1 2
1.1 2
1.2 3
1.3 4
2 6
2.1 6
2.2 8
2.3 10
2.4 11
3 13
3.1 13
3.2 15
4 16
4.1 2014 16
4.2 17
4.3 2015 19
4.4 19
5 20
5.1 20
5.2 22
5.3 27
5.4 29
5.5 30
5.6 31

1

1.1

2003

2014

2309.47m 185m

181m 4.0m

126.73m 40m 40.5m

2014

0.61mm 3.56mm

-0.59mm 4.29mm 4.29mm 29.76mm

2.0mm

2014

0.56mm 9.20mm

27.39mm 25.43mm

175m 2014 9 15 175m

164.63m 2014 10 31 175m

95.8 m^3 2014 29.17 L/min

400L/min

70 kW

34.38m 6000m^3

170m 2014

±0.3mm

1.62L/min

6.21mm 4.91mm

501.94L/min 382.17L/min

0.5mm

74.27mm 58.82mm

2003 6 2014

105324 7.5 t

22 1981 6 2003

6 2.1 t 3.6

1.3

1840.00m 185.00m

81m 104.00m 2014

1.0mm

19.65mm 25.40mm

2.69mm 9.11mm -0.54mm 0.29mm

92.83mm

212.56mm

70m

2625.0L/min

1717.9 L/min

2014 12

2

2.1

2014 6 9

6 9

1 2 6

7

8 2.4

1.5 - -

4 - 1 9

6

1 2-1

2014 4380 m^3

4510 m^3 1877 1990 2.9

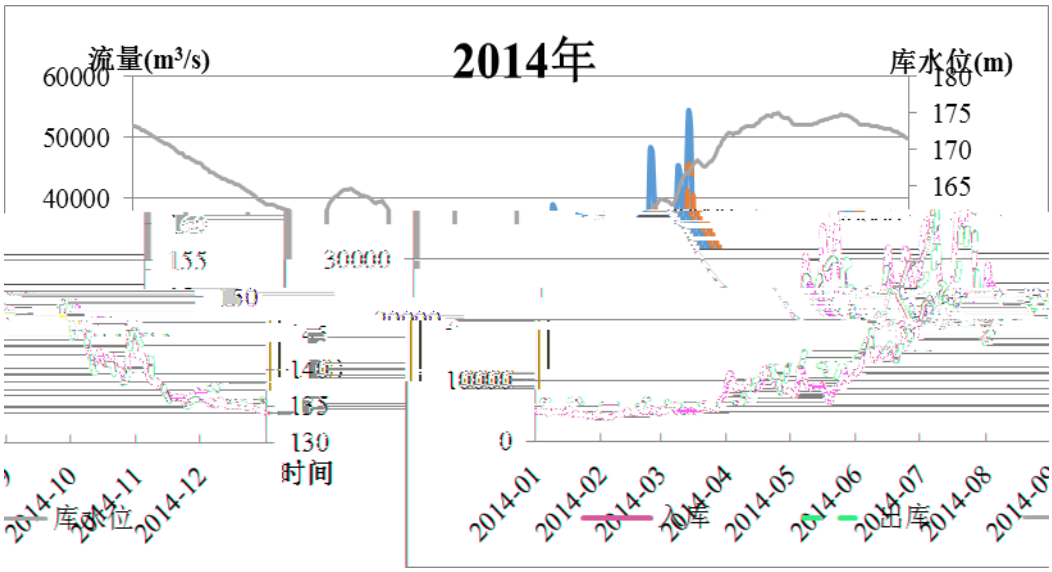
3960 m^3 2003 2013 10.6%

2014

1 4 9 12 5 8 6 9

55000m^3/s 9

20 2-2



2-1 2014

2-1 2014 6 9 mm

						-	-	-
		163.4	162.1	150.5	168.1	162.1	183.9	144.5
6		135.6	138.9	141.4	200.0	161.8	184.1	165.6
	(%)	21	17	6	-16	0	0	-13
		215.6	222	136.6	238.6	150.7	69.9	127.3
7		168.3	199.8	205.4	188.6	189.5	175	196.3
	(%)	28	11	-33	27	-20		
		196.4	238.1	169.1	164.7	208.9	203.9	330.4
8		135.4	206.8	169.9	141.1	156.9	139.3	153.9
	%)	45	15	0	17	33	46	115
		108.1	111.7	219.6	94.4	131.9	217.3	254.9
9		110.7		26.94	182.78	33.12	13.68	

2-2 2014 1 12

		1877 1990		2003 2013	
	m^3/s	m^3/s	%	m^3/s	%
1	4700	4350	8.05	4870	-3.94
2	4680	4000	17.00	4320	8.33
3	5490	4500	22.00	5060	8.50
4	9620	6720	43.15	6760	42.31
5	9330	12000	-22.25	10600	-11.98
6	15600	18600	-16.13	16400	-4.88
7	26200	30000	-12.67	27700	-5.42
8	26400	28200	-6.38	23100	14.29
9	32500	26600	22.18	22400	45.09
10	16100	19800	-18.69	14200	13.38
11	9320	10700	-12.90	8980	3.79
12	6230	6030	3.32	5730	8.73
	13900	14300	-2.80	12500	11.20

2014 17.1 17.2

0.1 39.9 2014 7 30

-2.5 2014 2 14 967.5mm

1136.2mm 1-2 23.7 / 9

2014 7 31 5 81

6 15 7 11 8 5 9 1

2.2

2013 11 11 14 175m

2013

11 26 0 174.71m

2014 6 10 8 146.06m

1

2013 11

26 0 243.5 m^3

180 1570m^3/s

39.03m

2

2014 2 4450$m^{3/}s$

6000m^3/s 166.4m

2m 2m

2 21

7000m^3/s

3 4 6000m^3/s

11 7060m^3/s

10 m^3

3

2014 5 14 18

6 4

20 5 30

6 4

6

20.3 20.6 15000 m^3/s 16100 m^3/s

16500m^3/s 15600 m^3/s 17000 m^3/s 18700m^3/s

147.27m 146.79m

6 7 18500m^3/s

2.3

2014

30000m^3/s 8

55000m^3/s 9 20 8

10

26500m^3/s 54.1% 168.54m 9 15

163.03m 175 m^3

2014

45000m^3/s

7

7 12

25000m³/s 7 19 18

97

22 6 18

25000m^3/s

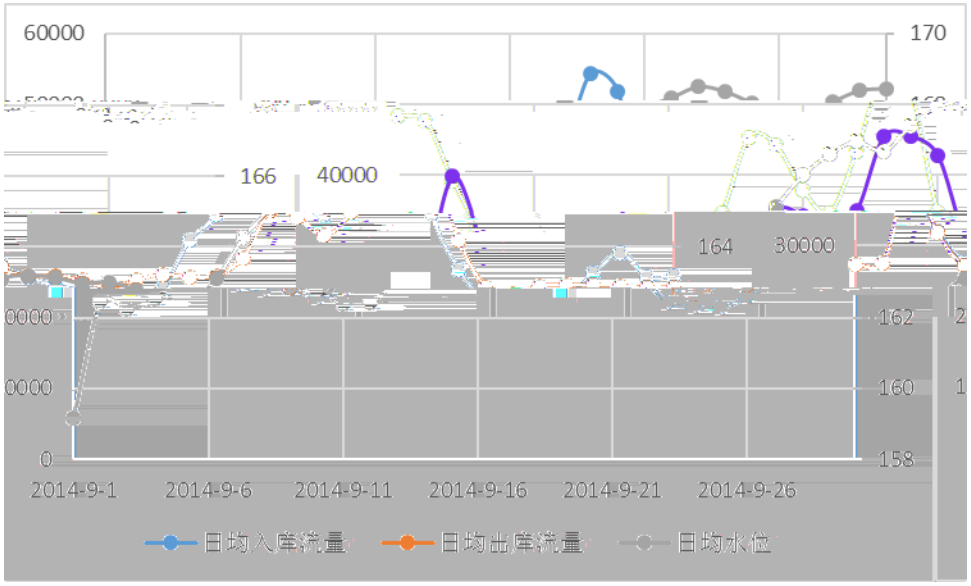
30000m^3/s 116

2.4

2014 9 10 9 10

31000m³/s 9 3.95m

33.73 m^3 9 2-2



2-2 9

2 10

10 9 168.58m

6.42m 62.07 m^3 10

174.5m

25000m^3/s 10 30 2

10 31 10

175m 16100m³/s

13900m³/s

3

3.1

3.1.1

2014

4394.79h

8088.28h 94.25%

5258.1h 8408.24h

95.98%

2014 7 14 34 8

25 2250 kW 2250 kW

703.72h 34 974.17h

2000 kW 1113.12h

3.1.2

2014

53 1592.28h

0

1

100%

3.1.3 2013 2014

2013 ~2014 30

D 8 C 17 B 3

2 4

61 29

2014 ~2015 2

C D 24 143

183

3.1.4

2014

3.2

2014

2014 kW ħ 4.31 m^3

5.47% 51.1 kW ħ 988.19

kW ħ

8108 kW ħ 2.69 t

4

4.1 2014

2014 10794

4.4 52 10898 t

6137 t

1225 t

, 80%

2014 16023 t

3604t 10898

0.68 2013

2013 0.60

4-1 2014

		2014		
		5407	5387	10794
		22357	22101	44458
		264257	256777	521034
		510074	510396	1020470
	t	61374072	47606076	108980148
	t	80750000	79480000	160230000
	TEU	376317	353292	729609

2014 97.08% 84.1%

71.0%

4-2 2014

		12	11
		90.21	74.15
		8	11
		44.40	48.36
		1	1

4.2.2

2014

PLC

4.2.3

70m

1 2

500 -

40000 m^3/s 45000m^3/s

2030 1.1

4.3 2015

2014

4.4

5

5.1

5.1.1

2014

5-1

5-1 2014

		2010 8		132 m^3 COD GB18918-2002 B COD 70.95% 80.51%	
		1997		1200t	

5.1.2

2014

2014

185m

2014

20 m^2

5.1.3

5.1.3.1

2014

5.1.3.2

2014

1320

285

5.1.3.3

2014

4200

3500 83.3% 16.6%

5.1.4

2014

V

GB3838-2002

GB5749-2006

GB3095-1996

46.5%

51.4%

45.1% 53.5%

2014

GB3096-2008 2

4a 3

5.2

5.2.1

2003 2013

1.96 t 1.86 t

62% 2014 0.554 t

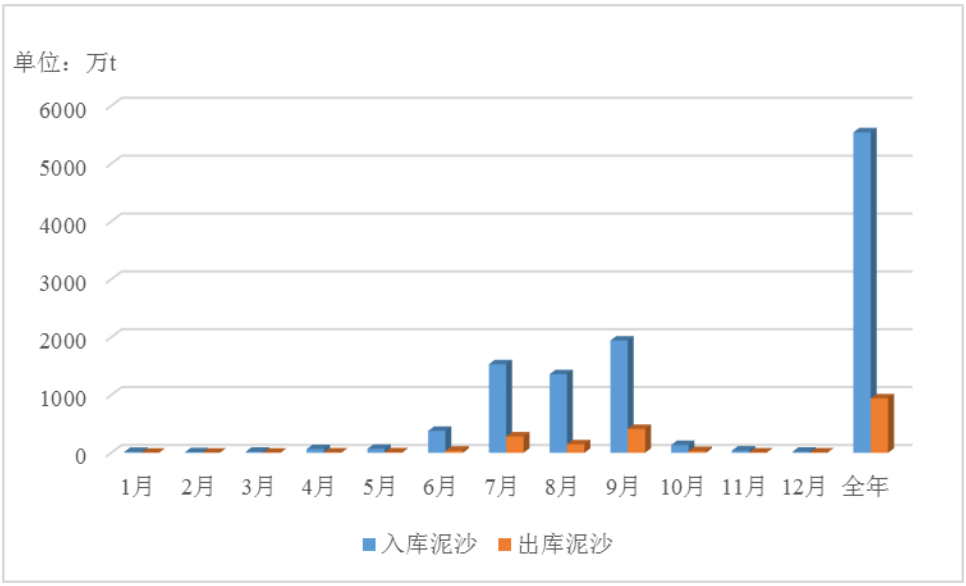
1956 2014 86%

12km

2014 0.105 t

2014 0.094 t 2014

5-1

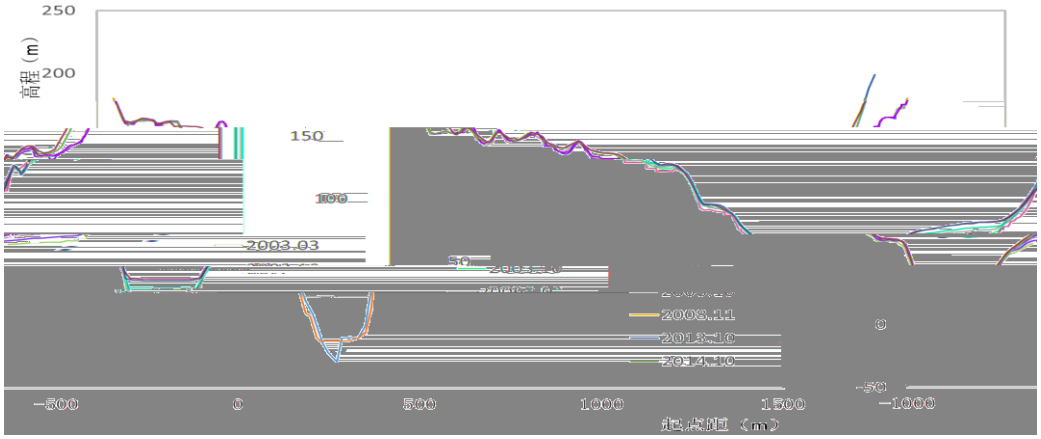


5-1 2014

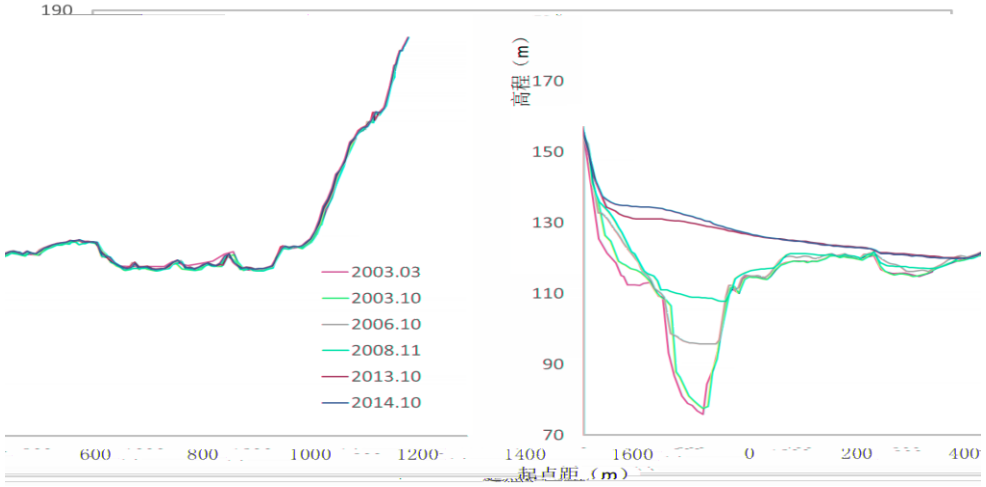
5.2.2

2003 6 2014 12 15.759 t 1.31 t 40% 24.4% 2014 0.449 t 19.0% 2014 5-2

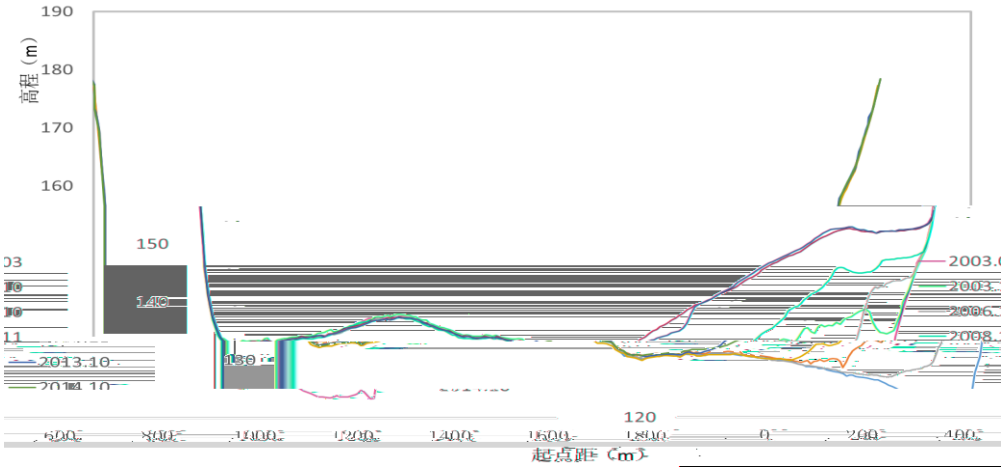
2003 3 2014 10 5-3



(a) S34 5.6km



(b) S207 360.4km



(c) 458.5km S253

5-3

5.2.4

175m

60km

2003 5 ~2014 12

1454.6 m^3

5.2.5

2003 3 2014 10

15.1km 175m

1.604 m^3 33.6m 64.6m

108m

5.3

5.3.1

2014

56%

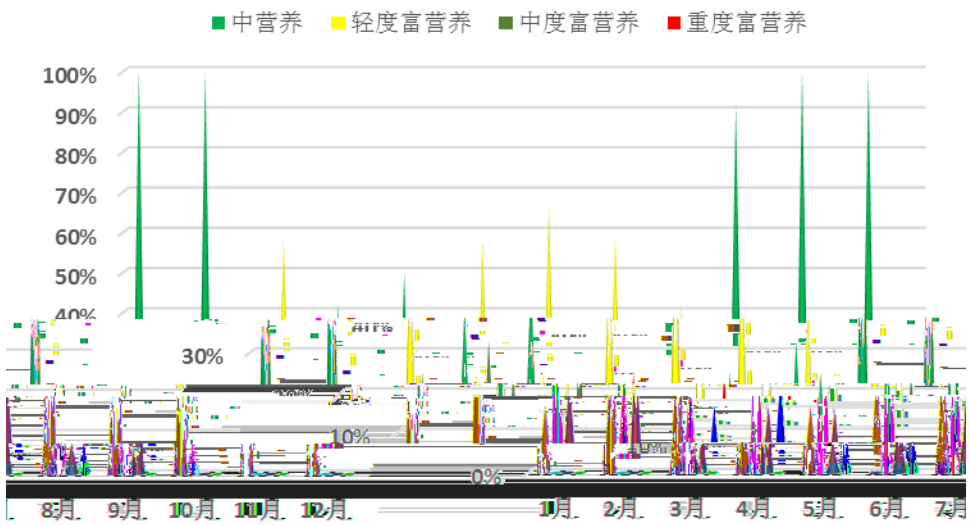
5-2 2014

2014	0.0%	56%	28%	11%	4%

2014 3 10

8% 100% 6

5-4 1 2 11 12



5-4 2014

5.3.2

1

2014 5 4

4 -5 7 -9

- 5 -

6 -7 - 8 -

2

2014

- - -

5.4

2014

1

B

2

4

0.47

0.54

3 4 13 “

”

2014

2000

18

9 4 13

5 9

1984

2014 56

5-3

	(1cm 5cm)	(10cm 35cm)	(1)		
1984 1990	1476000	8500	347		1484847
1991 1995	1350000	34000	10	16	1384026
1996 2000	1410000	154100	110	14	1564224
2001 2005		183612	1000	2	184614
2006 2010		385413	758	3	386174
2011 2012		1110	1058		2168
2013		5000	3034		8034
2014			2000		2000
	4236000	771735	6317	35	5016087

5.5

2014

9.8 m^3

5.6

2014 1 1 0 2014 12 31 24

M0

1207 M0-0.9 1002 M1-1.9 188

M2-2.9 12 M3-3.9 3 M4-4.9 2

4.5

2015 3 27 30 5 26

M3.0

M4.2 M4.5 M3.4

+ +

- VII

2014 2014 3 30 4.5