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Long-term effects of soil redistribution by tillage on the landscapes transformation

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During the last decade, soil redistribution due to tillage practices has been identified as an intensive soil erosion process. All the empirical tillage translocation models available in the literature demonstrate high rates of soil translocation for the more commonly used tillage implements. The long-term effects of this intensive soil redistribution within agricultural fields has resulted in a drastic modification of the bio-physical dynamics of the soil as well as the total land-system. A better understanding of the implications of soil redistribution by tillage may require reinterpretation of current agricultural landscapes. This reveal the need for studies for identifying current landscape features produced by past repeated tillage practices, as well as for documenting the bio-physical implications (hydrology, water erosion, soil variability, soil quality, productivity...) derived of such landscape transformations.
This communication presents several examples of field evidences observed in agricultural fields of Central Spain, Tuscany (Italy) and Central Minnesota (USA). The collection of field evidences are presented grouped according to the nature of the effects, into the following four classes:
i) Landscape leveling and smoothing
- Features of change of the soil surface level.
Ii) Modification of morphology of slope profiles
- Formation of banks at the lower field edges.
- Landscape benching by the formation of slope profile breaks at borders between adjacent fields located at mid-slope positions.
iii) Spatial variability of soil properties
- Patterns of distribution of areas of degraded soils (truncated soils) and of soil accumulations.
- Spatial variability of soil properties in the superficial soil horizons.
- Variability of soil profiles morphology along the slope profiles.
iv) Spatial variability of productivity
- Relationships between relieve and spatial variability of soil properties and productivity.

Key Words: soil redistribution, tillage erosion, slopes morphology, field evidences, soil variability, productivity