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ТРАНСФОРМАЦИЯ ОКРУЖАЮЩЕЙ СРЕДЫ И УСТОЙЧИВОЕ РАЗВИТИЕ В АЗИАТСКОМ РЕГИОНЕ

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Трансформация окружающей среды и устойчивое развитие в Азиатском регионе / Материалы Международной научной конференции (Иркутск, 08–10 сентября 2020 г.). – Иркутск: Изд-во Института географии им. В.Б. Сочавы СО РАН, 2020. – 186 с.

В сборнике опубликованы тезисы докладов Международной научной конференции «Трансформация окружающей среды и устойчивое развитие в Азиатском регионе». В статьях авторы делятся опытом решения фундаментальных научных проблем в области оптимального экологически ориентированного ресурсообеспечения природопользования и жизнедеятельности населения, а также устойчивого развития трансграничных территорий и регионов, имеющих тесные внешние экологические и социально-экономические связи со странами Северо-Восточной Азии. Особое внимание уделяется изменению природных комплексов в условиях возрастающего антропогенного воздействия на глобальном уровне, сохранению окружающей среды и взаимодействию стран и организаций, как на трансграничных участках, так и в регионах совместного социально-экономического интереса. В рамках конференции обсуждались вопросы развития и совершенствования объективных методов обработки географической информации, новые пространственно-временные модели для анализа и разработки стратегий устойчивого природопользования, «зеленой» экономики и регионального развития, геоинформационные, дистанционные и картографические методы анализа и представления данных о текущем состоянии, временной динамике и трансформации природных и социально-экономических систем.

Сборник ориентирован на широкий круг ученых-географов и экономистов, преподавателей, учащихся высших учебных заведений и представителей органов государственного управления различного уровня, интересующихся проблемами экологии, эффективного природопользования и территориального развития.

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Environmental transformation and sustainable development in the Asian region. Proceedings of the International scientific Conference (Irkutsk, September 08–10, 2020), Irkutsk: Sochava Institute of Geography SB RAS, 2020. – 186 p.

The proceedings of the International scientific Conference “Environmental Transformation and Sustainable Development in the Asian Region” were published in the collection. The publication features articles on solving fundamental scientific problems with the authors sharing their experience in the field of optimal environmentally-oriented natural resource use and livelihoods of the population, as well as sustainable development of transboundary territories and regions with close external environmental and socio-economic ties with the countries of Northeast Asia. Particular attention is paid to changes in natural complexes under increasing human-induced impact at the global level, environmental preservation and interaction of countries and organizations both in transboundary areas and in regions of joint socio-economic interest. The conference discussed the development and improvement of objective methods for processing geographic information, new spatio-temporal models for analysis and development of strategies for sustainable environmental management, green economy and regional development, geoinformation, remote and mapping methods of data analysis and presentation on current state, temporal dynamics and transformation of natural and socio-economic systems.

The collection is aimed at a wide range of geographers and economists, teachers, university students and representatives of government bodies of various levels interested in the problems of ecology, effective environmental management and territorial development.

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CHANGES IN THE CARBON DEPOSIT FUNCTION OF WESTERN SIBERIA PEATLANDS AT EXPLOITATION OF OIL FIELDS

Dyukarev E.A.^{1,2}, Sabrekov A.Z.^{2,3}, Glagolev M.V.^{2,3,4,5}, Kiselev M.V.¹,
Filippov I.V.², Lapshina E.D.²

¹*Institute of Monitoring of Climatic and Ecological System SB RAS, Tomsk, Russia*

²*Yugra State University, Khanty-Mansiysk, Russia*

³*Severtsov Institute of Ecology and Evolution, Moscow, Russia*

⁴*Lomonosov Moscow State University, Moscow, Russia*

⁵*Institute of Forest Science, Uspenskoe, Russia*

dekot@mail.ru

Peatlands are the most significant long-term accumulator of atmospheric carbon on the land. The important climate-forming role of large peatland systems is related to their influence on the regional balance of carbon dioxide, methane, heat and moisture. This report summarizes the results of field studies of carbon dioxide and methane fluxes in peatland ecosystems on the territory of the licensed areas of the Salym Petroleum oil fields (Khanty-Mansiysk Autonomous Region, Russia), the total annual greenhouse gas fluxes and suggest recommendations on the exploitation of oil fields aimed at increasing greenhouse gas accumulation by peatlands.

The results of field measurements of greenhouse gas fluxes were extrapolated for the entire growing season using mathematical models. The net ecosystem exchange is formed as the difference between photosynthetic assimilation of carbon dioxide by plants and CO₂ emissions in the process of respiration of plants and microorganisms. Peatland ecosystems with large biomass storages, including those in the tree layer, have significant fluxes (more than 1500 gCO₂ m⁻²) associated with photosynthesis, but the ecosystem respiration component (750-2200 gCO₂ m⁻²) is also high. As a result, the highest net carbon dioxide accumulation was observed in the mesotrophic sedge-sphagnum fen and in the treed bog, taking into account the tree layer (603 gCO₂ m⁻²). The other types of bogs accumulate 244-466 gCO₂ m⁻².

The total methane emission from the studied bogs has the highest values (32.6 gCH₄ m⁻²) at mesotrophic sedge-sphagnum fen. The other types of wetlands are divided into waterlogged (characterized by flux of 7-11 gCH₄ m⁻²) and relatively dry (with the level of bog waters 20-30 cm below the surface) (flux 4-6 gCH₄ m⁻²).

Essential fluxes of carbon dioxide and methane were recorded from the surface of the disturbed bogs - clearings along the low treed bog, where, depending on the ground cover, CO₂ emission vary in range 339 - 1267 2200 gCO₂ m⁻², and CH₄ emission is 12.5 gCH₄ m⁻². An assessment of the regional greenhouse gas balance for an area of 1,497 km² showed that in total terrestrial ecosystems absorb about 666 000 t in CO₂ equivalent per year. Forests annually accumulate 558 500 t, and peatland ecosystems absorb a total of 112 800 t.

Despite the fact that the intensity of annual carbon accumulation in forest ecosystems is higher than in peatlands, in the long-term perspective, peatlands conserve more atmospheric carbon than forests. According to the results of radiocarbon analysis of the upper layers of peat, long-term accumulation in the bog ecosystems of the study area is 59 600 t CO₂ per year, and long-term carbon accumulation in the soil of forest ecosystems is estimated at 22 000 t CO₂ per year.

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