

CONTENTS

Table of contents	(i)
List of figures	(v)
List of tables	(x)
Acknowledgements	(xi)
Abstract	(xiii)

CHAPTER 1 INTRODUCTION

1.1 Study area	1
1.2 Climate	3
1.3 Flora and fauna	3
1.4 Geology	4
1.5 Tectonics	4
1.6 Motivation and scope	7
1.7 Objectives	8
1.8 Approach	8
1.8.1 Evolution of Nal region	8
1.8.2 Palaeoenvironmental studies	9

CHAPTER 2 GEOLOGICAL AND GEOMORPHOLOGICAL STUDIES

2.1 Background information	11
2.1.1 Quaternary sediments of central and north Gujarat	13
2.1.2 Quaternary deposits of Saurashtra	15
2.1.3 Quaternary sediments of the Ranns of Kachchh	17
2.1.4 Quaternary sediments of the Nal depression	18

2.2 Present study	18
2.2.1 Remote sensing studies	19
2.2.1.1 Methodology	19
2.2.1.2 Results	23
2.2.1.3 Discussion	28
2.2.2 Subsurface lithological correlation	33
2.2.2.1 Methodology	33
2.2.2.2 Results and discussion	33
2.2.3 Studies on Nal Sarovar core	38
2.2.3.1 Lithological description	38
2.2.3.2 Sedimentological and mineralogical studies	41

CHAPTER 3 PALAEOCLIMATIC STUDIES

3.1 Background information	53
3.1.1 Dating of young sediments	53
3.1.2 Sources of palaeoclimatic information	56
3.1.3 Palaeoclimatic studies in north-west India	56
3.2 Present study	58
3.2.1 Basic principles	58
3.2.2 Results and discussion	61

CHAPTER 4 LUMINESCENCE DATING STUDIES

4.1 Thermal and optically stimulated luminescence	76
4.1.1 Age equation	76
4.1.2 Luminescence dating of sediments	79
4.1.3 Factors affecting the luminescence signal	83
4.1.4 Factors affecting the dose rate	87

4.2 Present study	88
4.2.1 Results	88
4.2.1.1 Salient features of results	92
4.2.1.2 Tests for anomalous fading and disequilibrium	94
4.2.2 Discussion	97
 <u>CHAPTER 5 SUMMARY, SYNTHESIS AND FUTURE PERSPECTIVES</u>	
5.1 Summary	102
5.1.1 Remote sensing and field studies	102
5.1.2 Sub surface lithological studies	102
5.1.3 Core studies	103
5.2 Synthesis	103
5.2.1 Geomorphic evolution of Nal region	104
5.2.2 Palaeoclimate of Nal region during past 7ka	108
5.3 Future perspectives	110
<u>Appendix A Sampling Procedures</u>	112
<u>Appendix B Experimental Procedures For Sedimentological And Mineralogical Analyses</u>	120
B.1 Textural analysis	120
B.2 Heavy mineral separation	120
B.3 X-Ray diffraction	120
<u>Appendix C Experimental Procedures For Radiocarbon Dating</u>	126
C.1 Sample pre-treatment	125
C.2 Preparation of sample for counting	125

C.3 Measurement of activity	126
C.4 Age determination	127
<u>Appendix D</u> Experimental Procedures For $\delta^{13}\text{C}$ And C/N Analyses	128
D.1 Calibration of the assembly line	128
D.2 Sample pre-treatment and gas extraction	131
D.3 Mass spectrometric measurements	133
<u>Appendix E</u> Experimental Procedures For Luminescence Dating	135
E.1 Sample collection	135
E.2 Laboratory procedures for determination of ED	135
E.3 Laboratory procedure for measurement of dose rate	140
E.4 Water Content Estimation	141
E.5 Data Analysis	142
REFERENCES	143