



The warming effect of the flare of natural gas on soil biological activity

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Simulation of global warming is one of the key issues of international efforts to study climatic changes. A number of manipulation experiments with soil warming have been established throughout the world in the last decades. We used warming with natural gas flare near the pine forest as a kind of manipulation experiment to assess the synergistic effect of drying and warming on plant-soil-microbial interactions.

The experimental area is situated in a pine forest subzone of the forest zone of the Western Siberia near Pokachi, Yugra (6173'N, 7549'E). The experimental plots were established in a young Scotch pine forest on sandy podzolic soil at three distances of 70, 90 and 130 m from the flare of natural gas, with trees exposed to strong (S) moderate (M), and weak (W) impact, respectively. Increase of soil temperature in summer time were moderate: on average 0.7oC and 1.3oC for the plots M and S, respectively, compared to the plot W. The plot S demonstrated increase in CO₂ efflux from the soil surface, mainly due to intensifying plant root respiration, by 18% compared to the plot W as well as increase in SOM content by 31%, with intensive accumulation of recalcitrant humus. By contrast, microbial biomass, labile SOM pool and basal respiration were higher in soil with weak flaring impact by 74%, 33% and 24%, respectively. Thus, three trends in plant-soil-microbe system exposed to warming and drying were revealed: i) SOM accumulation, ii) suppression of microbial activity, and iii) stimulation of root respiration.

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