

11.3 **Oil shale distribution and geology in Fushun basin**

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The Fushun Basin is located south of Fushun city, in Liaoning Province, northeast China. This region is an important coal and oil shale production base for China. It is the biggest open-pit mining operation in Asia and is well known for its thick oil shale deposits. The oil shale in the Jijuntun Formation has been dated to the Eocene epoch. Based on extensive fieldwork and sample testing, it has been concluded that the Fushun Basin consists mainly of swamp to lacustrine deposits that range in age from the Guchengzi to Xilutian Formation. Oil shale deposits developed from semi-deep lacustrine to deep lacustrine facies. As Fushun basin is a residual basin of Cenozoic age with no marginal facies, it proved that the present strata are the center of the past. According to the relative abundances of clay minerals, the oil shale of Jijuntun Formation contains primarily kaolinite (16.8%), mixed-layers of illite and montmorillonite (11.2%), illite (5.8%), siderite and small amounts of pyrite. Organic matter present in oil shale from this area consists of types I, II1 and II2 kerogen. The type I kerogen is developed in low-grade oil shale and the type II1 kerogen is developed in high-grade oil shale. The paleoclimate of the Fushun Basin is characterized by warm, humid conditions. The paleosedimentary environment is described as semi-deep lacustrine to deep lacustrine facies, which is believed to be optimal for oil shale formation. The Fushun Basin is a fault basin and today it is a simple cline pushed over by a latter upward thrusting fault. The thickness of each oil shale stratum is very large, the thickest layer is 190 meters thick and the thinnest layer has a thickness of 70 meters. The deepest part of the basin is in the east and also contains the thickest oil shale layers. Various syndepositional faults influenced the distribution of oil shale. Transverse syndepositional faults controlled the thicker distributions, while the lateral syndepositional faults controlled the oil shale strata developed along the east-west direction. Above all, areas with secondary fault subsidence are the best places for finding thick oil shale.