

# CONTENTS

Foreword .....	(v)
Acknowledgements .....	(vii)

## PART - I GENERALITIES

1. Dipmeter surveys	3
Introduction .....	3
The Dipmeter tool .....	4
Types of tools .....	5
2. Dip Computation .....	7
Introduction .....	7
Methodology .....	7
Presentation of dip-data .....	7
Kinds of dips .....	8
Structural dip determination .....	9
Determination of Structural dip from the tadpole plot	
Structural dip change	
Dip & the bore-hole drift .....	10
Dip of the strata	
Compacted formation	
Unconsolidated/less compacted formations	
Flat dips	
Structural dips-difficult environments .....	11
Process of dip deletions	
Structural dip deletion .....	11
Dip Groups & their Mega-Patterns .....	12
Red or slope groups	
Blue of current groups	
Yellow or random groups	
Green or constant groups	
Mega Patterns .....	14
Mega red pattern	
Mega blue pattern	
Mega yellow pattern	
Mega green pattern	

## PART - II STRUCTURAL & TEXTURAL INTERPRETATION

3. Structural interpretation .....	19
Introduction .....	19
Use of dipmeter and FMI (image) tools in structural interpretation .....	19
Information required for structural analysis of dip-data .....	20
Statistical Study of the dip-data .....	20
Dip & azimuth histograms	
Polar Plots	
Azimuthal frequency plot	

	Stereographic Projections .....	22
	Polar plot	
	Cyclographic plot	
	Stereographic projection of a line	
	Construction of stereographic projection	
	Wulff steronet	
	Schmidt steronet	
	Stereographic representation of structural elements .....	23
	Methods of dip data interpretation .....	26
	Quick-look technique	
	Bengtson technique	
	Automatic structural dip determination	
	Bore-hole images	
4.	Folds sedimentary .....	31
	Introduction .....	31
	Recognition of folds from the tadpole plot .....	32
	Salt and shale domes .....	33
	Various types of features found associated with salt domes	
5.	Faults .....	34
	Introduction .....	34
	Recognition of faults from the tadpole plot .....	34
	Exact depth of the fault	
	Normal faults .....	34
	Fault with no down-thrown distortion	
	Fault with down-thrown distortion	
	Distinguishing drag from the roll-over zone	
	Role-over	
	Growth fault .....	40
	Normal fault with hybrid distortion pattern	
	Reverse fault .....	43
	Structural cross-section from a single dipmeter log	
6.	Fractures .....	47
	Introduction .....	47
	Detection of fractures by .....	47
	Dipmeter tools	
	Resistivity image tools	
7.	Unconformity .....	50
8.	Texture of the rocks .....	52
	Introduction .....	52
	Texture .....	52
	Detrital rocks	
	Carbonate rocks	
	Well logging approach for determination of textural parameters .....	52
	Detrital rock texture .....	53
	Grain size	
	Sorting	
	Grain orientation	
	Packing	
	Carbonate rock texture .....	54

	Porosity .....	54
	Automatic extraction of textural information .....	55
9.	Sedimentary Rock-Structures .....	57
	Introduction .....	57
	Primary sedimentary structures .....	57
	Shape of sedimentary unit	
	Secondary sedimentary structures .....	59
	Determination of rock structure	
	Well-logging approach	
	Bed description .....	59
	Bed shape and bedding planes	
	Bed thickness	
	Nature of bed boundaries	
	Internal organization of beds	

**PART - III**  
**STRATIGRAPHIC INTERPRETATION**

10.	Stratigraphic interpretation .....	67
	Introduction .....	67
	System for classification of depositional environments .....	67
	Siliciclastic continental deposits .....	67
	Glacial Deposits	
	Eolian deposits	
	Dunes	
	Barchan Dunes	
	Transverse dunes	
	Parabolic Dunes	
	Seif or longitudinal dunes	
	Dome shaped dunes	
	Whalebacks	
	Reservoir Characteristics .....	71
11.	Fluvial System .....	72
	Introduction .....	72
	Alluvial cones and fans .....	72
	Proximal facies	
	Medial facies	
	Distal facies	
	Reservoir Characteristics .....	73
	Fluvial Channel Deposits .....	73
	Braidad Streams	
	Log characters	
	Reservoir characters	
	Meandering Channels .....	77
	Log characters	
	Position of a well in the point bar	
	Reservoir characteristics	
	Straight Channels .....	78
	Basic steps in interpreting fluvial channels	

12.	Deltas .....	81
	Introduction .....	81
	Major depositional regimes of delta system .....	81
	Upper delta plain	
	Lower delta plain	
	Dip patterns in distributary channels	
	Kinds of deltas .....	83
	Charecterstics of sand deposits .....	85
	Upper delta plain	
	Lower delta plain	
	Distributary mouth-bar	
	Creavasse sub-delta	
13.	Inter-Deletaic environments .....	88
	Introduction .....	88
	Morphological features of different types of coasts .....	88
	Micro-tidal coasts	
	Meso-tidal coasts	
	Macro-tidal coasts	
	Dip Trends .....	89
	Beach ridges	
	Tidal channels	
	Flood deltas	
	Ebb deltas	
	Wash-over fans	
	Long-shore current sand waves	
	Strand Plains	
	Cheniers	
	Geomorphic Zones of an off-shore shelf .....	93
	Beach Profile	
	Off-shore shelf	
	Lower shore-face	
	Upper shore-face	
	Beach	
	Fore-shore zone	
	Back-shore zone (Dune ridge)	
	Dip trends	
	Reservior characterstics	
14.	Carbonate sediments, reefs and other burried topography .....	95
	Introduction .....	95
	Carbonates .....	95
	Reefs and other burried topography .....	95
	Reef traps	
	Slope of the reef surface & complexities in dip patterns of the surrounding beds	
	Drape over reef and calculation of reef slopes	
	Drape over reefs involving compaction after deposition and calculation of reef dips.	
	Drape with simultaneous compaction and calculation of reef dips.	
	Top of the buried feature from dip-log .....	98
	Recognition of reef talus from the dip-log .....	98
	Dips due to solution of surrounding salts. ....	98
	Dips produced as a result of .....	98
	Salt removal after deposition of some beds	
	Early salt removal	
	Dip of the reef .....	99

	Unconformity traps .....	99
	Traps below unconformity	
	Traps above unconformities	
	Reservoir geometry	
	Estimation of compaction .....	100
	Compaction features .....	101
15.	Continental shelf sands .....	102
	Introduction .....	102
	Shelf sand deposits .....	102
	Sand sheets	
	Sand ridges	
	Log characters	
	Reservoir characteristics	
16.	Deep water deposition .....	106
	Introduction .....	106
	Mechanism of sedimentation .....	106
	Mud/debris flow	
	Grain flow	
	Fluidised flow	
	Turbidity currents	
	Sub-marine slides and slumps	
	Translational glide	
	Rotational slumps	
	Deep sea depositional models .....	107
	Classification of sub-marine fans .....	107
	Elongate fan	
	Radial sub-marine fans	
	Slope apron systems	
	Controls on deep sea sedimentation .....	109
	Sediment type and supply	
	Tectonic setting and activity	
	Eustatic sea-level changes	
	Litho-facies and sequence of sub-marine fans .....	109
	Facies associations .....	111
	Well logs .....	112
	Petroleum geology of deep sea sands .....	112
17.	Dip Scatter as an Environmental indicator .....	113
	Introduction .....	113
	Inner neretic zone .....	113
	Middle neretic zone .....	113
	Outer neretic zone .....	114
	Continental slope .....	114
	Abyssal range .....	114
	Dip scatter due to sea level changes .....	115
18.	Pre-requisites & Rules for Interpretation of dipmeter data .....	116
19.	Practical examples .....	117
	<b>References and Bibliography .....</b>	<b>121</b>