>0.61</b>	0.22	<b>0.28</b>	<b>0.48</b>	<b>0.69</b>	<b>0.85</b>	<b>0.74</b>	<b>-0.71</b>	<b>-0.86</b>	<b>-0.74</b>	-0.38	<b>-0.65</b>	<b>-0.64</b>	<b>0.79</b>	1.00

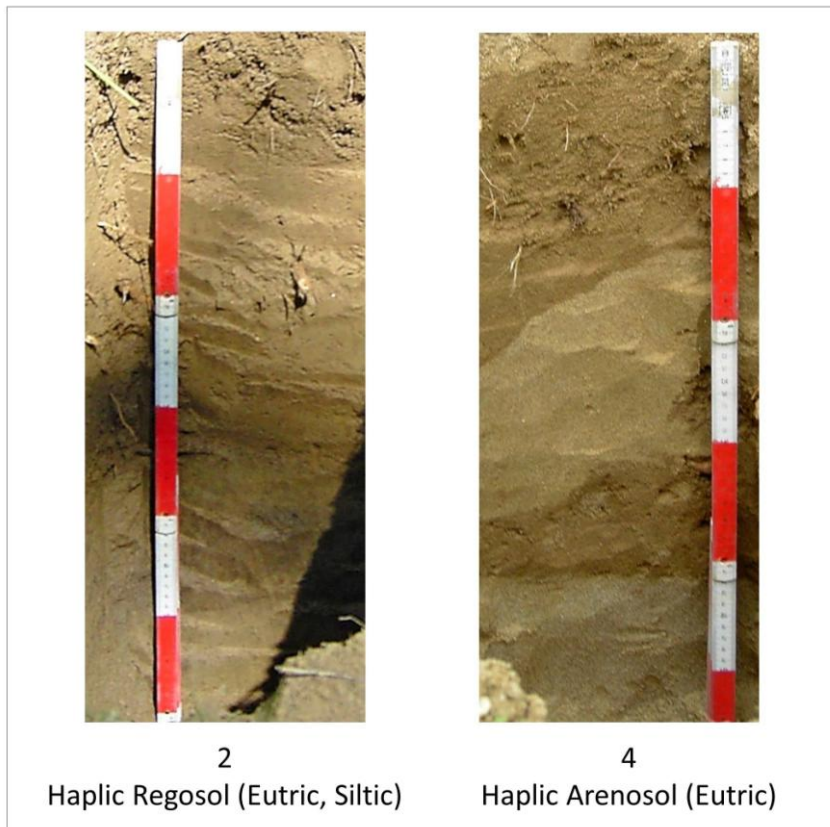


Figure S1. Photographical presentation of profiles 2 and 4 in PP.  
For profile description see Tables S1 and S2. Red/white intervals represent 10 cm.

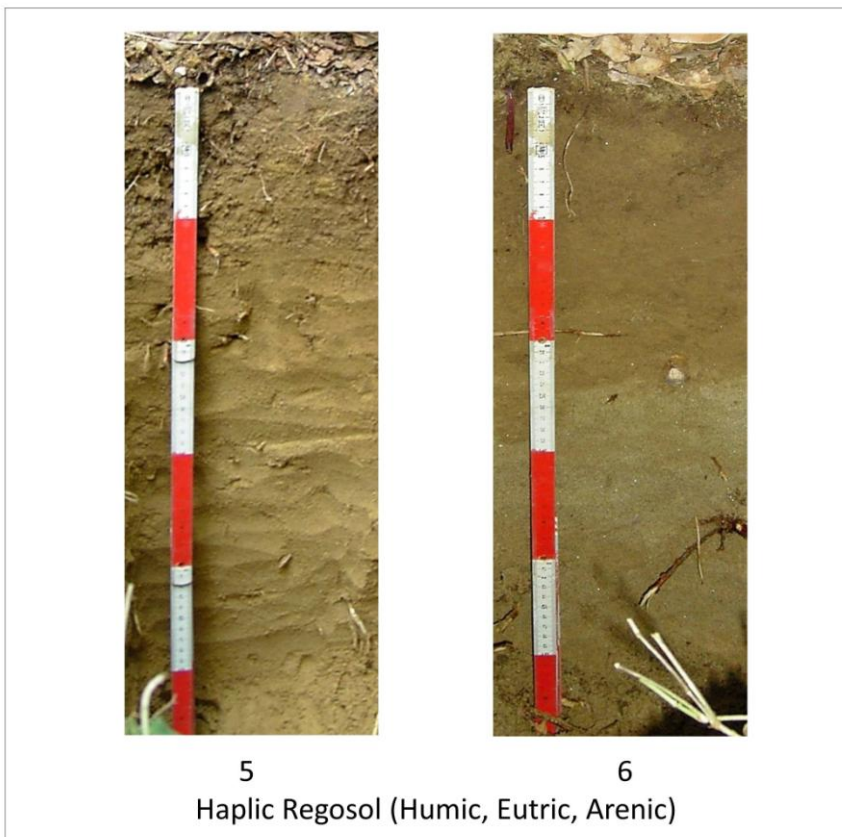


Figure S2. Photographical presentation of profiles 5 and 6 in NF.  
For profile description see Tables S1 and S2. Red/white intervals represent 10 cm.