



Post-fire soil catenas on the south of Primorsky kray (Russian Federation)

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Wildfires greatly affect physical, chemical and physico-chemical soil properties. In particular, one of consequences of wildfires is polycyclic aromatic hydrocarbons (PAHs) production, that are one of the most toxic pollutants. PAHs investigation in the soils of Primorie is relevant, as they were never studied in this area before.

We studied 5 catenas within “Land of the leopard” national park and “Kedrovaya pad” natural reserve. These are sparse forests that burnt in 2017, 2014 (often burnt before), forest burnt in 2014 (rarely burnt before), 2016 and background site.

Soils that remain on slopes are skeletal umbrisols. On the summits of mountains most of soils are cambisols and leptosols. In the samples we identified 11 PAHs, organic matter content and magnetic susceptibility.

In pyrogenic horizons we saw increase of PAHs content nearly twice against humus horizons.

Background soils have less PAHs in upper horizons than in lower ones. It can be explained with better aeration in upper horizons which makes PAHs decompose. Also photodegradation in topsoils is more favourable. Besides that, lower parts of soil profile are waterlogged for some time, and thus PAHs are conserved.

Prevailing PAHs on all sites are light compounds: homologues of naphthalene, phenanthrene, biphenyl. In topsoils the percent of light PAHs is less. In particular, 2- and 3-ringed to 4-ringed compounds ratio in upper horizons is approximately 10 times less than in lower ones.

Average numbers of magnetic susceptibility on the background are $17 \cdot 10^{-8} \text{ m}^3/\text{g}$ and $18\text{-}19 \cdot 10^{-8} \text{ m}^3/\text{g}$ on the burnt ones. Maximum of magnetic susceptibility in post-fire soils on northern slopes is in upper horizons, while on the background magnetic susceptibility increases downwards. It is strongly marked in the difference between background and 2017-burnt sparse forest. Such phenomena we can explain with dehydration of soils in high temperature of wildfires and better crystalizing of non-silicate iron.

On post-fire sites we see thicker humus horizons than on the background (on average 18-38 cm against 15 cm) and increase of organic matter content. It is considered to happen because of high ashy elements income from burnt plants, and also from vegetation change.