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Northeast China Eastern basin group of lower cretaceous reservoir characteristics research

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Abstract: The eastern basin formation refers to yilan - ytong fracture of the east of the small and medium-sized sedimentary basin.Lower cretaceous in the basin, reservoir and caprock development, on the whole study basin reservoir characteristics of group appear necessary, field sampling, the microscopic study of rock debris particles structure and composition, and to grasp the physical properties of the rock from the Angle of the diagenetic evolution, finally summarizes the eastern basin group of overall evolution regularity of reservoir characteristics.

Keywords: *Northeast China Early Cretaceous lithofacies palaeogeo graphy sedimentary facies*

I. REGIONAL GEOLOGICAL

The eastern basin group includes 38 main sedimentary basin, with a total area of about 5.4 x 106 km2.Basin basement is mainly composed of palaeozoic group and the former metamorphic rock of palaeozoic group of parts with different period of granite intrusion.Sedimentary cover and in Cenozoic, upper palaeozoic.In the north of sanjiang, jixi and boli basin, lower cretaceous from the bottom up, in turn, drops of tao river, the city group and MuLeng group, in the southern region of tonghua, Korean pine, HunJiang basin, lower cretaceous Korean pine from bottom to top in turn development group, chick rock group, the head groups and prosper the woods mountain group [3-6].In the early cretaceous, warm and humid climate in the northeast, lakes, and formed a large number of fault depression freshwater lake basin.Existing studies have shown that [4-6, 9], the city of cretaceous sedimentary period of group, north main development in the study area in the land and sea, fan delta, littoral and shallow lake facies and equal to half deep lake sedimentary system, sedimentary water body is shallow, formed coal and mudstone, carbonaceous mudstone and coal seam type hydrocarbon source rocks and;South to lake facies sedimentary environment is given priority to, only a handful of areas developed limnetic facies, sedimentary water body is relatively deep, mainly lacustrine dark mudstone, shale, only a handful of thin coal seam basin development.Overall, consistent with global cretaceous hydrocarbon source rock development [10].And development in the delta delta plain, delta front subfacies, and beach bar of shore shallow lake development of sand body has good reservoir property, and closely adjacent to hydrocarbon source rocks of the mudstone, the so-called "the advantage", is favorable reservoir facies belt, thus to study the reservoir characteristics have great practical significance.

II. PETROLOGICAL CHARACTERISTICS

Research in the field, samples and the grinding chip, statistics under mirror clastic particles content in each chip.The results show that the northeast basin group of cretaceous reservoir is mainly feldspar sandstone and lithic feldspar sandstone.Reservoir, high shale content, clastic particles separation, grinding, and the bad - in the reservoir with low textural maturity and compositional maturity, belong to basin belong to product of proximal accumulation, its physical property is poor "congenital factors".

At the same time, combining with analysis of test results of other researchers, completed in northern songliao basin and eastern periphery of medium and small basin group of cretaceous reservoir rock type map (figure 1).By the figure can be seen, the lower cretaceous reservoir lithology mainly lithic feldspar sandstone (V), only a handful of basin for feldspar sandstone (IV) (VI), feldspathic lithic sandstone and lithic sandstone (VII).According to the structure of the classification of the lithology is mainly for the glutenite, in thick sandstone, sandstone, fine sandstone, fine sandstone and siltstone, followed by volcanic rock, bedrock reservoir (granite and metamorphic rocks, etc.).

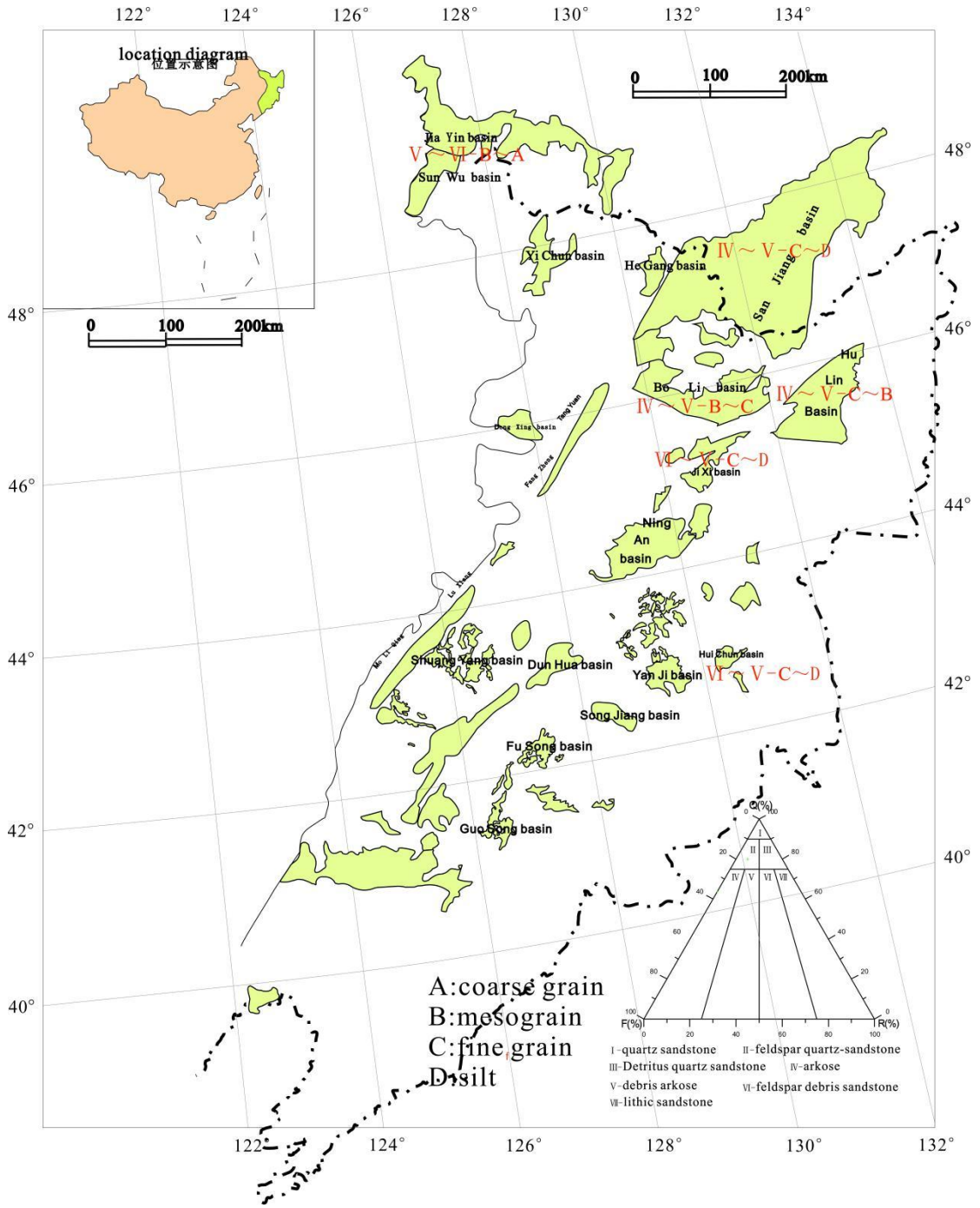

Fig1 In northern songliao basin and eastern periphery small basin group of cretaceous reservoir rock type distribution

III. THE DIAGENETIC CHARACTERISTICS AND PORE EVOLUTION

1. into rock characteristics

According to the influence of diagenesis on reservoir physical properties, outside the eastern and northern songliao basin group of reservoir diagenesis of small and medium-sized basin can be divided into constructive diagenesis and destructive diagenesis two categories (Zhou Shuxin, 1996).Destructive diagenesis mainly includes compaction and cementation, constructive diagenesis mainly include dissolution and metasomatism.

2. into rock

In the statistics of the fluid inclusions homogenization temperature, vitrinite reflectance, Ro, sporopollen color TAI, chromatography - mass spectrometry, pyrolysis analysis, X-ray diffraction, the common sheet, casting thin section microscopic identification, scanning electron microscopy (sem) and electron probe analysis laboratory, on the basis of according to the oil industry standards (SY/T5477-2003) clastic diagenetic stage division

standard, will yenji basin in Cenozoic clastic rock diagenesis stage stage A and B can be divided into major rock, rock up stage A1 subage stage, A2 and B two five diagenetic stage, diagenetic (Asia), the bottom depth of 250 m and 550 m respectively, 1300 m, 1700 m and 1700 m >.Use the same method, divided into other basin reservoir diagenetic stage, and the basin reservoir diagenetic stages of together, completed the cretaceous diagenetic stage distribution (figure 2).Found that most of the basin reservoir rock up to stage A period.But most basin can reach up in northern rock stage B period, the southern basin can only achieve A rock up phase.Therefore, the northern basin group of cretaceous diagenesis was stronger than the south, diagenesis has the characteristics of "north south weak".

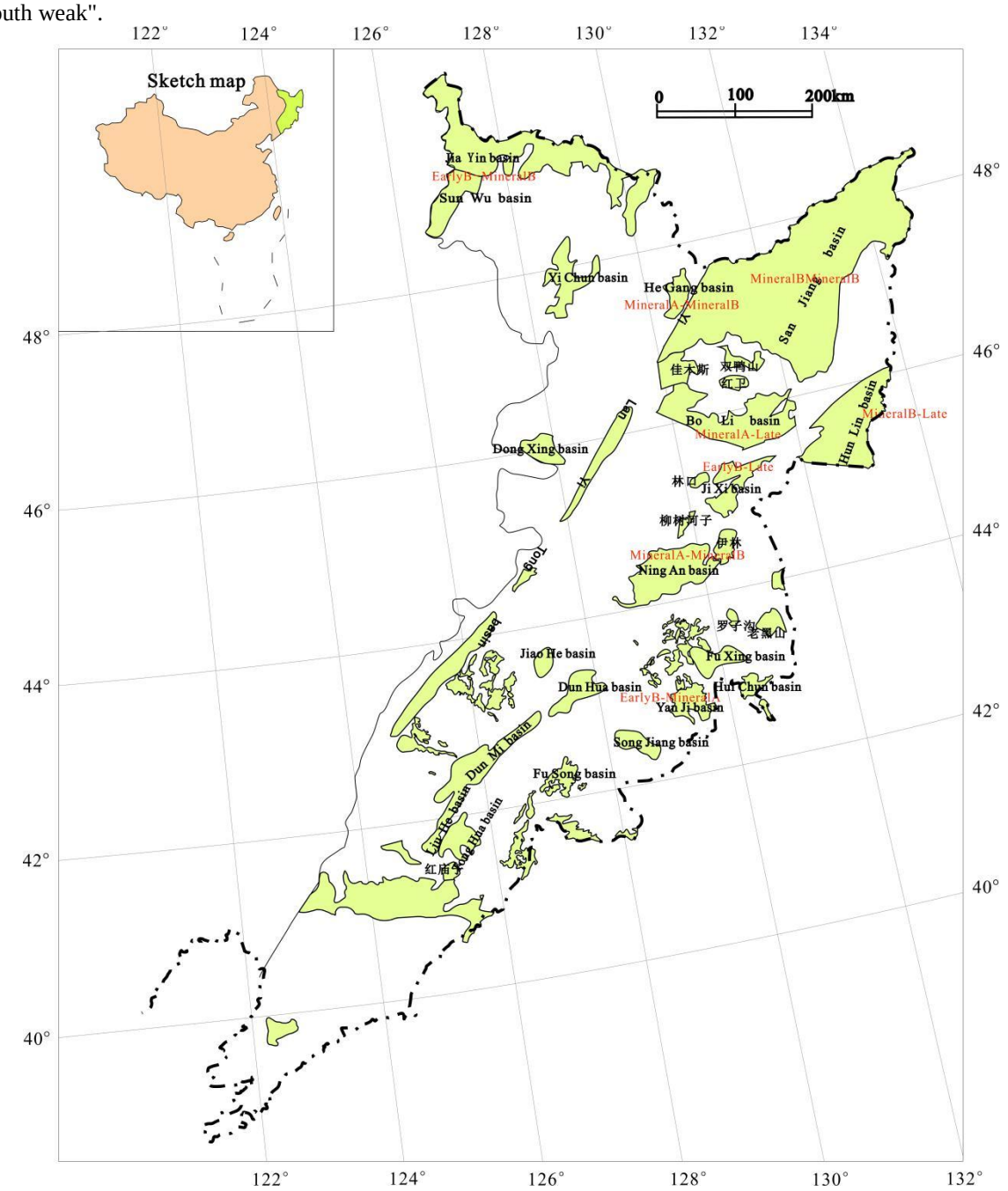

Fig 2 In eastern basin group in the distribution of Cenozoic reservoir diagenetic stage

3. pore type and pore structure characteristics

Northeast cretaceous basin group of the basin sediments of textural maturity and compositional maturity is not high, the original physical property is poor, compaction resistance is poor, the strong compaction and cementation, primary pore was consumed, now more than the porosity of the reservoir is formed by the dissolution of secondary porosity.By the microscopic observation found that the cretaceous reservoir in the porosity of intergranular dissolution pore, grain dissolved pore, intragranular dissolved pore, rare, primary pore

reservoir's throat is small and micro-fine throat - has a fine throat.

IV. PHYSICAL CHARACTERISTICS

Most of poor reservoir property, cretaceous basin are mainly low porosity, low permeability, local to the hole infiltration.Overall, in the central basin of the three - jiayin basin and eastern basin group of ning an, hunchun, songjiang and tonghua basin of lower cretaceous reservoir physical property is relatively good.

4. **physical factors**

(1) deposition effects on reservoir property

As mentioned earlier, the cretaceous reservoir belongs to the proximal sedimentary, compositional maturity and structural maturity of sediments to the poor, high shale content, poor sorting, poor reservoir properties of the original.

(2) the influence of diagenesis on reservoir physical property

Sediments high content of feldspar and cuttings, poor sorting, feldspar lithic are easy to be crushed out of shape, so in the process of mechanical compaction, sediment more easily by compaction.Cementation is mainly quartz and carbonate cementation.In the dissolution stage, soluble of feldspar and cuttings sediment corrosion by acid fluid form the secondary porosity, thus the cretaceous reservoir is given priority to with secondary porosity.

(3) the structure's influence on the reservoir property

Influence on the structure of reservoir physical properties in a crack in the structure formed by the passage of the influence of reservoir physical properties.

(4) factors affecting reservoir physical property is quantitative research

In order to quantitatively study the effect of sedimentary facies and diagenesis, the project selection yenji basin without fracture reservoir of lower cretaceous samples measured porosity and permeability data, statistics of different sedimentary facies in the diagenetic stage of reservoir porosity and permeability.

①the sedimentary reservoir property study area is relatively have obvious control effect, affecting reservoir physical property of "innate factor".In diagenetic strength of similar cases, the stronger the hydrodynamic depositional environment, sand body composition maturity, the higher, the better physical property.Come A1 and rock phase, for example: in the fan delta plain subfacies and delta front facies and inshore subaqueous fan sand bodies of better properties, the porosity were 12.97%, 11.03%, 8.02%, permeability were 64.53 x 10-3 M M2, 56.99 x 10-3 M M2 and 3.6 x 10-3 M M2, half deep lake - deep lake facies sand body physical properties of the worst, the porosity and permeability were 8.02% and 1.34 x 10-3 M M2.

②diagenesis and reservoir property in the studied area has an important impact, affecting reservoir physical property of "the day after tomorrow factor".In certain cases of sedimentary facies, diagenesis, the more the worse reservoir property.For example, fan delta front subfacies in different diagenetic stages, the difference of reservoir physical properties and reservoir type of change is very obvious, along with the increase of the diagenesis and diagenetic stage A1 A2 and rock up period, phase, the rock up to stage B period, fan delta front subfacies of reservoir porosity is respectively 9.36%, 9.12%, 4.48%, permeability were 64.53 x 10-3 M M2, 56.99 x 10-3 M M2 and 1.34 x 10-3 M M2.

V. CONCLUSION

(1) basin group of reservoir porosity of intergranular dissolution pore, grain dissolved pore and intragranular dissolved pore, primary pore development, reservoir's throat is small, mostly micro-fine throat - has the fine throat, belongs to a dense reservoir.

(2) affected by diagenesis, reservoir property along with the increase of the diagenesis physical property variation.

(3) the basin group in central and eastern basin group, under the influence of sedimentation, diagenesis and integrated, makes the lower cretaceous reservoir physical property is relatively good.

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