Study on sequence stratigraphy of Lishu fault

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Abstract. Under the guidance of sequence stratigraphy theory and method, the comprehensive utilization of seismic, logging, drilling and core data, set up the pear tree fault fault depression sequence stratigraphy framework. Pear tree will sag from top to bottom drill in quaternary, upper cretaceous qingshankou formation, lower cretaceous quantou formation, denglouku group, the city group, shahe, fire stone mountain group and basement, and focus on description of quantou formation, denglouku group, the city group, shahe, fire stone mountain group interface features. And the seven tree, Qin Gutun key stratigraphic classification and correlation in the study area for research.

1 Regional geological survey

Pear sag is located in the southeast uplift area, songliao basin is a composite basin superimposed fault depression, east of tanlu fault zone, pear, gongzhuling across two city, covers an area of about 2300 km^2, mining area resources 360 million tons of oil equivalent, 205 opening of exploratory well, the whole sag found nine oil and gas fields, proven oil reserves of 44.3585 million tons, proven degree is 20.6%; Proven gas geological reserves of 19.341 billion square, the proven degree is 13.5%. Is divided into four secondary structural belt, the Northern Slope zone, steep slope zone, the central structural belt, west slope area in the east.

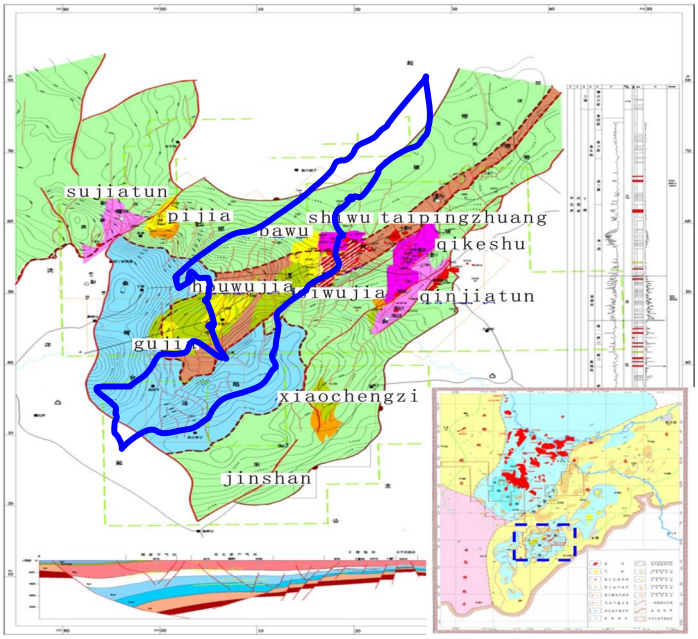

Figure 1 pear trees in the study area

2 Sequence interface features

Shahe subgroups (K1sh):fault sequence, the distribution is controlled by fault depression, stratigraphic thickness generally 600-1400 - m, in the pear tree faulted the thickest of up to 2500 m.

To mulberry fracture is bounded in the west and east, south overlap, to the north by denudation. The group at the bottom of the alluvial fan and braided river sedimentary, the upper plate to sub-sag in shore and shallow lake to half deep lake - deep lake facies, basin around the development of fan delta, alluvial fan and limnetic facies. The group stratum layer in the development of important hydrocarbon source rocks in this area.

City group(K1yc):belong to fault sequence, the group characteristics of stratigraphic distribution and shahe subgroups similar characteristics, to mulberry fracture is bounded in the west and east, south direction overlap, north raised by denudation, stratum thickness is usually 200-800 m. Sedimentary characteristics, its inheritance shahe subgroups period water scope to further expand, but water is a bit lighter. Main development of braided river delta or alluvial fan, fan delta, littoral and shallow lake, half deep lake-deep lake deposits, such as high quality hydrocarbon source rocks, also can form high quality reservoir, often form since the author classifies the type accumulation combination.

Denglouku group (K1d):belong to fault sequence, stratigraphic distribution features inherited battalion city group, the thickness of the 100-1500 - m, lithology of light gray, gray, beige, gray sandstone, mudstone and grey, glutenite, unconformable contact with the overlying quantou group, development of sedimentary facies have shore shallow lake and deep lake - half deep lake, fan delta deposit, etc.

Quantou group (K1q):period of quantou formation in basin evolution into depression stage, no longer restricted by fault basin, are widely distributed. The sedimentary strata in the southern songliao basin are stable distribution, formation thickness usually is 500-1800 m. Lithology is given priority to with oxidation and tonal mudstone and sandstone and glutenite, dominant in river deposits, followed by flood plain, shore and shallow lake sedimentary, delta and its stable distribution of small.

3 The sequence stratigraphic framework analysis

3.1 The north-south direction stratigraphic framework analysis

Around in the seismic section the reflection layer interface structure, logging and logging data has obvious feature. Shahe son of stone mountain fire at the bottom of the group, or basal surface of the basin, which is a Mesozoic strata, is formed by uplift period of basin tectonic activities area truncation unconformable surface, corresponding to the seismic reflection interface T5, equivalent to the Jurassic bottom reflection interface. Reflector above show the onlap phenomenon, basal generally strong reflection energy, lower for clutter - weak reflection or layered - weak reflection. Under interface is basement metamorphic rock, mudstone cover directly above the basement metamorphic rocks, the surface of discontinuity generally represents the sedimentary environment mutation, on logging curves at the same time also have obvious response (figure2).

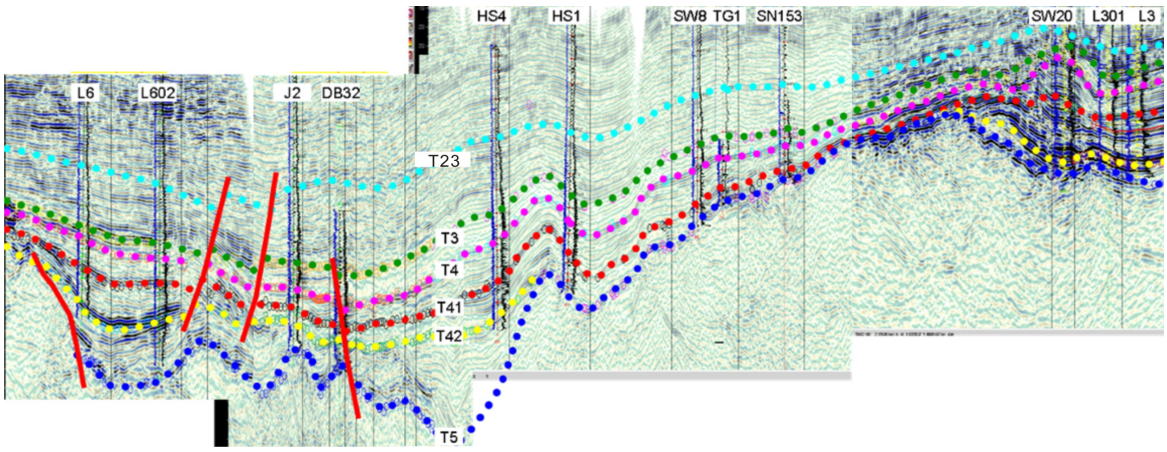

Figure2 sequence region and even the well seismic profiles

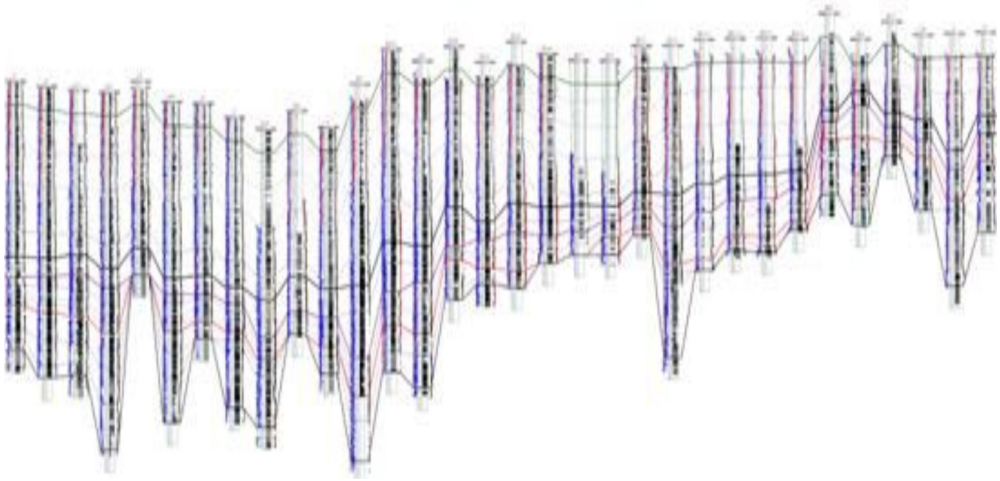

Figure 3 the skeleton even the well profile

3.2 What direction the sequence stratigraphic framework analysis

Seven tree strike-slip faults on the east side of fire stone mountain group formation development, old fault control for the basement fault depression, stratigraphic sedimentary thickness is larger, the top surface of unconformity surface. According to the fault development situation in section, on the whole the profile shows characteristics of sequence stratigraphy, longitudinal under cutting lateral fault controlled by unconformity sequence interface of south north, west east ultra thin thick characteristics. Seven tree layer region the most stable, most obvious contrast characteristics, step by step a thickness of each layer had no obvious change, seven tree region in the second member of the springs, spring three thickness thinning. Slow formation thickness changes, shahe subgroups stratigraphic overlap in residual thickness thinner fire stone mountain group formation, central bulge shahe subgroups stratigraphic overlap on the basement.

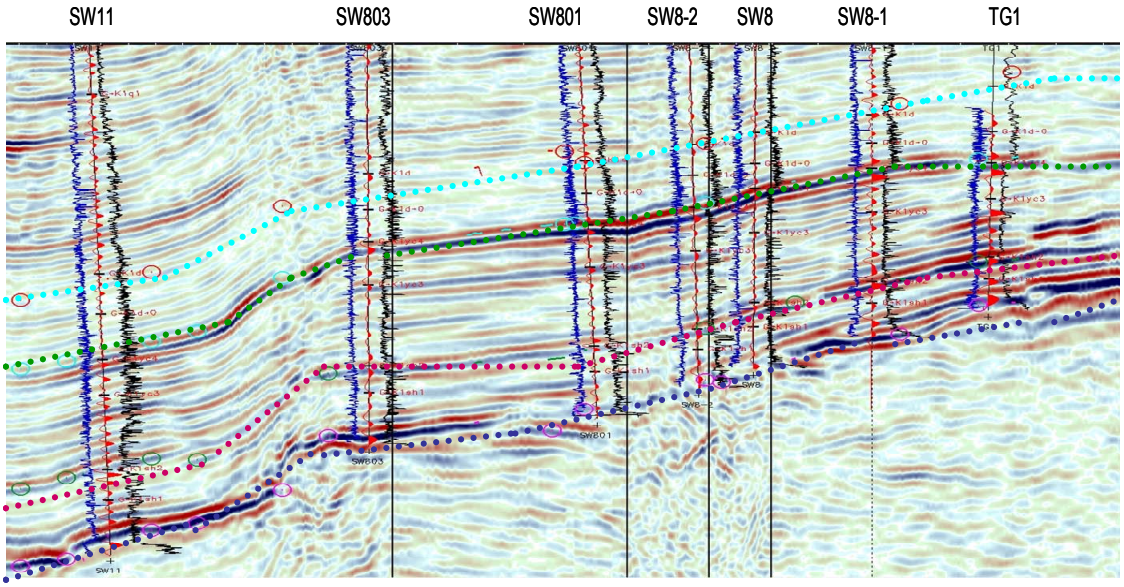

Figure 4 seven tree seismic even well section

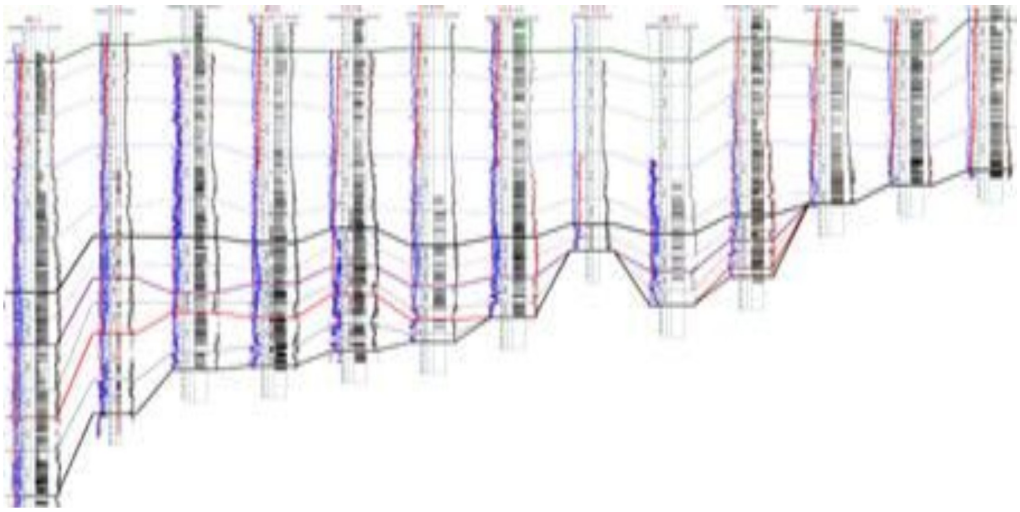

Figure 5 seven tree Wells sequence profile

Summary

(1)The pear tree downfaulted top-down partitioning quantou formation, denglouku group, the city group, shahe, fire stone mountain group and basement.

(2)Describes the quantou formation, denglouku group, the city group, the interface characteristics of shahe subgroups.

(3)From Qin Gutun with seven tree stratigraphic classification and correlation of the interval thickness thinning, north to the north curl, south north thick thin, at the bottom of the overlap. Acknowledgements

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References

[1] Yu-shuang hu, ming-xue zhang. Pear songliao basin rift sedimentary evolution and sequence stratigraphy models [J]. Journal of daqingOil school journal, 1999, 23 (1).

[2] Li Mingcheng, hydrocarbon migration theory and oil and gas exploration [J], earth science, 2004, 29 (4):379-383.

[3] Shimizu,dong zhao of silver, liu jun,etc.Half graben faulted basin type of hydrocarbon accumulation pattern - pear fault depression in songliao basin as an example [J], journal of jilin university (earth sciences), 2003 (1):43-47.

[4] Mr.Luo,LuHong, pear depression fracture characteristics and control of the oiland gas [J], journal of daqing petroleum institute, 1996, 20 (3):6-10.

[5] Zou,lj;jia,wen-zhizhao, etc. In southern songliao basin accumulation Dynamicsand distribution of lithostratigraphic reservoirs [J],oil exploration and development, 2005,32 (4):125-130.

[6] Qin, to XiaoLi Wen Sheng male, etc. 2009. The city ten house oilfield camp, shahe group stratigraphic correlation research, divided into the internal data.