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Interactive comment on "Re-evaluating the 1940s CO_2 plateau" *by* Ana Bastos et al.

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The authors would like to thank the referee for the encouraging comments.

In Section 3.2.3, the use of different extreme LUC scenarios for the plateau period in OSCAR is intended to provide an estimate of how much ELUC may theoretically contribute to the required sink, given the δ^{13}C record constraint. We show that given its high uncertainty, even extreme changes as the idealised experiments defined could be compatible with the δ^{13}C record. Nevertheless, the authors would like to point out that the effect of war-related mortality and migrations is, very likely, not negligible. For example, Vuichard et al. (2008) have shown that land-abandonment after the collapse of the former Soviet Union, estimated to be of about 20 million hectares led to a small, but still significant, sink of about 64TgC in 10 years.

In Hurtt et al. (2011), a 6 million ha decrease of crop area between 1940 and 1950

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in the Soviet Union (Fig. 1) is reported, which appears to be rather small, considering the war-time demography and economics. Analysis of Lyuri et al. (2010) based on agricultural data archives revealed much bigger drop in ca. 30 Mha during 1940-1950 just in Russia (Fig. 2), not accounting for a decrease in crop areas in Ukraine and Belorussia severely affected by the war.

The number of war-related deaths is estimated to be 26.6 million people, about 14% of the population (Harrison, 2000) and, with the re-location of the industry from the western front to the eastern provinces, about 10 million people are estimated to have been evacuated from the western areas (Nove, 1989). Furthermore, agricultural output is estimated to have fallen by up to 60% during the peak of the war (Nove, 1989). Also, at the time of WW2, the reliance of Russian population on fuel wood was likely much larger than in the last decades of the Soviet Union. The huge decrease in population also decreased harvest pressure on forests and woodlands, so our "LUC hypothesis" is in reality a land management hypothesis. Likewise, the war-related mortality during WWII in China is estimated to be of about 14million people (Mitter, 2013), although its impacts on agriculture and economy are not so well known.

Although these changes were rather fast and were followed by recovery in after the war, their effects in carbon stocks and on gross LUC emissions might not be negligible. As a thought experiment, and considering the estimates by deB Richter Jr Houghton (2011) of gross LUC fluxes for the first years of the 21st century, a suppression of present gross LUC emissions would provide an additional sink of 2.5PgC/yr.

The authors acknowledge that detailed information regarding land-use are hard to obtain for the earlier 20th century, and especially during the war period and therefore this exercise might remain speculative. Nevertheless, further efforts to obtain detailed cropland area in key countries such as the ones severely affected by war could potentially shed some light on the impact of fast but devastating events on the carbon dynamics of ecosystems.

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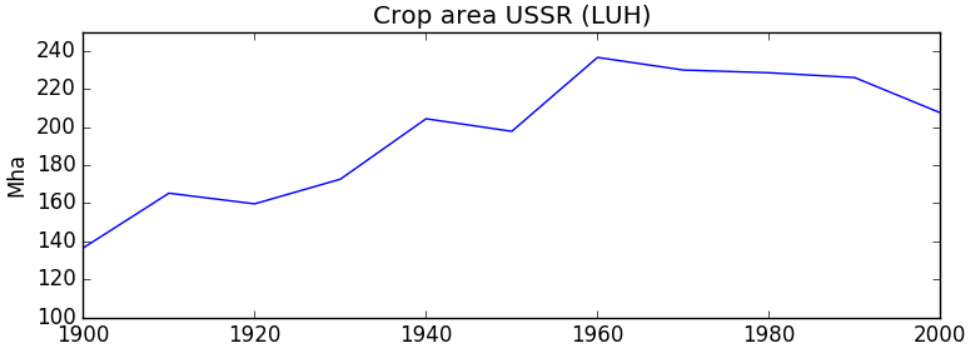

Fig. 1. Changes in crop area in the Former Soviet Union during the 20th century reported by Hurtt et al. (2011).

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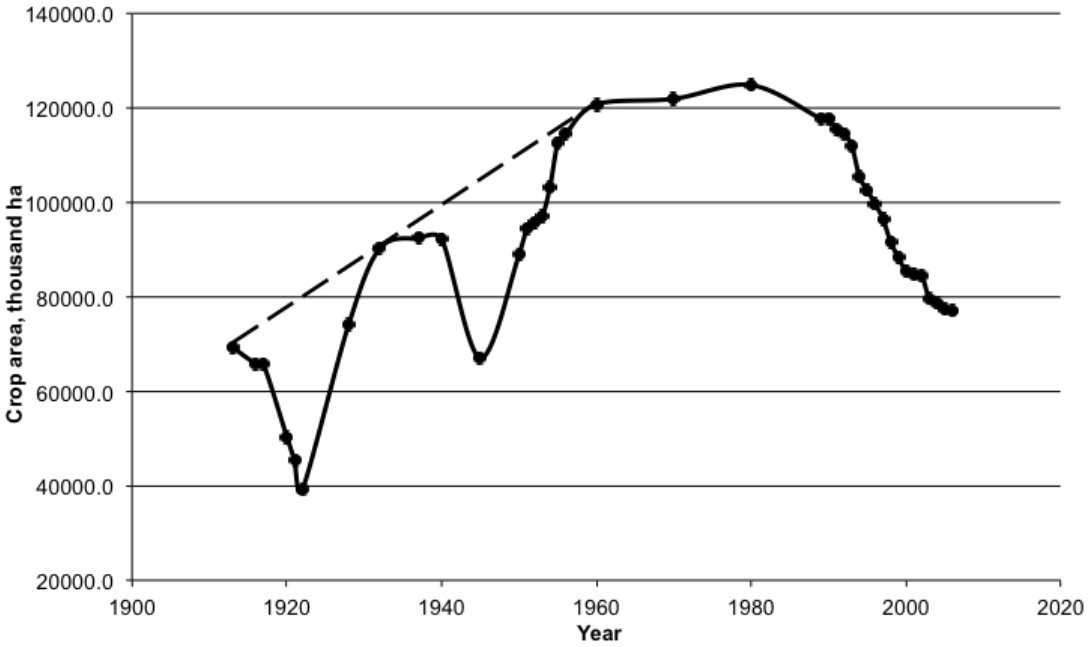

Fig. 2. Changes in crop (sown) area in Russia with two sharp drops during the civil war and WWII (solid line).Dashed line: hypothetical scenario of crop area in absence of these 2 crises (Lyuri et al 2010)

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