



Effects of grass fires on soil magnetic properties – a pilot study

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Abstract:

Pilot comparative magnetic study on two soil profiles (burnt by grass fire and original), developed on loess sediments in NW Bulgaria in the region of Koshava village, have been carried out. The aim of the investigation is to compare the magnetic characteristics of burnt and un-burnt soil in order to establish the character of the changes (mineralogical and structural) occurring after heating. Detailed sampling, carried out at each 0.5 cm along depth permits attaining high-resolution depth variations in different magnetic characteristics. A set of magnetic parameters were measured – magnetic susceptibility, frequency dependent magnetic susceptibility, anhysteretic remanence, isothermal remanence. Complex use of these parameters gives information about concentration, magnetic grain size and kind of ferromagnetic iron oxides in soils. It is found that in the uppermost one centimeter of soil depth all magnetic parameters are strongly enhanced in comparison with the virgin soil. The most significant is the increase in frequency dependent magnetic susceptibility, thus suggesting thermal production of ultra fine strongly magnetic particles. Increased intensity of the anhysteretic remanence points to appearance of a new fraction of stable single-domain magnetic particles in the upper 1 cm of the burnt soil. Deeper in soil profile, no enhancement with strongly magnetic secondary minerals was obtained.