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MANGANESE IN THE OIL DEPOSITS OF THE DNIPRO-DONETSK DEPRESSION

This work is devoted to the results of the latest research on the characteristics of the distribution and content of metals in oils with the aim of creating an objective (natural) classification of the main 36 active oil deposits of the largest oil and gas-bearing region of Ukraine - the Dnipro-Donetsk Basin using cluster analysis [1-4]. Solving this task will contribute to the development of a set of predictive criteria for hydrocarbon accumulations and the scientific substantiation of geological-economic, technological and ecological assessment of their use, which in turn determines the relevance and practical value of the conducted research.

The factual basis of the work was the results of analyzes of the manganese content in oils from 36 deposits of the Dnipro-Donetsk Basin. In the process of research, in order to achieve the goal, clustering of oil deposits was carried out using the weighted centroid method, which was implemented in the professional statistical software platforms "STATISTICA" and "SPSS", the analysis of the clustering results was performed, which made it possible to interpret the obtained geochemical information in a genetic sense.

During the clustering of Dnipro-Donetsk oil and gas region deposits according to the manganese content in the oils (Fig. 1), seven groups of clusters were noted: 1.1.1.1.1, 1.1.1.1.2.1, 1.1.1.1.2.2, 1.1.1.2, 1.1.2, 1.2 and 2. The average manganese content in deposits oils is 0.41 ± 0.05 ppm, median value 0.3 ppm. Cluster 1.1.1.1.1 contains oil deposits: *Matlakhivske*, *Perekopivske*, *Novo-Mykolaivske*, *Monastyryshchenske*, *Malosorochynske* and *Korobochkynske* with an abnormally low manganese content from 0.068 ppm (*Matlakhivske* deposit) to 0.131 ppm (*Korobochkynske* deposit), with an average value for the cluster of 0.102 ppm. Cluster 1.1.1.1.2.1 unites the deposits: *Prokopenkivske*, *Kremenivske*, *Lipovodolynske*, *Solontsivske*, *Krasnozaiarske*, *Yaroshivske*, *Kachalivske*, *Rozpashnivske*, *Prylukske*, *Khukhrianske* and *Sukhodolivske* with low content from 0.18 ppm (*Prokopenkivske* deposit) to 0.27 ppm (*Sukhodolivskoye* deposit), average concentration manganese in the oils of the cluster deposits is 0.23 ppm. The *Sofiivske* and *Talalaivske* deposits form cluster 1.1.1.1.2.2 with content values below the average, respectively, from 0.3 ppm to 0.3058 ppm, the average content value for the cluster is 0.3029 ppm. Average concentrations of 0.373 ppm (*Bakhmachske* deposit) - 0.452 ppm (*Trostianetske* deposit) are deposits: *Bakhmachske*, *Radchenkivske*, *Kulychikhinske*, *Karaikozivske*, *Turutynske*, *Solokhivske* and *Trostanetske* deposits of cluster 1.1.1.2, with the average value of this indicator for the cluster 0.403 ppm. Cluster 1.1.2 is composed of deposits: *Zakhidno-Kharkivtsivske*, *Kybytsivske* No. 52, *Shchurynske*, *Kybytsivske* No. 1, *Kybytsivske* No. 56 and *Sahaidatske* No. 1 with content values above the average, from 0.547 ppm (*Zakhidno-Kharkivtsivske* deposit) to 0.719 ppm (*Sahaidatske* deposit No. 1), with an average value for the cluster of 0.604 ppm. Cluster 1.2 is represented by oil deposits: *Kybytsivske* No. 5, *Kybytsivske* No. 51 and *Sahaidatske* No. 13 with high values of manganese concentrations, from 0.9 ppm (*Kybytsivske* deposit No. 5) to 0.95 ppm (*Sahaidatske* deposit No. 13), with an average content of cluster 0.924 ppm. Abnormally high content is associated only with the single *Yuriivske* deposit of cluster 2 with a value of 1.6 ppm.

Taking into account that the concentration of metals in the composition of oil from the deposits of the Dnipro-Donetsk basin is a geochemical indicator of their general ontogenesis, such an analyzed factor as the manganese content requires further consideration and interpretation in genetic terms.

The main practical value of the performed research consists in establishing the concentrations and the possibility of predicting the content of metals in the oils of the studied deposits, which in turn provides the opportunity to solve the following urgent practical tasks:

- a number of industrial-raw materials issues, which are based on the assessment of the metal content of oils as ore raw materials, since the content of some elements in them sometimes exceeds ore concentrations, therefore there is a possibility of their concomitant industrial extraction from by-products during their processing processes;
- technological issues caused by the negative impact of some elements contained in oils on the equipment used during their extraction and processing;
- environmental problems associated with the formation in the process of processing and, to a lesser extent, during oil extraction, high concentrations of compounds of potentially toxic metals that pose a threat to the

environment.

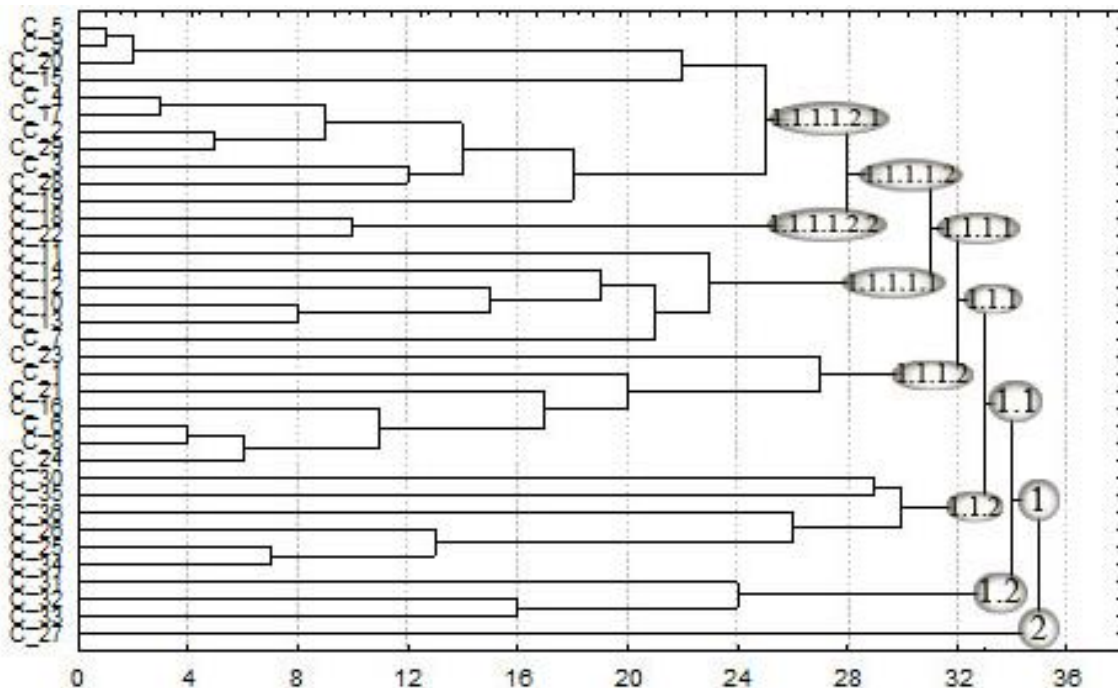


Figure 1. Dendrogram of the clustering results performed by means of the weighted centroid method of manganese content in oil deposits. Legend: 1, 2, 1.1, 1.2, 2.1, 2.2, 2.3 – clusters; Oil deposits: 1 – Bakhmachske, 2 – Prylukske, 3 – Krasnozaiarske, 4 – Kachalivske, 5 – Kremenivske, 6 – Karaikozovske, 7 – Korobochkynske, 8 – Kulychykhinske, 9 – Lipovodolynske, 10 – Monastyryshchenske, 11 – Matlakhivske, 12 – Malosorochynske, 13 – Novo-Mykolaivske, 14 – Perekopivske, 15 – Prokopenkivske, 16 – Radchenkivske, 17 – Rozpashnivske, 18 – Sofiivske, 19 – Sukhodolivske, 20 – Solontsiivske, 21 – Solokhivske, 22 – Talalaivske, 23 – Trostianetske, 24 – Turutynske, 25 – Zakhidno-Kharkivtsivske, 26 – Shchurynske, 27 – Yuriivske, 28 – Yaroshivske, 29 – Khukhrianske, 30 – Sahaidatske No.1, 31 – Sahaidatske No.13, 32 – Kybytsivske No.5, 33 – Kybytsivske No.51, 34 – Kybytsivske No.52, 35 – Kybytsivske No.56, 36 – Kybytsivske No.1.

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