Geophysical Research Abstracts
Vol. 16, EGU2014-2068, 2014
EGU General Assembly 2014

Soil productive potential of the river basins located in European part of Russia

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The search for integral monitoring indicators of natural ecosystems biosphere functions assessment is becoming really urgent nowadays. From the point of view of ecologic and economic indicators, characterizing ecosystems structure and functioning, soil fertility and vegetation productivity parameters, which have been studied for a long time as biosphere and environment forming functions rank first priority.
For integrated characteristic of ecosystems soil and vegetation condition we have suggested to apply the index of "soil-productive potential" (SPP), characterizing the ability of nature and nature-anthropogenic ecosystems for sustained product (phytomass) reproduction under specific soil-bioclimatic conditions. It characterizes ecosystem reserve via the index expressed in numbers and averages the following parameters:
• specific phytomass reserve (all living elevated and underground parts of plants in terms of total dry mass t/ hectare are considered);
• specific productivity (phytomass augmentation for a year per unit area);
• natural soil fertility (humus content, % as a characteristic);
• crop-producing power (grain crop-producing power is considered, centner/hectare);
• bioclimatic parameters (integrated index, including the sum of biologically active temperatures and moistening coefficient);
• soil-ecologic index (SEI).
Soil-productive potential allows the assessment of average perennial area resource for phytomass production by natural and nature-anthropogenic ecosystems.
For more convenient comparative estimation, characteristics are ranked by dividing them into equal intervals according to 5-number scale with consequent numbers summation to overall index. As a result both soil-productive potential of natural eco-systems and total soil-productive potential of the whole area with a glance to the condition of available agrocenosis are calculated.
Soil-productive potential of 12 first-rank major river basins of the European part of Russia have been assessed. Within the largest basin in terms of watershed area of the Volga, the Oka and the Kama (2-nd rank river basins) have been singled out and characterized separately.
The method of river basins boundaries overlapping (in digital map scaled 1:1000000) on zonal spaces in «Arc GIS» has been applied.
The biggest phytomass reserve is concentrated in the Neva and the Oka river basins, in the southern direction phytomass reserve is gradually declining due to the decrease of forest area. The most productive areas are the Don, the Ural, the Kuban basins. Productivity of the Volga basin ecosystems as a whole is medial (the highest values are typical for the Oka basin). The highest humus content is registered in the Kuban river basin, the lowest - in the North Dvina basin. The most favourable bioclimatic conditions are observed in the Dnieper basin. As a result high values of soil-productive potential are typical for the ecosystems of the Dnieper, the Kuban and the Volga basins where this value is high only due to the Oka basin area.
The received values of soil-productive potential were correlated to hydraulogic characteristics of these basins, peculiarities of land use and arable land condition (according to SEI and crop capacity). High discharge module is stated to be typical for the northern rivers basins of little soil-productive potential (the Pechora, the Mezen); river basins of high soil-productive potential are characterized by low or average values of discharge module (the Dnieper, the Oka, the Kuban).
The most agriculturally developed area is the Don basin, as here agricultural load reaches the highest limit, about 60% of the area is ploughed up though natural ecosystems and agricultural systems potential is not the highest, that may threaten the proper functioning of the basin.
Ecosystem high soil-productive potential in the Kuban basin corresponds to good condition of arable lands, high

crop capacity and great agricultural development of the area.