Geophysical Research Abstracts
Vol. 20, EGU2018-1559, 2018
EGU General Assembly 2018

Accumulation of Glyphosate and AMPA, “pseudo-persistent” pollutants in long-term experiments under no-till and conventional tillage

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Glyphosate (N-(phosphonomethyl glycine) is a post-emergence, non-selective, foliar herbicide. More than 200 million liters of this herbicide are applied every year in Argentina, where the main agricultural practice is no-till (NT), accounting for 78 % of the cultivated land. In this work, we studied the distribution of glyphosate in long-term experiments (more than 15 years) at different locations under NT and conventional tillage (CT). We take samples from 0-2, 2-5, 5-10, 10-15, and 15-20 cm depth with four replication and two treatments NT and CT at 6 locations: Balcarce (BA) a loam soil, Bordenave (BO) a sandy loam soil, Marcos Juarez a silty loam soil (MJ), Paraná Vertisol a clay soil, Paraná Mollisol a clay loam soil y Pergamino a silty loam soil.
No difference between tillage practices was found on glyphosate concentration, significant differences were observed among locations and depth and interactions between depth and locations. Nevertheless, the concentration of AMPA at 0-2 cm depth was 1.6 times higher in no-till than in conventional till.
To our knowledge, this study is the first dealing with the accumulation of glyphosate and AMPA in soils under different tillage systems. In the present study. Our results show that glyphosate and AMPA are present in soils under agricultural activity with greater concentration in the first two cm of soil and the AMPA concentration at this depth is greater in NT than in CT.