

Contents

1	Introduction	1
1.1	Prologue	1
1.2	Sedimentation at the Lower Reach of the Rupnarayan River	2
1.2.1	Physical Background of the Catchment Area of the Rupnarayan River	6
1.2.2	Problems of Sedimentation in the Lower Reach	10
1.3	Objectives of the Present Work	14
1.4	Applied Methodology	15
1.5	Data Used in the Study	16
	References	16
2	Channel Forms and Patterns	19
2.1	Introduction	19
2.2	Field Monitoring and Applied Methodology	20
2.3	Nature of Cross-Sections	22
2.3.1	Cross-Sections and Velocity Distribution	22
2.3.2	Cross-Sections and Turbulence	23
2.4	Longitudinal Profile and Thalweg Profile of the Channel	24
2.5	Depth Distribution along the Lower Reach	25
2.5.1	Seasonal Variation of Depth Distribution	25
2.6	Width-Depth Ratio	27
2.7	Channel Widening, Flow Separation and Diversification	28
2.7.1	Flow Separation, Velocity Reduction and Sedimentation	29
2.8	Stream Meandering	30
	References	30
3	Stream Hydraulics	33
3.1	Introduction	33
3.2	Field Monitoring and Applied Methodology	34

3.3	Steady and Unsteady or Uniform and Non-uniform Flow of Water	35
3.4	Pattern of Flow	37
3.5	Nature of Flow	38
3.6	Velocity Distribution	38
3.6.1	Surface Water Velocity Distribution across the Channel	39
3.6.2	Surface Water Velocity Distribution along the Channel	39
3.6.3	Relation between Depth and Velocity	42
3.6.4	Seasonal Fluctuation of Velocity	43
3.6.5	Relation between Stream Velocity and Sedimentation	44
3.7	Water Discharge	44
	References	46
4	Tidal Character	49
4.1	Introduction	49
4.2	Data Collection and Methods	50
4.3	Tidal Velocity	51
4.4	Tidal Range	52
4.4.1	Tidal Range and Sedimentation	52
4.5	Tidal Asymmetry	53
4.5.1	Tidal Asymmetry, Water Velocity, Stream Energy and Sedimentation	55
4.6	Tidal Prism	56
4.6.1	Tidal Prism and Sediment Transport Power	56
	References	58
5	Sediment Load: Concentration and Transport	61
5.1	Introduction	61
5.2	Field Monitoring and Applied Methodology	62
5.3	Amount of Suspended Sediment in Water	65
5.3.1	Fluctuation of Suspended Sediment Amount in Water	65
5.4	Transportation of Suspended Load	67
5.4.1	Fluctuation of Suspended Load Transport	67
5.4.2	Dependence of Suspended Load Transport on Suspended Sediment Concentration	69
5.4.3	Dependence of Suspended Load Transport on Water Discharge	70
5.5	Transportation of Bed Material Load	71
5.5.1	Fluctuation of Bed Load Transportation	72
	References	76

6	Analysis of Bed Load Sediment Texture	79
6.1	Introduction	79
6.2	Materials and Methodology of the Study	80
6.3	Sediment Texture at Different Reaches	82
6.3.1	Mean Grain Size of Sediment	83
6.3.2	Sorting of Sediment	85
6.3.3	Skewness	87
6.3.4	Kurtosis	90
6.4	Proportion of Sand-Silt-Clay in Sediments	92
6.5	Identification of Sediment Type by Triangular Diagram	93
	References	94
7	Conclusion	97
	Index	99

Sedimentation in the Rupnarayan River

Volume 1: Hydrodynamic Processes Under a Tidal
System

Maity, S.K.; Maiti, R.

2018, XVII, 100 p. 35 illus., 29 illus. in color., Softcover

ISBN: 978-3-319-62303-0