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EVALUATION OF A BLENDED SATELLITE IN-SITU SNOW DEPTH ANALYSIS OVER MOUNTAIN TERRAIN

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ABSTRACT

Operational snow depth analysis is utilized for regional snow assessments over a variety of temporal scales, providing important information to water management planners and policy makers. Another use of snow-depth-based analyses is for initialization of snow states in numerical weather prediction (NWP) models, with implications for predictions of the meteorological atmospheric variables. A blended snow depth analysis based on optimal interpolation of satellite and in-situ data is evaluated over mountain terrain. The method uses a satellite estimate of snow depth as first guess and updates it by blending it with in-situ snow depth from surrounding stations. The technique is applied to snow depth retrieved from AMSR2 onboard the GCOM-W1 satellite and in-situ snow depth obtained from NOAA's Global Historical Climatology Network. Next, the utility of the AMSR2 satellite snow depth and the blended output are evaluated over Western US during the winter months of January and February 2017. To investigate the potential benefit of the technique for NWP model applications, snow depth obtained from NOAA's Global Forecast System is also inter-compared with the satellite and blended outputs. Results indicate that this blending approach greatly enhances the performance of the satellite product over mountain terrain, making it suitable for reliable large-scale snow assessments over these regions. Moreover, the technique generates more accurate blended output compared to forecast snow depth from NOAA's Global Forecast System, demonstrating the benefit of the technique for NWP model applications.

Keywords: snow depth; optimal interpolation; satellite remote sensing; in-situ data

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FACTORS AFFECTING MOBILITY OF ZINC IN SOILS OF UKRAINE

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ABSTRACT

Zinc (Zn) deficiency is the most common problem of micronutrient deficiency on our planet. This problem is also relevant for Ukraine, as soils are insufficiently provided with Zn, plants are deficient, respectively, and insufficient quantity of Zn is contained in food, which leads to human diseases. Our research showed that the total zinc content in soils increased from the north to the south of Ukraine (Polissya < Forest-Steppe < Steppe): in sod-podzolic soil the Zn content was 40 mg kg⁻¹, in dark gray podzolic - 45 mg kg⁻¹, chernozem typical - 48 mg kg⁻¹, chernozem ordinary - 58 mg kg⁻¹, dark chestnut - 70 mg kg⁻¹. The content of Zn mobile forms, on the contrary, was subject to inverse dependence - the highest level was observed in the soils of Polissya - 9.5 mg kg⁻¹, the lowest in the soils of Steppe - 0.5 mg kg⁻¹. Zn was more firmly fixed by the soils of chernozem-type, higher mobility was observed in soils with pronounced podzolic processes. Zn mobility depended from the properties of soil: pH of the soil solution, the amount of organic matter and clay minerals. Zn mobility increased with increasing soil acidity, increasing the amount of organic matter and clay fraction. There was a close inverse correlation between these indicators and Zn mobility: the pairwise correlation coefficients (r) ranged from - 0.861 to - 0.991. Agrotechnological methods of winter wheat growing reduced the quantity of potentially mobile Zn compounds in the soils of Polissya, Forest-Steppe and Steppe of Ukraine in compared to the natural background. However, mineral and organic fertilizers mainly increased their content, as well as intensified the transfer of Zn from the soil to wheat plants, as evidenced by the biological absorption coefficients which were > 1.

Keywords: agrochemical parameters, mobility, soil, climatic zones, zinc.

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EFFECTS OF CLIMATE CHANGE AND DROUGHT IN KONYA: A REVIEW

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ABSTRACT

The environment of our planet likes simply like a greenhouse. Practically 50% of the sun's lights arriving at the earth are reflected from the earth. Atmospheric climate is described via carbon dioxide, methane, water stream, ozone, nitrogen oxides, and so others, which are additionally called ozone depleting substances. On these gases, they reflect a portion of the sun beams reflected from the earth back to the earth. The effect of environmental change isn't only an expansion in temperatures. Plants, creatures and biological systems just as human networks are at genuine hazard because of components, for example, dry season, floods, serious tropical storms, expanded recurrence and impact of extraordinary climate occasions, raised sea and ocean water levels, expanded causticity of the seas, softening icy masses. An impermanent dampness lop-sidedness is called dry season territorially. Its long-haul indication permits time to take the fundamental measures for dry season, however dry spell is the most noticeably terrible calamity after some time. The drought, which can manifest itself everywhere after the moisture balance deteriorates, can be felt even in areas with high precipitation. Drought has been effective in Iran as in many countries around the world and the duration of drought has been constantly increasing in the last 20 years. As a result of the study, it was determined that the yield of dry products will decrease in the future. As a precaution, it is recommended to complete the dams and ponds, transfer water between the basins and switch to modern irrigation systems. Drought has a complex structure that affects many sectors of the economy and extends this effect far beyond regions with drought. The reason for this is that water is an indispensable factor in production. The majority of the Konya Closed Basin water supply is supplied from groundwater due to the low level of above-ground water sources, limited alternative irrigation sources or full efficiency. Konya Closed Basin has significant water potential. However, the increasing agricultural activities in recent years have caused excessive and unplanned water use, and thus the surface and groundwater levels have decreased.

Keywords: Climate change, Greenhouse effect, Drought, Temperature increase, precipitation

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EFFECT OF FERTILIZERS SYSTEMS ON ACCUMULATION OF HEAVY METALS IN GRAY FOREST SOIL

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ABSTRACT

Mobile forms content of plumbum and cadmium at systematic application of organic and mineral fertilizers in field crop rotation on gray forest soil has been investigated. It was found that the use of fertilizers affected the accumulation of these indicators in the soil relative to the initial state, but the maximum concentration of maximum permissible concentrations (MPC) was not observed. With the organic fertilizer system (60 t/ha of manure) there was a decrease in mobile plumbum by 33% compared to its initial content in the soil. However, it should be noted that the coefficient of technogenic concentration for plumbum was more than one ($K_c > 1$), which indicates the process of its accumulation in the soil to the background level. The highest indicator of the coefficient of technogenic concentration for plumbum ($K_c = 2$) was observed with the joint application of organic and mineral fertilizers (60 t/ha of manure + $N_{100}P_{60}K_{100}$). The distribution of mobile plumbum and cadmium according to the soil profile depended on the peculiarities of soil genesis - there was a tendency to increase stocks under agrochemical load in the norm $N_{100}P_{60}K_{100}$ against 60 t/ha of manure, in the lower part of illuvial humus and upper - illuvial horizons at a depth of 50–80 cm, as well as a decrease at the boundary of humus-eluvial and illuvial humus horizons - 25–45 cm. Studies of the content of mobile forms of plumbum and cadmium in the grain of winter wheat indicate the stability of levels of contamination by these elements of the grain within the permissible concentrations of MPC.

Keywords: heavy metal, soil, toxic effect, plants, soil fertility, fertilizers.

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A STUDY ON DIFFERENCES OF ALBANIAN *Salvia officinalis* L. ESSENTIAL OILS DEPENDING ON GEOGRAPHICAL POSITION

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ABSTRACT

Essential oil percentage content of wild *Salvia officinalis* L. isolated with hydro distillation method was explored depending on geographical area. Chemical composition of essential oil collected in different areas of Albania located in North and South was assessed. The sampling was extended in 11 regions of Albania collected during the year 2017. Samples were collected on during summer in the wild. Hydrodistillation method has been applied for the extraction of essential oil in leaves. The oil was isolated in a Clevenger type apparatus and analysed with GC-FID and GC MS/MS QQQ. The samples were immersed in 500 ml water and boiled using distillation flask heater for 3 hours, at boiling point temperature. The plant/liquid ratio used for this study was 1:10 (g:ml). The yield of essential oil in relation to the geographical position shows small changes from point to point. The percentage of essential oil level for the analyzed samples varies between 1.8 - 3.0%. All eleven samples were used for oil profiling via GC-FID/GC MS analysis but only two of them, North and South region (Koplik/M2 and Dhembel/M10), were chosen in order to compare essential oil composition between north and south of Albania. Around 33 chemical compounds were analyzed and identified according to their relative retention time and mass spectra. The main components were α -thujone (20-35%), Camphor (18-44%), 1,8-cineole (8-15%).

Key words: essential oil, *Salvia officinalis* L, hydrodistillation, extraction, sampling, chromatographic

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***Staphylococcus aureus* STRAINS ISOLATED FROM BOVINE MASTITIS SENSITIVITY TO ANTIBIOTICS**

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ABSTRACT

The aims of this work was to study the sensitivity of *Staphylococcus aureus* strains isolated from bovine mastitis antibiotics. A total of 22 pure strains of *S. aureus* were collected from 58 quarter milk samples from 29 (69,04%) dairy cows detected with subclinical mastitis by California mastitis test (CMT). The isolates were subjected to an antibiogram. The tests showed that one strain among the isolates tested is MRSA (Methicillin resistant *Staphylococcus aureus*). This MRSA exhibited cross-resistance to all betalactamines which extends to other families of antibiotics. SARM strains also showed strong resistance. vis-à-vis penicillin (95,23%) and tetracycline's (90,47%) Resistance was also recorded vis-à-vis; the combination amoxicillin + clavulanic acid (47,61%), erythromycin (19,04%), the combination trimethoprim + sulfamethoxazole (4,76%) and bacitracin (9.52%). neomycin, gentamicin, ciprofloxacin and clindamycin were active on MRSA's. The high prevalence of subclinical mastitis and multi-resistant *S. aureus* strains testifies to the need for an effective control strategy based essentially on the early detection of subclinical mastitis, the identification of the causative agent and the study of its sensitivity to common antibiotics.

Keywords: Mastitis, SARM, Antibiogram, SARM, *S. aureus*.

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