, , . . ,2012,55(2):622-630,doi:10.6038/j.issn.0001-5733.2012.02.025.

Zhang J F, Li G M, Zhang Y, et al. Responses of groundwater levels to intermittent water transfer in the lower Tarim River. (in Chinese), 2012, 55(2):622-630,doi:10.6038/j.issn.0001-5733.2012.02.025.

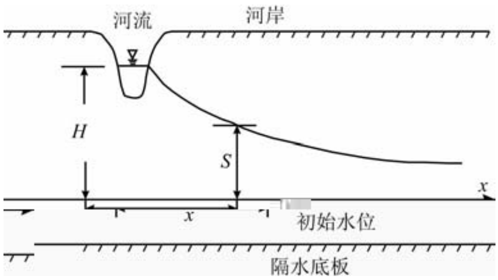
[1,2], [1*], [1], [3], [3]

1 , 100029
2 , 451191
3 , 830011

( ) , .
30 , . , ,
. ,
. ,
. , ,
. , , 35 m.
, , 0. 3 m,
. , . ,
, .

, , , ,
doi:10.6038/j.issn.0001-5733.2012.02.025 P631 3 0

model is also rendered into a simple form. A section of high density resistivity is conducted to explore the condition of aquifer in the study area for its combining properties of resistivity sounding and electrical profiling. The result of geophysics unveils that the table water aquifer is horizontal and bedded with a thickness of about 35 m. Based on the result, a field data fitting from the simplified model shows that the calculated groundwater table has a very small mean absolute error with a maximum of 0. 3 m which is far less than the fluctuation of observed groundwater table. And the correlation analysis unveils a significant correlation between computed and observed values. So the one-dimensional model is good to indicate the changes of groundwater levels in the vicinity of watercourse, and it can be used for evaluating the effe e



4

Fig. 4 Sketch map of groundwater level by river

$_0$, , $_0$

, (3)

$$^2 \cdot \frac{\partial^2}{\partial \ ^2} \quad \frac{\partial}{\partial}, \qquad (4)$$

, (4)

:

(0,)

: (,0) 0

,

,

, ,

. , ,

.

[19].

( ), ,

$$(\omega) \quad \frac{1}{2\pi}\int_{\infty}^{\infty} (\ ) e^{\ i\omega} \ d \ , \qquad (5)$$

$$(\ ) \quad \int_{\infty}^{\infty} (\omega) e^{i\omega} \ d\omega \qquad (6)$$

, (5)

(4) ,

, .

$$\frac{\partial}{\partial} \quad \frac{\partial^2}{\partial \ ^2}, \qquad (4)$$

$$^2 \quad 0, \qquad (7)$$

, (,) (,

.

, (

20 80)

. (6). ,

, (1 2) ( ),

. , ( ) ( ),

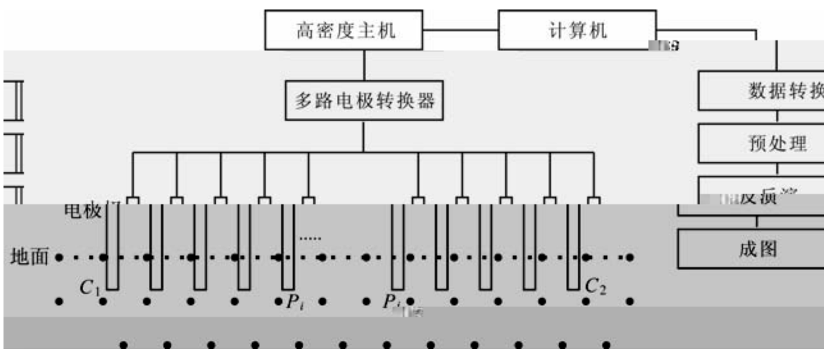
:

. ρ_s / , (16)

, [21]、 .

[22-23]、 [24-25] . , ,

[25-26]. , .



6

Fig. 6 Map of high density electric method

( ), : ① , 6 m, (3).

, , E60BN ,

; ② 128 , 8 m, 、

, .

; ③ (7) ,

; ④ 、 . , , ,

、 , .

. , :

35 m , 35 m 25 Ωm

4 , ; 35 m

25 Ωm .

:

,

、 ,

.

, ,

, .

, 100 m,

. ,

. , 6.1 m. ,

. , , .

(1) , ,

.

, E_2 (14) .

, 35 m, 8 E_2

1.3 m/d, μ_d . 9 10

0.15[27]. E_2、E_3、E_4 E_3 E_4

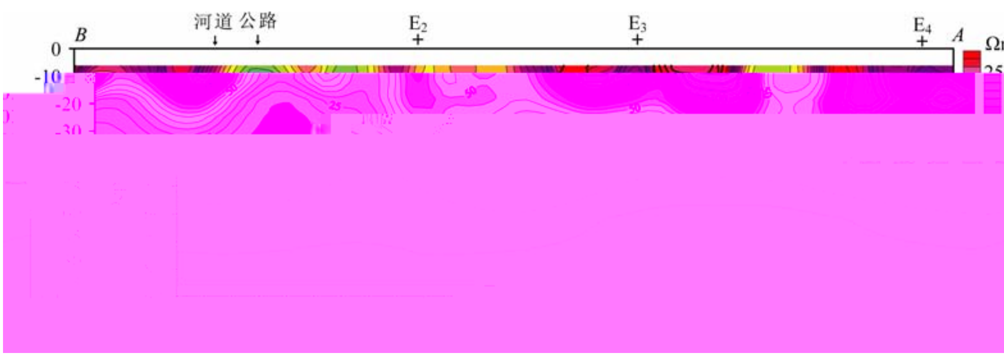
. . , ,

, E_2 (14)

, E_3 E_4 ,

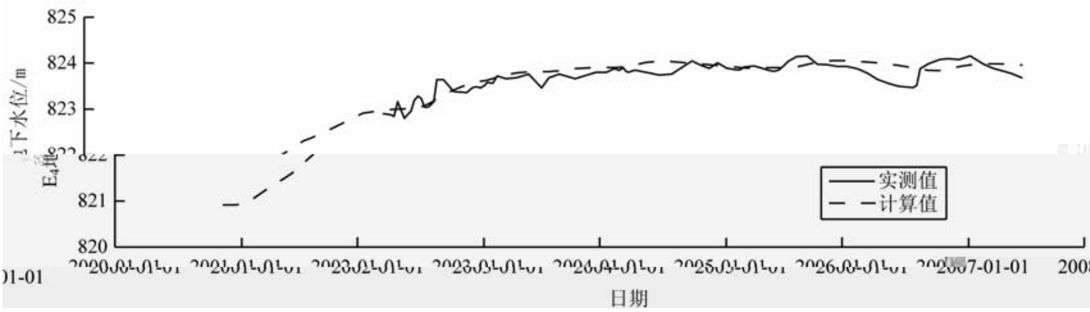
, 4.58 m .

(E_2, 2004-6), 7.04 m(E_4, 2006-11), (MAE)、



7 ( )

Fig. 7 Inversion s



10 E_4

Fig. 10 Results of calculated and observed water level for E_4

(RMSE) Pearson

:

(MAE):

$$\mathrm{MAE} \quad \frac{1}{} \sum_{1} | \quad _{c} \quad _{o} |$$

(RMSE):

$$\mathrm{RMSE} \quad \frac{1}{} \sqrt{\sum_{1} (\quad _{c} \quad _{o})^{2}}$$

( ):

$$\frac{1}{\quad 1} \sum_{1} \left(\frac{\quad _{c} \quad \bar{}_{c}}{_{c}} \right) \left(\frac{\quad _{o} \quad \bar{}_{o}}{_{o}} \right)$$

, $_c$ $_o$; $\bar{}$

.

	MAE	RMSE		*
E_2	0.058	0.126	0.993	0.000
E_3	0.304	0.372	0.947	0.000
E_4	0.141	0.177	0.883	0.000

* =0.

(

2) : (150 m) E_2

, 0.993; E_3(300 m) ,

0.947; E_4(500 m) ,

0.883.

,

0.001.

.

、 ，

(References)

[1] , , .
. , 2004, 27(3): 361-366.
Zuo Q T, Li J, Ma J X, et al. Study on the risk of water diversion from bosten lake to tarim river. (in Chinese), 2004, 27(3): 361-366.
[2] , , . 50
. , 2006, 61(3): 262-272.
Hao X M, Chen Y N, Li W H. The driving forces of environmental change during the last 50 years in the tarim river basin. (in Chinese), 2006, 61(3): 262-272.
[3] , , .
. , 2004, 26(6): 69-76.
Zhang Y C, Li B L, Cheng W M, et al. Hydrological response of runoff to climate variation in Kaidu catchment. (in Chinese), 2004,

, 2010, 38(1): 89-94.

Li J, Ma X L. The application of high-density electrical method to the collapse-surveying on the dam. (in Chinese), 2010, 38(1): 89-94.

[22] . . ,
2010, (1): 34-38.

Lin W T. Application of the high density electrical method on the roadbed reconnaissance in the karst area. (in Chinese), 2010, (1): 34-38.

[23] , , .
. , 2008, 34(15): 18-19.

Ouyang M, Chen S J, Li L. Application of the high density electrical method on an-gu hydropower in Sichuan province. (in Chinese), 2008, 34(15): 18-19.

[24] , ,