CHAPTER 9

CONCLUSIONS

Sequence stratigraphic interpretation and determination of paleoenvironment and depositional process are done through the integrated studies that include biostratigraphic data, log data, petrographic data, clay mineral study and total organic carbon analysis of subsurface and outcrop sections of Late Cretaceous age of Ariyalur-Pondicherry sub-basin. The results and interpretation of the research findings are discussed in the respective chapters of the thesis. Based on the results of the research work, the following conclusions are drawn.

1. Correlation of subsurface and outcrop exposures show that three $2^{nd}$-$3^{rd}$ order sequences developed in the Late Cretaceous sedimentary sections of Ariyalur-Pondicherry sub-basin. The sequences are named as sequence A, B and C.

2. Sequence C is partly recorded in SS-1 and SS-2 sections and comprises HST. In SS-3 section, complete Sequence C is documented which comprises TST, MFS and HST. Lower SB of Sequence C lies at the bottom of $D.\ asymetrica$ biozone and the upper SB lies at the boundary of $G.\ bulloides$ and $G.\ ventricosa$ and $G.\ linneiana$ biozones.

3. Sequence B is recorded in all the studied subsurface sections, SS-1, SS-2 and SS-3 and its age is equivalent to $G.$
"linneiana" biozone. It comprises of TST, MFS and HST. Sequence B is partly preserved in outcrop sections as Sillakudi Formation, which represents TST of Sequence B. Campanian-Maastrichtian boundary marks the upper SB of Sequence B. In outcrop the upper sequence boundary of Sequence B is represented by Kaller conglomerate.

4. Sequence A is partly preserved in SS-1 section and comprises of TST, whereas in SS-2 and SS-3 sections it is completely represented by TST, MFS and HST. Sequence A is represented by Kallankurichchi Formation and Ottakovil Formation in outcrops. Ferruginous limestone and lower arenaceous limestone units defines the TST of Sequence A in outcrop, top of Gryphea limestone marks the MFS, and upper arenaceous limestone of Kallankurichchi Formation and Ottakovil Formation constitute the HST. Upper sequence boundary of Sequence A is base of Kallamedu Formation, which is of late Maastrichtian age. For subsurface sections, KTB marks the upper sequence boundary of Sequence A.

5. Benthic foraminiferal assemblage suggests that the depositional environment for the subsurface sections was outer shelf to slope and paleobathymetry is recorded to be 200m to greater than 500m. In certain depth intervals the paleoenvironment is recorded as inner to middle shelf.

6. The depositional environment for the outcrop sections was inner to middle shelf as suggested by characteristic calcareous benthic assemblage.

7. Sequence A and Sequence B are condensed in thickness in SS-3 section in comparison to SS-1 and SS-2 sections.
8. Correlation of well log data shows KTB lies at the base of bow-shaped gamma response in SS-1, SS-2 and SS-3 subsurface sections. Sand bodies of slump deposit have been identified in SS-1 section.

9. Dominance of acid plagioclase over orthoclase, perthitic inclusions in plagioclase feldspar, abundance of chlorite in clay mineral infer that the source of the marine sedimentation in this sub-basin during Late Cretaceous time was a granitic province.

10. Abundance of angular feldspar grains is noted in all the three subsurface sections and in outcrop exposures. It infers short distance of transportation. Foraminiferal assemblage has suggested that in subsurface sections, depositional environment in general was beyond middle shelf, even outer shelf to slope is recorded. Thus from the above two facts it can be inferred that perhaps the paleoshelf was narrow.

11. The area was tectonically stable during Late Cretaceous time, inferred from the presence of kaolinite.

12. Occurrence of kaolinite also suggests that the climate was warm, humid and tropical during the Late Cretaceous time in the study area.

13. With the fluctuation of relative sea level, the variation of oxic-anoxic condition is recorded.

14. Total Organic Carbon data of Late Cretaceous samples of Ariyalur-Pondicherry sub-basin establish that it has negligible hydrocarbon potential.