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Global carbon cycle and petroleum genesisis

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Two features of the new global carbon cycle model allow us to take a fresh look at the genesis of oil. I mean orogenic cycles and global photosynthesis. The first links the processes of the earth's crust with photosynthesis, the second ensures the synthesis of "living matter" which is a source of organic carbon in rocks. Uneven movement and collisions of lithospheric plates caused cyclic and uneven dynamics of photosynthesis. Such dynamic provided maximum accumulation of organic matter in rocks at the end of the orogenic cycles during the transition from one cycle to another. This was the time when drastic environmental events and mass extinction of organisms were taking place. As a result, rocks, rich in organic matter ("black shale"), were formed. These rocks subsequently became powerful sources for hydrocarbon generation. The presence of global photosynthesis in the global carbon cycle with its ability to self-regulation, made the cycle evolving and finally led to the point of ecological compensation, i.e. to a sustainable state. The analysis of the problem by means of carbon cycle model allows concluding that the first industrial oil deposits couldn't appear before the Ediacaran (650 – 540 Ma), whereas organic-rich rocks with related oil deposits were unlikely to arise after the Miocene. This statement is confirmed by the correspondence of the distribution of known world oil reserves and the number of discovered oil fields in the territory of the former USSR as well as data on successive four stages of 13C oil enrichment observed in the Phanerozoic. The ability of global photosynthesis to self-regulation depending on CO_2 and O_2 concentrations in the surrounding makes the cycle spontaneously strive to a steady-state. The equation of global photosynthesis applied to global carbon cycle looks as follows:

Biography

Alexander Ivlev received his PhD (1968) in the Chemical Technology Institute of Mendeleyev (Moscow). His next PhD (1986), he got in the Institute of Chemical Physics of Russian Academy of Sciences for research on biophysical mechanisms in photosynthesizing cell. In 2005 he was awarded the medal of the Russian Academy of Natural Sciences "To Author of Scientific Discovery". Since 1971 he worked in the Scientific Research Institute of Oil Prospecting. In 1995 he was invited to be a Professor of Russian State Agrarian University. Here he discovered the carbon isotope effect in photorespiration (1993) and the oscillatory nature of photosynthesis (2004) and began the project "Global Carbon Cycle". He is an author of 5 scientific monographs and over 230 publications in Russian and foreign journals.

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