



Environmental Monitoring Report

Project Number: 34097
December 2005

People's Republic of China: Shanxi Road Development II Project Quarterly Report No. 06 on Environment Monitoring in Construction Period

Prepared by Shanxi Environment Monitoring & Testing Center of Communications
Shanxi, People's Republic of China

For Shanxi Hou-yu Expressway Construction Co. Ltd.

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QUARTERLY REPORT No. 06
ON ENVIRONMENT MONITORING
IN CONSTRUCTION PERIOD

Shanxi Environment Monitoring & Testing Center of Communications
December, 2005

Project Name: Environment Monitoring in Construction Period
For Shanxi Houma - Yumenkou Expressway

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Foreword

Shanxi Houma-Yumenkou Expressway is a part of national trunk road from Erlianhot to Hekou. It's also an integral section of provincial latitude road network in Shanxi. After this project is completed, it will greatly improve the local traffic situation, which is very conducive to the economic development in Shanxi.

This project began in May 2004, and the expected construction period is three years. Entrusted by Shanxi Hou-yu Expressway Construction Co. Ltd, Shanxi Environmental Monitoring & Testing Center (SEMTC) carried out systematic environment monitoring test along the Project alignment from October to December in 2005. In our working process, we strictly followed the regulations issued by the State Environmental Protection Bureau, Shanxi Provincial Environmental Protection Bureau and Shanxi Provincial Communications Department. Based on the test results, we compiled this quarterly report in construction period.

Finally, we would like to acknowledge support and cooperation that Shanxi Hou-yu Expressway Construction Co. Ltd has given us in our work.



Testing Analysis



Field Sampling

ENVIRONMENT MONITORING IN CONSTRUCTION PERIOD
QUARTERLY REPORT NO. 06

1. General Introduction

1.1 Geographic Position & Direction of the Expressway

The proposed Shanxi Houma-Yumenkou Expressway is located at 35°23' to 36°55' N and 110°15' to 112°23'E in southwest of Shanxi province, and its entire length is 66.84km. It is a section of national trunk road from Erlianhot to Hekou. This road is started from Houma traffic hub, passing through Xinjiang county, Jishan county and Hejin city and crossing over Yellow River, and finally ended at a place near Xiyaonan in Shaanxi province.

1.2 Basis for Work

This investigation was based on the contract of Shanxi Houma-Yumenkou Expressway Environmental Monitoring and relevant requirements in the Environment Impact Assessment (EIA).

1.3 Guides & Purpose

This investigation was focused on air quality, noise, surface water along the line and rubbish, waste water disposal situation in residential areas of road construction companies. We adopted objective working principle and strictly followed relevant environmental monitoring regulations of various levels. Through this assessment on environmental situation along the line, we can provide scientific information for environmental protection of this expressway during construction period, which is beneficial to the coordinated development between road construction and environment protection.

1.4 Monitoring Period and General Situation of Road Construction

We took the samples three times from October 12 to December 16, and road construction was normally going during the investigation. By December 10, construction companies altogether had basically completed construction of bridges and culverts in E1-E5 contract sections, the approach of Yellow River Bridge, cable stayed bridge, 19% of T shaped slab prefabrication of side bridges and primary tower in dual tower bridge in E6 and E7 contract sections, totaled 79.6% of the bridge construction work. At same time all the equipment in P1-P4 contract sections had been installed and checking on its working condition is smoothly underway. Gravel and sand layer had been built. 30 % of amount of building material for bed layer had been transported into construction site.

1.5 Evaluation Standards of Environment Quality

Construction companies should follow the regulations of environmental protection approved by relevant administrations in the period of project design, construction, acceptance test and its operation. This rule was stated in No.3 document, with its name of Management on Environmental Protection Standards issued by China environmental protection agency in 1999. So we implemented these environmental protection standards in the monitoring work of road construction period. For what was not mentioned in previous regulations, we follow current environmental protection standards according to the practical conditions.

a) Environmental Air

Total suspended particle (TSP) should meet standard of Class II demanded in “Quality Standards of the Environmental Air” (GB3095-1996) .The standard value is listed in table 1-1.

Table1-1 Environmental air quality standard (extracted)

Name of pollutant		Limited value (mg/m ³)
TSP	Day average	0.30

b) Environmental Noise

We conducted test according to the information provided by book “Limited Values of Noise on Construction Sites” (GB12523-90) , part of which is listed in table1-2.

Table1-2 Limited values of noise on construction sites (extracted)

Construction period	Main source of noise	Leq dB (A)	
		Daytime	Night
Earth & stone work	Bulldozer, excavator、charger etc	75	55
Pile driving	Different kinds of pile driving machine	85	No construction
Structure	Concrete mixer, tamping bar, electric saw etc	70	55
Installation	Crane, Elevator etc	65	55

1.6 Assurance for Monitoring Quality

Following the related requirements in the document of SEPA(91) HJZ No.043 About Management Regulations of Environmental Monitoring Quality Guarantee (interim) , we have worked out a “Quality Control Plan” and strictly carry out it to ensure the correctness of the data. Including:

- a. All monitoring personnel are qualified and certified.
- b. All monitoring instruments employed by our center must be checked by authoritative measuring bureau before use in order to guarantee the reliability of test data.
- c. Strictly follow the test methods stipulated in the related standards of the state.

Monitoring Results of Environment Quality

2.1 Monitoring Results on Air Quality & Analysis

2.1.1 Monitoring Analysis Methods

See Table 2-1 for monitoring analysis methods

Table 2-1 Monitoring analysis method for environmental air

Tested item	Testing method	Method number
TSP	Gravimetric method	GB/T15432-95

2.1.2 Monitored Points, Items and Times

See Table 2-2 for monitoring points, items and times

Table 2-2 Monitored points, items and times

Order	Monitored points	chainage	Monitored item	Monitoring frequency
1	BeiPingYuan	K0+500	TSP	Testing for 3 consecutive days with at least 12 hours for sampling every day
2	DongHang	K14+300		
3	FuBo	K44+500		
4	CangTou school	K58+250		

2.1.3 Monitoring Results and its Analysis

See Table 2-3 for monitoring results

Table 2-3 Monitoring results of environmental air

unit : mg/m^3

Item	Monitor- ed points	Measured values								
		October			November			December		
		12th	13th	14 th	14 th	15th	16 th	14 th	15 th	16 th
TSP	BeiPingYuan	0.34	0.40	0.36	0.37	0.41	0.34	0.36	0.34	0.39
	DongHan	0.36	0.32	0.38	0.30	0.36	0.39	0.35	0.37	0.40
	FuBo	0.34	0.31	0.36	0.36	0.39	0.42	0.40	0.44	0.38
	CangTou school	0.30	0.36	0.33	0.38	0.36	0.39	0.41	0.43	0.35

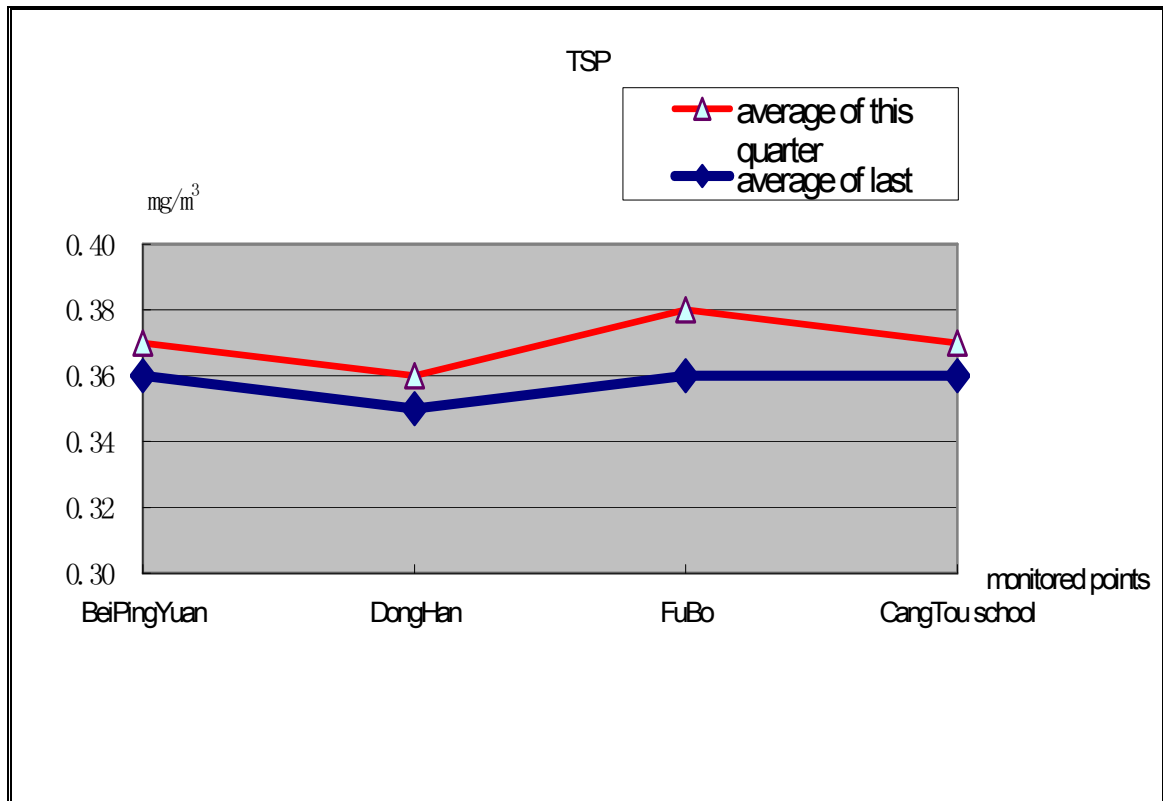
Table 2-4 Statistical table of monitoring results on environmental air

order	Tested points	Range of measured data (mg/m^3)	average (mg/m^3)	Overproof multiple	Maximum overproof multiple
1	BeiPingYuan	0.34-0.41	0.37	0.23	0.37
2	DongHan	0.30-0.40	0.36	0.20	0.33
3	FuBo	0.31-0.44	0.38	0.27	0.47
4	CangTou school	0.30-0.43	0.37	0.23	0.43
Standard value		0.30			

2.1.4 Analysis of Air Monitoring Results

Analysis of monitoring results: The range of TSP values in 3 months is from $0.30 \text{ mg}/\text{m}^3$ to $0.44 \text{ mg}/\text{m}^3$. The average of every tested point in 3 months all exceed standard value. The overproof multiples are between 0.20 and 0.27. The maximum overproof multiple this time is 0.47.

2.1.5 Analysis of Air Quality Variation



Graph 1: Quarterly variation of air quality

From the graph above, we can learn that the averages of TSP values in 4 sensitive points go up to some extent compared with that of last quarter.

2.2 Monitoring Results on Noise & Analysis

2.2.1 Monitoring Method

Measurement was conducted according to GB/T12524-90 "measurement method for noise in construction site". Monitoring instrument: Model HS6288D sound level meter.

2.2.2 Monitoring Points, Items and Times

See table 2-5 for Monitoring Points, Items and Times

Table 2-5 Monitoring points for noise and times

Order	Monitored points	Chainage	Distance from road center (m)	monitored item	Frequency
1	BeiPingYuan	K0+500	100	Noise : equivalent acoustic level A	Measuring once at daytime and night respectively
2	ShuiXizhuang	K6+700	110		
3	DongHan	K14+300	80		
4	FuBo	K44+500	70		
5	XinFeng	K54+800	200		
6	LingLi	K57+900	Left side		
7	CangTou	K58+200	50		
8	CangTou school	K58+250	120		

2.2.3 Analysis on Monitoring Results

Monitoring results for noise is listed in table 2-6

Table 2-6 Monitoring results for noise

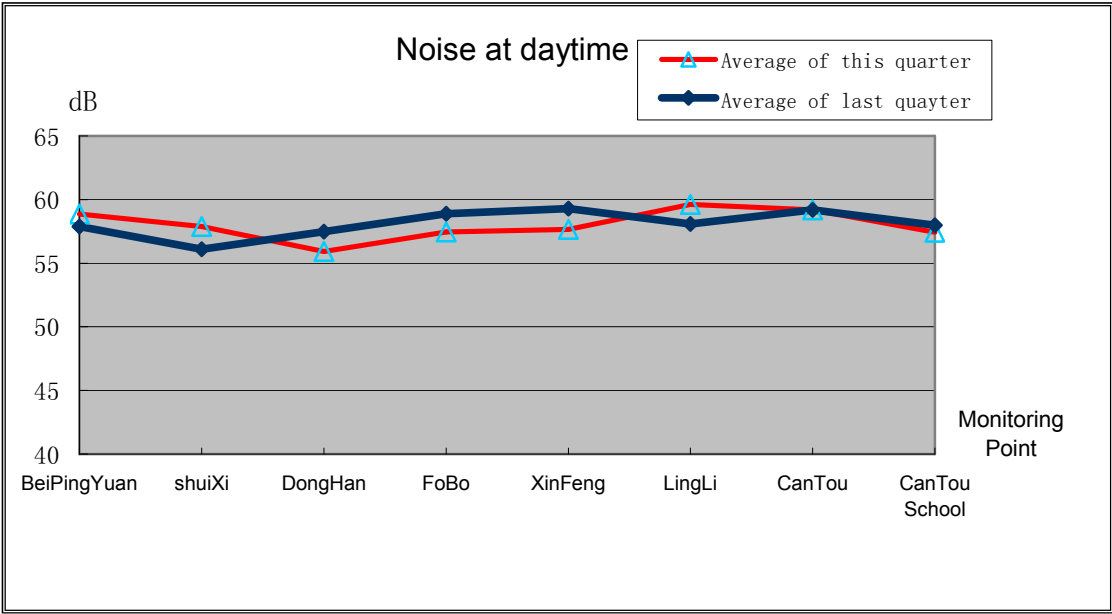
No.	Monitored points (villages)	Leq dB(A)					
		October		November		December	
		day	night	day	night	day	night
1	BeiPingYuan	57.9	48.4	60.4	46.8	58.3	46.6
2	ShuiXiZhuang	57.8	49.6	57.5	46.2	58.4	47.6
3	DongHan	55.0	45	56	46.3	56.8	45.6
4	FuBo	58.3	49.8	56.8	48.4	57.3	48.7
5	XinFeng	58.2	47.8	56.1	47.9	58.7	48.2
6	LingLi	61.6	49.2	57.6	50.3	59.7	49.2
7	CangTou	60.1	52.6	57.9	49.6	59.6	50.2
8	CangTou school	56.8	47.5	57.4	45.6	58.1	47.2

2.2.4 Noise Monitoring Results & its Analysis

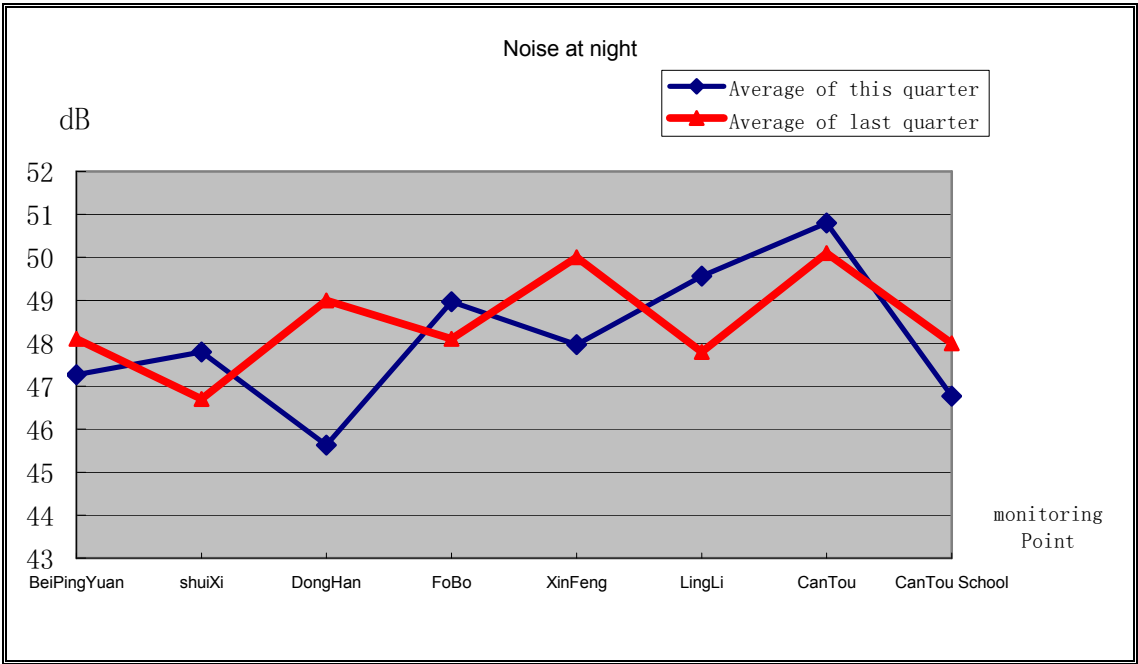
(1) The recorded results are between 55.0dB and 61.6dB on 8 monitored points at day time. All meet the requirement stipulated in “Limited Values of Noise on Construction Sites”.

(2) The results between 45.0 dB and 52.6 dB are recorded on 8 monitored points at night. All meet the requirement of limited value, 55 dB.

2.2.5 Analysis on Environmental Noise Quality Variation



Graph2: Quarterly variation of noise at daytime



Graph3: Quarterly variation of noise at night

From the chart above, we can see that environmental noise quality basically keeps stable compared with last quarter.

2.3 Results & Analysis on Rubbish, Waste Water Disposal Situation in the Residential Areas of Contractors

2.3.1 Investigation Results

See Table 2-7 for investigation results on rubbish and waste water disposal situation.

Table 2-7 Investigation results on rubbish and waste water disposal

Time	Construction companies	Persons in charge	Residence	Rubbish disposal	Waste water disposal
October	Taiyuan Road Construction Group	LiuYouZhi	XiaoLing	Disposed rubbish with the villagers together	Discharge waste water into sewage system
			FuYou		
November	China Railway Bridge construction company	Huang GuoHao	CangTou	First put rubbish into garbage can , then buried it	Set up settling tank for waste water and disinfect it
	YunCheng Highway construction company	MaJinHu	TaiDu	Disposed rubbish with the villagers together	Set up settling tank
December	JiLin road construction company Ltd	ZhangLianYi	ShiCun	Disposed rubbish with the villagers together	Discharge waste water into sewage system
			LiuJianZhuang		

2.3.2 Analysis on Investigation Results

Through table 2-7, we can know that rubbish in residential areas of construction sites was collectively handled and finally it was buried or transported to rubbish station. We can also learn that waste water was discharged into local sewage system or into settling tank for disinfection. The disposal work was well managed without causing environmental pollution.

3 Environmental Quality Assessment & Suggestions

From what we have described above, we can see overall environmental condition along the alignment keeps relatively stable while all construction work is normally going on. It is because relevant construction companies adopted

effective environmental protection measures according to *HouYu Expressway Environment Protection Strategies*. TSP values in this quarter exceed standard and go up a little compared with that of last quarter due to local inhabitants burned coal to warm their houses. All monitoring results of noise meet standard and keep relatively stable.

It is suggested that construction companies should continue to strengthen their environmental protection management and enhance their employee's awareness of environmental protection for maintaining good environmental conditions along the expressway. Because the noise that heavy machinery produces usually goes beyond limited value, it is also suggested that the heavy machinery should be banned from using at night in order to maintain the good environmental quality along the line.

Appendix:

Measured meteorological data along the houyu expressway

Time Point		October 12th				October 13th				October 14th			
		Air temperature	Air pressure	wind velocity	wind direction	Air temperature	Air pressure	wind velocity	wind direction	Air temperature	Air pressure	wind velocity	wind direction
Bei Ping Yuan	7:00	12	96.9	windless	-	10	96.9	windless	-	13	96.9	windless	-
	11:00	18	96.5	windless	-	17	96.5	windless	-	19	96.5	windless	-
	15:00	20	96.3	windless	-	20	96.3	windless	-	21	96.4	windless	-
	19:00	16	96.5	windless	-	15	96.5	windless	-	17	96.5	windless	-
Dong Han	7:00	13	97.0	windless	-	10	97.0	windless	-	13	97.0	windless	-
	11:00	17	96.4	windless	-	18	96.4	windless	-	19	96.4	windless	-
	15:00	21	96.4	windless	-	21	96.4	windless	-	22	96.4	windless	-
	19:00	16	96.5	windless	-	15	96.5	windless	-	17	96.5	windless	-
FuBo	7:00	12	97.4	windless	-	11	97.4	windless	-	12	97.4	windless	-
	11:00	18	97.2	windless	-	18	97.2	windless	-	17	97.3	windless	-
	15:00	21	97.2	windless	-	21	97.2	windless	-	20	97.3	windless	-
	19:00	15	97.3	windless	-	15	97.3	windless	-	16	97.3	windless	-
Cang Tou school	7:00	12	97.6	windless	-	10	97.6	windless	-	12	97.4	windless	-
	11:00	18	97.6	windless	-	18	97.6	windless	-	18	97.4	windless	-
	15:00	21	97.5	windless	-	21	97.5	windless	-	20	97.5	windless	-
	19:00	15	97.5	windless	-	14	97.5	windless	-	16	97.5	windless	-

Note: related units in this table “°C” for air temperature, “kpa” for atmospheric pressure, “m/s” for wind velocity, degree “°” for wind direction.

Appendix:

Measured meteorological data along the houyu expressway

Time Point		November 14th				November 15th				November 16th			
		Air temperature	Air pressure	wind velocity	Wind direction	Air temperature	Air pressure	Wind velocity	wind direction	Air temperature	Air pressure	wind velocity	wind direction
Bei Ping Yuan	7:00	6	96.8	windless	-	5	96.8	windless	-	5	96.8	windless	-
	11:00	14	96.5	windless	-	14	96.5	windless	-	13	96.6	windless	-
	15:00	16	96.5	windless	-	17	96.5	windless	-	15	96.5	windless	-
	19:00	5	96.6	windless	-	7	96.6	windless	-	5	96.6	windless	-
Dong Han	7:00	6	97.5	windless	-	6	97.5	windless	-	6	97.6	windless	-
	11:00	14	97.5	windless	-	14	97.5	windless	-	14	97.5	windless	-
	15:00	17	97.3	windless	-	17	97.5	windless	-	17	97.5	windless	-
	19:00	5	97.3	windless	-	5	97.6	windless	-	5	97.6	windless	-
FuBo	7:00	6	97.8	windless	-	6	97.8	windless	-	6	97.8	windless	-
	11:00	14	97.8	windless	-	14	97.6	windless	-	12	97.8	windless	-
	15:00	17	97.6	windless	-	17	97.6	windless	-	16	97.6	windless	-
	19:00	6	97.7	windless	-	7	97.7	windless	-	6	97.6	windless	-
Cang Tou school	7:00	5	98.1	windless	-	5	98.1	windless	-	4	98.1	windless	-
	11:00	13	98.1	windless	-	13	98.1	windless	-	13	98.1	windless	-
	15:00	16	98.3	windless	-	16	98.3	windless	-	15	98.3	windless	-
	19:00	6	98.3	windless	-	6	98.3	windless	-	5	98.3	windless	-

Note: related units in this table “°C” for air temperature, “kpa” for atmospheric pressure, “m/s” for wind velocity, degree “°” for wind direction.

Appendix:

Measured meteorological data along the houyu expressway

Time Point		December 14th				December 15th				December 16th			
		Air temperature	Air pressure	wind velocity	Wind direction	Air temperature	Air pressure	wind velocity	wind direction	Air temperature	Air pressure	wind velocity	Wind direction
Bei Ping Yuan	7:00	-8	97.5	windless	-	-7	97.5	windless	-	-7	97.5	windless	-
	11:00	0	97.4	windless	-	0	97.4	windless	-	0	97.4	windless	-
	15:00	1	97.4	windless	-	1	97.4	windless	-	1	97.4	windless	-
	19:00	-6	97.5	windless	-	-6	97.5	windless	-	-5	97.5	windless	-
Dong Han	7:00	-8	97.6	windless	-	-7	97.5	windless	-	-8	97.5	windless	-
	11:00	1	97.7	windless	-	1	97.5	windless	-	0	97.5	windless	-
	15:00	1	97.7	windless	-	1	97.3	windless	-	1	97.5	windless	-
	19:00	-6	97.7	windless	-	-5	97.3	windless	-	-5	97.6	windless	-
FuBo	7:00	-9	97.6	windless	-	-8	97.8	windless	-	-8	97.8	windless	-
	11:00	1	97.5	windless	-	0	97.7	windless	-	0	97.6	windless	-
	15:00	1	97.5	windless	-	1	97.7	windless	-	1	97.6	windless	-
	19:00	-5	97.6	windless	-	-5	97.7	windless	-	-5	97.7	windless	-
Cang Tou school	7:00	-9	98.1	windless	-	-8	98.2	windless	-	-8	98.2	windless	-
	11:00	0	98.1	windless	-	0	98.2	windless	-	0	98.2	windless	-
	15:00	1	98.2	windless	-	1	98.3	windless	-	1	98.3	windless	-
	19:00	-5	98.2	windless	-	-5	98.3	windless	-	-5	98.3	windless	-

Note: related units in this table “°C” for air temperature, “kpa” for atmospheric pressure, “m/s” for wind velocity, degree “°” for wind direction.