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ARID ECOSYSTEMS

Журнал освещает фундаментальные исследования и результаты прикладных работ по проблемам аридных экосистем и борьбы с антропогенным опустыниванием в региональном и глобальном масштабах. Издается с 1995 года по решению Бюро Отделения общей биологии Российской академии наук.

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РОССИЙСКАЯ АКАДЕМИЯ НАУК
ОТДЕЛЕНИЕ БИОЛОГИЧЕСКИХ НАУК
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Научного совета по проблемам экологии биологических систем

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ABSTRACTS

SATELLITE CLIMATIC EXTREMES INDEX OF DRYLAND

© 2012. A.N. Zolotokrylin, T.B. Titkova

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Satellite index for detecting climatic extremes, such as droughts and over-humidification after heavy precipitation at drylands, have been suggested. Satellite Climatic Extremes Index (SCEI) calculated as summed deviations from the long-term average values (normalized SD) of soil moisture, NDVI, albedo, surface temperature. Peculiarities of SCEI in case of studying desertification dynamics in the North-West Caspian region are discussed.
Keywords: climatic extremes, albedo, surface temperature, NDVI, soil moisture, MODIS, dryland.

ANALYSIS OF EXTENSIVE ATMOSPHERIC DROUGHTS FEATURES IN THE SOUTH OF THE EUROPEAN RUSSIA

© 2012. E.A. Cherenkova

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Classification of hazardous atmospheric drought area over the European territory of Russia using daily observations data of daily surface air temperature and daily precipitation for the period 1936-2010 was done. Winter/ spring meteorological conditions and spatial/ temporal features of summer atmospheric drought on the south of European Russia in some years of the most extensive drought are investigated. It is shown that the highest correlation identified between: atmospheric drought area and a total duration of the drought; the number of continuous periods of more than 20 days with maximum daily temperature above 25°C without effective precipitation from May to September; the number of days with maximum daily air temperature above 25°C without effective precipitation from May to September.
Keywords: climate change, hazardous atmospheric drought, Selyaninov's hydrothermal coefficient, south of the European Russia.

TO THE PROBLEM OF PROGNOSIS OF MELTED SNOW SURFACE RUNOFF FORMING IN FOREST-STEPPE AND STEPPE ZONES

© 2012. A.T. Barabanov, V.I. Panov

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Nature factors role in forming the melted snow surface runoff is analised, the law of erosion-hidrologic process limiting factors is set out, an eguation for calculating the runoff and a method of its prognosis are given.
Keywords: surface runoff, snow stocks, soil freezing depth, soil moisture, runoff limiting factors law.

THE IMPLEMENT OF MARKOV CHAINS FOR PROBABILISTIC FORECAST OF THE DIFFERENT CONDITIONS OF MOISTENING IN THE VEGETATION PERIOD ON THE EXAMPLE OF VORONEZH

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We propose a methodological approach to assessing the probability of occurrence of different moisture conditions in individual months of the growing season for the territory of the Voronezh using Markov chains, according to long-term observations of air temperature and precipitation.
Keywords: moisture, precipitation, air temperature, frequency, probability, vegetation period, hydrothermal coefficient, Markov chain.

THE PROBLEMS OF DESERTIFICATION IN REPUBLIC TUVA

© 2012. A.D. Sambuu*, A.B. Dapyldie*, A.N. Kuular*, N.G. Khomushku**

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Results of studies of changes of the steppe landscapes of Tyva in connection with various use of lands are presented. Under the anthropogenic influence to the steppe native zone transformed natural vegetation and changed the productivity in steppe landscapes of Tyva with changing of the plant cover and replaced some the ecosystems with agricultural ecosystems. With increasing anthropogenic press to the native steppes deflation of the agricultural ecosystems is increased. In Tyva from the all kind of transformation the deflation is very developed. The maximum study of the degradation of the agricultural ecosystems are the arable field and pasture. Consequence of the agrarian assimilation of steppes of Tyva is deserted lands.
Keywords: dedeserted, degradation, salted, deflation, water erosion, transformation, monitoring.

MEIOBENTHOS COMPOSITION AND STRUCTURE IN HIGH-MINERALIZED TRIBUTARIES OF THE ELTON LAKE

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The meiobenthos of six tributaries of the hypergaline Elton lake (the Volgograd region) in low-flow period (August) has been researched for the first time. New species for science, Russia and the region have been found. The widespread halophilic and halobiontic organisms formed the basis of the community. The community was characterized by the relatively low diversity and the extremely large range of abundance and biomass with the high extent of domination of separate species. The tendency of decrease of species richness with increase of a mineralization from mezo- to eu- and hipergaline level was observed.

Keywords: high-mineralized (salty) rivers, meiobenthos, taxonomic composition, quantitative parameters.

VEGETATION OF SALINE ECOTOPES IN THE SOUTH-EAST BOUNDARY OF EUROPE

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In the area of the SE Europe border 57 lower units of saline ecotopes vegetation distinguished with use of the Braun-Blanquet method have been described. They belong to 9 classes (*Artemisietea lerchianae* Golub 1994, *Crypsidetea aculeatae* Vicherek 1973, *Glycyrrhizetea glabrae* Golub et Mirkin in Golub 1995, *Molinio-Arrhenatheretea* Tx. 1937, *Nerio-Tamaricetea* Br.-Bl. et Bolòs 1958, *Petrosimonio oppositifoliae-Kalidietea caspici* Mirkin ex Mucina cl. prov., *Phragmito-Magno-Caricetea* Klika in Klika et Novák 1941, *Scorzonero-Juncetea gerardii* Golub et al. 2001, *Thero-Salicornietea* Tx. in Tx. et Oberd. 1958) and a few of them are placed in interclass spaces. The families *Poaceae, Chenopodiaceae* and *Asteraceae* participate most actively in the community formation. More often the communities occupy negative relief elements and adjacent sites. Most of the classes occur on intrazonal soils with wide amplitude of a salinization degree in the upper horizon. The communities are located in valleys of two large rivers of the region (the Volga and the Ural) and on the Primorskaya plain as well as in their neighbourhoods (in a radius of dozens of kilometers). Most of them are registered in the south of the study area – mainly in and westwards the Volga-delta, namely here their greatest diversity is observed. The classes *Thero-Salicornietea, Glycyrrhizetea glabrae* and *Molinio-Arrhenatheretea* are geographically more widely distributed. The communities are located mainly nearby water objects and in rather densely populated areas. Both natural and anthropogenic factors determine their existence. The important ones are direct and indirect influence of the Caspian sea level change, change of a hydrographic network, grazing, recreation, construction, soil erosion, destruction of habitats, hay-mowing etc. 13 associations (5 – in Kazakhstan, 8 – in the Astrakhan' region) with rare and endangered species demanding protection at various administrative levels may be recommended for regional Green Books.
Keywords: vegetation, saline ecotopes, south-east of Europe, the Braun-Blanquet method.

GRAZING BEHAVIOR OF AWASSI SHEEP AND THE BIODIVERSITY OF PLANT SPECIES UNDER SEMI-ARID RESERVED CONDITIONS

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The objectives of this study were to classify plant and vegetation patterns as well as to

investigate the grazing behavior of Awassi sheep raised under extensive semi-arid environmental conditions. The study was conducted at Twana reserve. Plant productivity was determined and the allowable productivity and stocking rate were calculated. High variation was observed in native vegetation used for sheep grazing in the reserve. Additionally proper stocking rate should be applied in each grazing scenario in order to avoid overgrazing.
Keywords: Awassi sheep, plant species, grazing behavior, reserved conditions, Jordan

DIVERSITY ASSESSMENT OF VERTEBRATE FAUNA IN A WETLAND OF HOT HYPERARID LANDS

© 2012. H. Chenchouni

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A great paradox arises when we talk about biodiversity in wetlands located at hot-hyperarid lands. Ayata Lake (155 ha) belongs to the complex of wetlands of Oued Righ Valley in Algerian Lower-Sahara. Surveys conducted between October 2009 and June 2010 has allowed assessing vertebrate diversity living in the lake and its surrounding areas. Several methods and techniques were used for sampling and censing each group of vertebrate (fish, amphibians, reptiles, birds and mammals). Inventories revealed the existence of 03 fish, 02 amphibians, 06 reptiles, 55 birds, and 07 mammals. Phenological types (winter or summer migrant, breeder, sedentary, occasional visitor) were attributed to birds then population dynamics were discussed. Birds used generally the waterbody in winter where migrants, mainly waterbirds, were abundant. We investigated for most inventoried species the specific habitats occurring in that respond to their behavioural and diet ecology. Biogeography status of vertebrate species revealed a desert affinity, which is represented mainly by Saharan and Saharo-sindian bio-models; except for birds which revealed dominance of Palaearctic biogeographical categories. This approach helped to highlight the biological resources of Ayata Lake and determine its actual ecological value. Furthermore, this study proposes some suggestions for management and conservation.
Keywords: Ayata Lake, Lower-Sahara, fish, amphibians, reptiles, birds, mammals, biodiversity, Algeria.

VEGETATION DIVERSITY AND ROLE OF *LEPTADENIA PYROTECHNICA* IN BIOMASS CONTRIBUTION AND CARBON STORAGE IN ARID ZONE OF INDIA

© 2012. G. Singh, K. Singh, D. Mishra, S. Shukla

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We studied diversity of tree-shrubs and productivity and carbon storage capacity of *Leptadenia pyrotechnica* (Forsk.) Decne in Indian Desert in three agro-climatic zone namely Arid western plain (AWP), Transitional plain of inland drainage (TID) and Transitional plain of luni basin (TLB) with a view to monitor the contribution of *L. pyrotechnica* in biomass production and carbon storage in arid areas. Population and basal area were greater for shrubs than for the tree species. The contribution of *L. pyrotechnica* in basal area was about 40%. Carbon content of *L. pyrotechnica* varied from 43.32 to 45.86% and 39.45 to 42.51%, whereas nitrogen content varied from 0.41 to 2.21% and 0.57 to 1.69% in oven dry stem and

roots, respectively indicating relatively greater carbon and nitrogen in stem than in roots. The highest population of tree and shrubs was in TID and AWP, respectively but total basal area was highest in TLB zone. Species richness was highest for tree, whereas species diversity and evenness were highest for shrub in all agro-climatic zones. Species dominance was highest in AWP zone for both tree and shrubs. Plants of *L. pyrotechnica* were taller in TLB, thicker (collar diameter) in TID and with highest numbers of tillers in AWP. Height (H) and collar girth (G) showed power relations (R^2=0.683, P<0.001) with above-ground and compound relations (R^2=0.552, P<0.001) with below-ground biomass. Both the above-ground and belowground biomasses were the highest in TLB and lowest in TID zone. Root/shoot ratio was similar in AWS and TID zones but was significantly greater (1.25) in TLB zone suggesting greater biomass allocation to roots. Conclusively, *L. pyrotechnica* has significant contribution in vegetation population, basal area and biomass production and showed greater biomass allocation to roots that help in stabilizing soil and sequestering carbon.
Keywords: agroclimatic zone, biomass partitioning, carbon storage, Indian desert.

CURRENT IMPORTANT PROBLEMS OF THE MODERN STEPPE SCIENCE (INFORMATION ABOUT THE VI INTERNATIONAL SYMPOSIUM «STEPPE OF NORTHERN EURASIA»)

© 2012. A.G. Ryabukha, A.A. Chibilyov, S.V. Levykin

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The VI International symposium «Steppe of Northern Eurasia» took place in Orenburg on June 18-23, 2012. It was organized by the Institute of Steppe Ural Branch of Russian Academy of Sciences, Nature protection committee of the Russian Geographical Society, with the assistance of the Russian foundation for basic research, and the UNDP / MNR / GEF project "Improvement of the mechanisms and management of protected areas in the steppe biome of Russia". The purpose of the Symposium was to address urgent problems in the steppe of natural resources, study and preservation of landscape and biological diversity of the steppes in the 21st century. Over 180 scientists from 9 countries (France, the Netherlands, Turkey, Hungary, the Czech Republic, Ukraine, Kazakhstan, and Russia) attended the VI International symposium «Steppe of Northern Eurasia» including from 24 regions of Russia. More than 80 papers were presented in two plenary sessions and four case ones. The reports to reflect the results of research in the following areas: emerging issues of historical steppe science, culture and natural heritage of steppes, biological and soil diversity of steppe regions, steppe nature use strategy and problems of ecological rehabilitation for steppe landscapes, ecological and geographical research of steppes and adjacent areas: evolution, structure and anthropogenic transformation of landscapes.