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Golovkinskii law for prediction of distribution of rock lithotypes of Permian deposits (east part of Russian plate)

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Zone of development of upper-permian-kazanian deposits in Volga-Kama petroleum province is the region of facies interrelations law identification. This law is known as the rule of Golovkinskii-Valter. Many details of geological formations relationship in change zones are still discussed. Efforts of analytic expression of Golovkinskii rule for specific regions of its development are very important. We analyzed width of horizons of the Kazanian Stage. They are in zone of facies change of marine gray and red formations of the east part of Russian plate. Results of this analysis were principle for analytic expression of Golovkinskii rule. Percent proportion of main lithological types of these rock formations was also used. We used profile which was based on data from 75 wells. This profile crosses region of development of kazanian deposits from the river Volga to Urals territory. It overpasses main structural and tectonic units of the region: Kazan-Kirov downfold, system of lifted blocks of Tatar Arch and Upper-Kama depression. Kazanian deposits of Kazan-Kirov downfold are represented by typical marine gray carbonate-terrigenous formation. Red formation is deposed within Upper-Kama depression. Zone of these formations relationship is limited to central parts of Tatar Arch. Abrupt fluctuations of content of one rock type in insignificant distance are common. Every rock type has unique features in its distribution on profile. That's why it is possible to study function of dependence of certain rock type content from distance as a sum of regular and chance components. Intensively rising change of proportions of different rock types is presented in the zone of transition from typical marine deposits to red deposits. So trends of variation of percent content (y) of main rock lithotypes depending on distance (x) can be described by simple difference equations: dy = -kdx, for rocks of marine gray formation. dy = k(M-y)dx, for rocks of red formation. M – mathematical expectation of rock type content. k – constant of proportionality. Definition of constants of these functions allowed to express Golovkinskii law in terms of exponential equations system for Kazanian deposits of studing region. There were established principles of facies transition in marine gray and red formations interrelations zone. So fields of development of rocks-collectors of hydrocarbons and impermeable layers of the region can be predicted.