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Palaeogeographic and stratigraphic control of glendonite occurrences in the Middle Jurassic - Lower Cretaceous of Western Siberia

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Glendonite is a calcitic pseudomorph after metastable mineral ikaite - hexahydrate of calcium carbonate ($CaCO_3*6H_2O$); glendonites are often found within terrigeneous sediments in outcrops or well core. In modern marine settings, ikaite appears in clayey, silty or sandy sediments in near-freezing environments, and in ancient rocks glendonites findings are usually considered as indicator of cold bottom water. Ikaite and glendonite can be recognized in sediments by their specific shape - bipyramidal, three-pointed or pineapple-like. The aim of the current study was to evaluate the stratigraphic and spatial distribution of the Jurassic-Cretaceous glendonites found within wells penetrating sedimentary cover of the Western Siberia to determine the paleogeographic significance of glendonites.

The West Siberia region is a huge hydrocarbon province, many wells were drilled within the region, the stratigraphic framework and paleogeographic reconstructions for the Western Siberia are studied in details. In the West Siberia, terrigenous deposits of the Jurassic, Cretaceous and Cenozoic gently overlie fractured and folded basement rocks. Jurassic to Lower Cretaceous deposits usually occurred here at depths between 1,5 and 3,5 km. In the Jurassic, glendonites are found from Bajocian to Callovian stages (Middle Jurassic), as well as in all Upper Jurassic stages. The Lower Cretaceous glendonites are found within the Ryazanian, Valanginian and Hauterivian stages. Also, it appears that the wells with glendonite findings are located in the northwestern part of the Western Siberia (northern than 59°N).

The appearance of glendonites in the West Siberia is well corresponding with the stages of maximum climate cooling in the Middle Jurassic (Bajocian - Callovian) and Lower Cretaceous (Ryazanian and Hauterivian), while Upper Jurassic occurrences are uncommon. In the Middle Jurassic, the West Siberian platform was covered by a shallow epicontinental sea with depths of 25-100 m, and the and the distribution of glendonites, at least in the Bajocian and Bathonian, was controlled by low bottom temperatures due to the cold climate in the region. In the Callovian age, a deep depression (depths of up to 200 m) was formed in the easternmost part of the basin; this depression persisted until the end of the Hauterivian, thus, glendonites found the Upper Jurassic to Lower Cretaceous deposits indicate low bottom temperatures in the deepest parts of basin depression.

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