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Interactive comment on "Time since death and decay rate constants of Norway spruce and European larch deadwood in subalpine forests determined using dendrochronology and radiocarbon dating" *by* M. Petrillo et al.

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This is certainly an interesting issue that Dr. Kahl is addressing. We mentioned in the manuscript that the measured CWD ages are high (particularly for decay classes 4 and 5) and that the derived decay constants are quite low. We also pointed to the problem that the used approach probably underestimates the decay rates (cf. p. 14810, L. 11-14). The higher the age, the higher is the probability (according to Fig. 2 in Kruys et al., 2002) that snapshot sampling may overestimate the age and mean residence time of CWD. Thus, the decay rate may be underestimated. Calculating the overall CWD

decay rates by using density values along a chronosequence has, therefore, the risk that a certain error is introduced. It however seems that this error is not overwhelmingly distinct in our case. We now made the calculations (Table 1) according to the proposed stage-based matrix model of Kruys et al. (2002). The differences (mean residence time and rate constants) between Kruys' model and our approach are small (Table 2). Kruy's model gives slightly higher decay constants. The CWD decay rates depend, among others, on the snag position (downed, leaning, standing; Köster et al., 2009). All analysed CWD had a downed position. However, it is impossible to find out if a part of the CWD was once in a leaning or upright position (which finally affects the age and decay rate).

We probably did not emphasise the problem of CWD age overestimation clearly enough in the manuscript. Consequently, we will better focus on this issue (in the discussion, conclusions and also in the abstract) in the revised version.

References Kruys, N., Jonsson, B. G., and Ståhl, G.: A stage-based matrix model for decay-class dynamics of woody debris, Ecol. Applic, 12, 773-781, 2002. Köster, K., Ilisson, T., Tukia, H., Jõgiste, K., and Möls, T.: Early effects after forest disturbance in decomposition of trees in two windthrown areas in East Estonia, Balt. For., 15, 143-150, 2009.

Interactive comment on Biogeosciences Discuss., 12, 14797, 2015.

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Decay class	No of samples		Mean residence time		Decay constant (yr^{-1})	
	Spruce	Larch	Spruce	Larch	Spruce	Larch
1	4	3	77	80	0.013	0.012
1+2	8	3	36	47	0.027	0.021
1+2+3	4	3	28	67	0.036	0.015
1+2+3+4	6	6	63	116	0.016	0.009
1+2+3+4+5	5	3	63	254	0.016	0.004

Fig. 1. Mean residence time and decay constants calculated using the stage-based matrix model of Kruys et al. (2002)

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	Average decay constant k (yr^{-1})	Residence time* (yr)	Half-life* (yr)
a)			
Norway spruce	0.018	56	39
European larch	0.012	83	58
b)			
Norway spruce	0.012	84	58
European larch	0.005	222	154
c)			
Norway spruce	0.022	45	32
European larch	0.012	83	58

*calculated from the average decay constant

Fig. 2. (cf. Table 7 in the manuscript). CWD decay parameters based on a) equation 1 (cf. manuscript), b) the regression approach (cf. manuscript) and c) stage-based matrix model of Kruys et al. (2002)

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