

Subsurface water of West Siberia

SHIGANOVA O.V., SMIRNOV L.V., SURKOV V.S. Siberian Research Institute of Geology, Geophysics and Mineral Resources, Novosibirsk, Russia.

The West Siberian sedimentary basin, with the rocks containing about 500 thous. km³ of subsurface water, involves two hydrogeological stages divided by the Turonian-Oligocene argillaceous aquiclude: upper (Paleogene-Quaternary) and lower (Jurassic-Cretaceous). HCO₃⁻, Cl⁻, Na⁺ ions prevail in water of the upper stage, HCO₃⁻, Ca²⁺, Mg²⁺ ions dominate in marginal zones (mainly in the east and south-east). Subsurface water mineralization is no more than 10-15 g/l. Chloride sodic brines with mineralization of up to 100 g/l are found in the southern regions (groundwater of near-swamp belts). Primary resources of fresh and low-mineralized subsurface waters (up to 3 g/l) are concentrated there as well. Their geological reserves constitute about 70 thous. km³ and are principally localized in central and northern West Siberia.

Water composition of the lower stage is being formed affected by lithofacies and pressure-temperature conditions. Cl⁻ and Na⁺ ions are dominating; HCO₃⁻ content is enhanced in zones of infiltration recharge only. Mineralization averages 15-40 g/l. Brines, up to 80-90 g/l, are marked in zones where water-enclosing rocks rest on the basement carbonate formations. Azonal are formation waters of hydrocarbon pools, high HCO₃⁻ content and mineralization of 10-15 g/l exceeding the background one are characteristic of their composition. Industrial (J, Br) and mineral (J, Br, SiO₂, CO₂) water storage is significant. Exploitation reserves of the latter are more than 30 thous. m³ per day.