UNIVERSITY OF BAYREUTH

Department of Micrometeorology

Documentation of the Atmospheric Boundary Layer Experiment, Nam Tso, Tibet

08th of July – 08th of August 2012

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1. Introduction

1.1. Description of the experiment

The experiment was conducted under the framework of TiP (SPP 1372). During the campaign, radiosondes were launched by the Department of Micrometeorology of the University of Bayreuth. The experiment took place at Nam Tso Comprehensive Observation and Research Station of the Chinese Academy of Science (CAS), at Nam Tso, Tibet, China.
The radiosondes deliver vertical profiles of temperature, humidity, pressure, wind speeds and directions. Additionally, energy flux data by Eddy Covariance technique, components of the radiation balance measurements of moisture and temperature at 3 m altitude, wind speeds and directions from a tall tower up to 20 m, soil temperature, soil moisture and precipitation data were obtained from the ITP.

Expanding on the Nam Tso 2009 campaign, that was primarily aimed at investigating energy and matter fluxes between the surface and the atmosphere, as a requirement for understanding Asian monsoon variability and for quality control and upscaling purpose, the goal of this experiment is to investigate the vertical structure of the atmosphere at Nam Tso Lake basin and to link local/mesoscale atmospheric circulation and local convection to the surface. The measured atmospheric profiles and the data obtained from ITP will serve for model initialization and validation purposes with the ATHAM (Active Tracer High-resolution Atmospheric Model) model that is in active use and under further development at the University of Cambridge, UK. Further, the radiosounding data will be used in order to investigate the boundary layer development under different atmospheric and weather conditions at Nam Tso Lake.

1.2. TiP Project*

The German Science Foundation (DFG) priority program 1372 TiP studies the Tibetan Plateau focusing on the three interlinked processes, plateau formation, climate evolution and human impact and Global Change. This study is motivated by the importance of the Tibetan Plateau on a global scale comparable to the importance of Antarctica and the Arctic. Its formation had a profound impact on the environmental evolution at regional and global scales and until today directly influences the habitat of billions of people. Moreover, the Tibetan Plateau, like the Polar Regions, proves to be particularly sensitive to anthropogenic Global Change. The different interactions and research areas of different subprojects are displayed in Figure 1-1.

*This paragraph is cited from Biermann et al. 2009, working report 41

Within the project the key processes are analyzed with respect to their impact on ecosystems on three different time scales. The first being the Plateau formation, with the uplift dynamics and related climate change during the last millions to several tens of millions of years, he second being the Late Cenozoic climate evolution and environmental response during the last tens of thousands to hundreds of thousands of years with decadal to centennial resolution. And finally the phase of human impact and Global Change is analyzed focusing on the present stage, the past ~ 8000 years, and perspectives for the future, Figure 1-2.

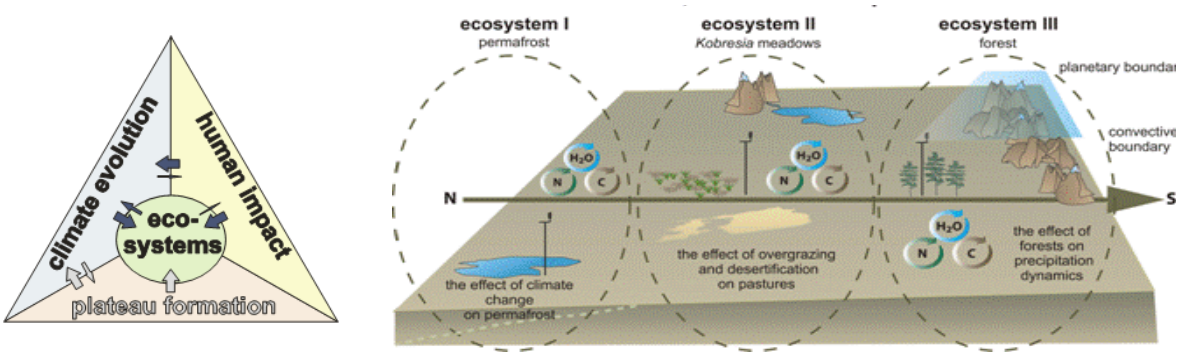

Figure 1-1: Scheme of the different research areas covered in the TiP Project.

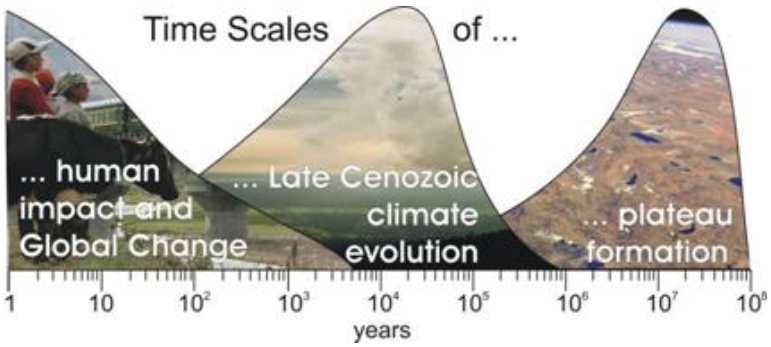

Figure 1-2: Time scales on which the importance of processes is analyzed within the TiP Project.

2. Experimental setup

2.1. Measurement site

The measurement site is located at the Nam Tso Station of the CAS Nam (N30° 46.44’ E90° 57.72’). The geographical location is shown in Figure 2-1 and Figure 2-2. Nam Tso Station is in a distance of 280 m SO of a small lake at the SE side of Nam Tso Lake, which is located at 4730 m a.s.l. and 150 km N of Lhasa. The small lake’s shore line stretches for about 1 km to each side of the site and in an angle of 232° against north.

At Nam Tso Station site an Eddy Covariance (EC) complex is installed, which is equipped with a CSAT3 and KH20. Additionally to the EC Station with a soil complex, there is a CNR4 Net Radiometer as well as a rain gauge. Furthermore, there is a profile tower on the experiment site.
An overview of the setup at Nam Tso Station is given in Figure 2-3. The whole area, which also includes a site for a tent, is fenced with a one meter high netting wire. Distances between the different devices and obstacles can be seen in Figure 2-3 and in Table 2-1.

Figure 2-1: Map of the Autonomous Region Tibet and the PR China. The black dot marking the Nam Tso Station, CAS. (modified from www.chinatouristmaps.com)

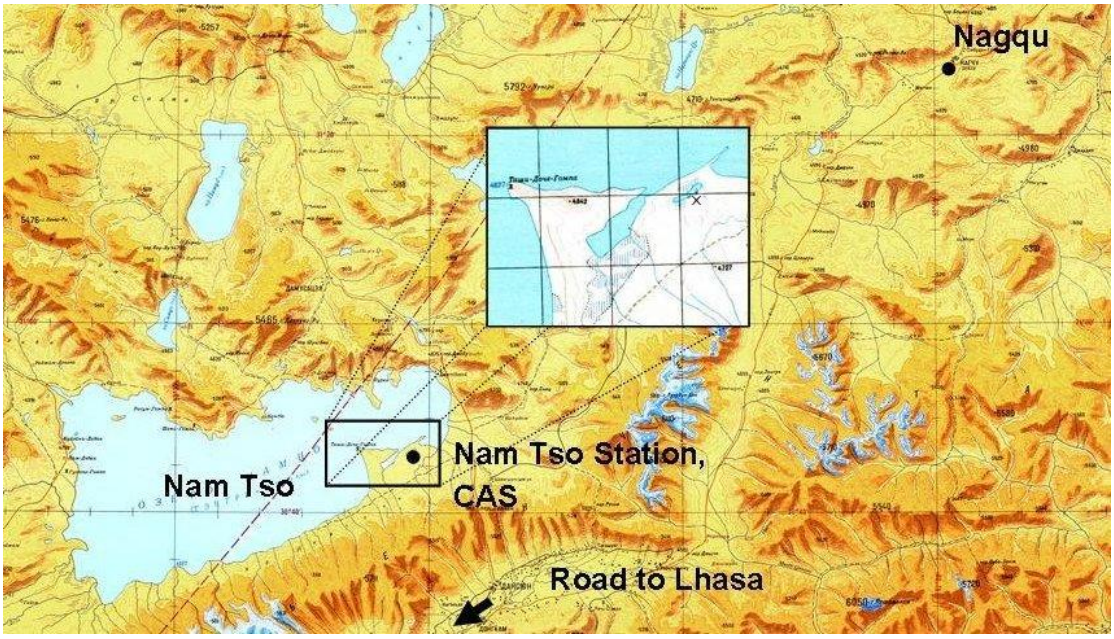

Figure 2-2: Location of the experimental site inside Tibet. The + marks the location of the EC Station and the **x** the location of the Nam Tso Station from CAS (modified from http://en.poehali.org/maps).

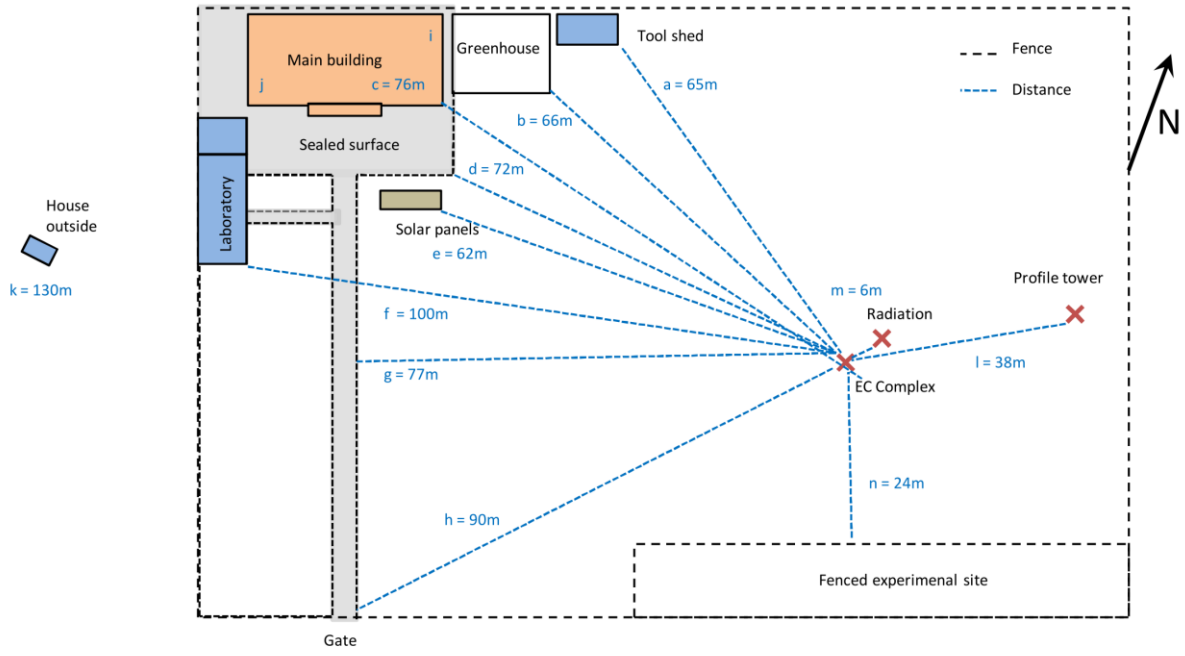

Figure 2-3: Map of the measurement site at Nam Tso. An overview on the distances to the EC Station is given in Table 2-1.

Table 2-1: Distance on the measurement site, as shown in Figure 2-3.

Obstacle	**Label**	**Distance [m]**	**Angle against north [°]**
EC Station – Tool shed	a	65	305
EC Station – Greenhouse	b	66	290
EC Station – Main building (1)	c	76	280
EC Station – Sealed surface	d	72	275
EC Station – Solar panel	e	62	270
EC Station – Laboratory	f	100	255
EC Station – Road	g	77	255
EC Station – Gate	h	90	215
EC Station – Main building (2)	i	85	270
EC Station – Main building (3)	j	135	285
EC Station – Building outside	k	130	245
EC Station – Profile tower	l	38	60
EC Station – Radiation	m	6	38
EC Station – Fence	n	24	160

2.2. Instrumentation

2.2.1. Radiosondes

The radiosondes were launched on selected days for 00, 06 and 12 UTC, corresponding to 08, 14 and 20 BST or approximately 06, 12 and 18 LST on the site of Nam Tso Station (Figure 2-4). The launches were conducted 30 minutes before the above mentioned times in order to take into account the ascent time and have readings of the mid-troposphere at the scheduled time.

Vaisala RS92-SGPL sondes with Li-Ion batteries were used together with Totex TA-600 balloons filled with Helium corresponding to a free lift of 1.05 kg. From launch 12 on, Totex parachutes were attached.

The full components of the sounding system can be seen in Table 2-3 and 2-4, as well a in Figure 2-5. The factory-preselected wavelength of 403.0 MHz was used. Sondes were reconditioned before launching. Due to a lack of drying agent in the GC25 no ground-check was executed. Due to a lack of ground measurements, near-surface measurements of the radiosondes were used for the p_0 level.

The first sounding (17-07-2012 00UTC) was launched the station parameters of Lhinzi station in the System-Parameter settings of the sounding system. This was corrected for subsequent launches. Communication with Vaisala tech-support indicated that this would have an effect on the results of the sounding, such as sonde position and vertical processing of data. It was therefore decided to re-simulate the sounding with correct station altitude and station coordinates from the binary d3cb-file. This was done by Vaisala tech-support on 06-03-2013. The resulting new d3cb-file and ETD-file were placed into the data folder with the suffix Vaisala.

Figure 2-4: Radiosonde ascent at Nam Tso Station

Table 2-2: Radiosonde ascents

No	Launch dd-mm-yyyy UTC	Serial No.	Start Time [UTC]	Time to burst [s]	Max Height [hPa]	Remarks
1	17-07-2012 00	H1653425	-1 23:23:12	4502	8,6	1) 2)
2	17-07-2012 06	H1653422	05:29:27	5774	7	1)
3	17-07-2012 12	H1653406	11:30:38	4984	8,8	1)
4	18-07-2012 00	H1713062	-1 23:27:11	5694	9,1	1)
5	18-07-2012 06	H1653418	05:27:33	5208	9,3	1)
6	18-07-2012 12	H1653423	11:28:30	5440	15,4	1)
7	19-07-2012 00	H1713063	-1 23:30:51	6302	6,9	1)
8	19-07-2012 06	H1652420	05:27:05	5330	8	1)
9	19-07-2012 12	H1653417	11:31:10	5558	7,3	1)
10	22-07-2012 00	H1653401	-1 23:37:19	5470	10,6	1)
11	22-07-2012 06	H1653421	05:28:00	5518	10,7	1)
12	22-07-2012 12	H1653415	11:24:25	6256	6,1	
13	23-07-2012 00	H1653429	-1 23:27:19	5364	13,7	
14	23-07-2012 06	H1653409	05:28:34	6304	8,4	
15	23-07-2012 12	H1653433	11:26:11	5756	8,2	
16	24-07-2012 00	H1653424	-1 23:31:58	5902	8,1	
17	24-07-2012 06	H1653434	05:24:46	5818	7	
18	24-07-2012 12	H1653426	11:28:13	4508	15,3	
19	27-07-2012 00	H1653431	-1 26:27:48	6686	11,8	
20	27-07-2012 06	H1653428	05:24:48	4800	23,6	Power lost
21	27-07-2012 12	H1713681	11:28:13	5904	13,7	
22	28-07-2012 00	H1713681	-1 23:26:53	6244	6,9	
23	28-07-2012 06	H1653442	05:25:40	5900	8,7	
24	28-07-2012 08	H1653419	07:57:24	6632	6,2	max BLH
25	28-07-2012 12	H1653435	11:28:40	5636	8,9	

Remarks: 1) no parachute
2) Sounding was re-simulated by Vaisala on 06-Mar-2013 (see text for details)

Table 2-3: Components of Vaisala Portable Antenna CG25

Device	Serial Number
Vaisala GC 25 Groundcheck station	S/N Z51469
Vaisala SPS 220 Sounding processing subsystem	S/N A09201
Vaisala RGB21	S/N Z504
Edgeport USB Converter RS 232	S/N I41200487
Vaisala Sounding Processing workstation (Dell Latitude D505)	S/N A09201
Vaisala DigiCORA III MW21 v. 3.2.1	S/N 3404909-991573
SANTAK Twin-Guard 1000 UPS	S/N 120522-87650511 (Launch 1-9)
Vaisala CG 25 portable antenna	See components (Table 2-4)

Table 2-4: Components of Vaisala Portable Antenna CG25

Part number	**Component**	**S/N**
15684 CG	Tripod	
CG 4164-C	Tripod assembly	
GA 45007	Trimble GPS bullet antenna	A03416
5683 CG	UHF antenna	
CG 4158-E	UHF antenna assembly	
CG 35612	Pole assembly	
CG 35612	Cross arm assembly	
GA 45050	Antenna supply voltage regulator	Z502004

The setup of the radiosounding system and how its components are linked to each other is displayed in Figure 2-5.

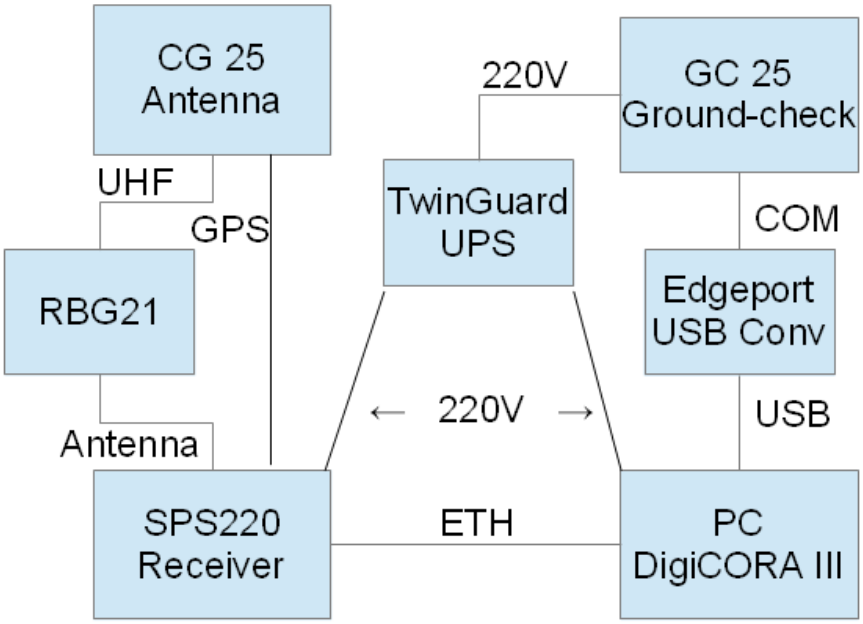

Figure 2-5: Schematic setup of VAISALA Portable Radio Sounding System

2.2.2. Turbulence measurement complex

The following section will list the measurement devices which were used to equip the turbulence measurement complex. Figure 2-6 shows the orientation of the devices to each other and their orientation against North. An overview of the alignment and specifications of these devices are given in Table 2-5.

The Krypton Hygrometer was calibrated at the Nam Tso Station and remounted on July 13th 2012. For details on the calibration see Appendix A.

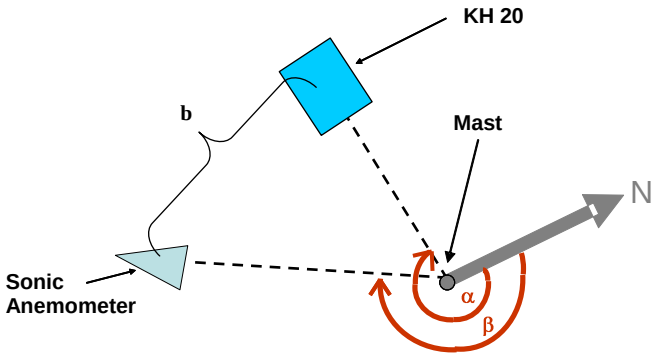

Figure 2-6: Setup of the turbulence measurement system.

Table 2-5: Instrumentation of EC Station

Parameter	**Device**	**SN**	**Calibration Factor**	**Calibration/ Conversion**	**Height [m]**	**Angle against north**
Wind vector and sonic temp.	CSAT3	10272	---	Calibration in device	3.06	200° (β)
Humidity	KH20	1649	V0: 5348 mV X: 1.508 cm kw: -0.2011	---	3.06 Distance from CSAT 0.25 (b), Angle to CSAT 330°	210° (α)
Humidity	HMP45	---	---	Conversion in Logger mV to g m^{-3}	3.07	---
Temperature	HMP45	---	---	Conversion in Logger mV to °C	3.07	---
Pressure	HMP45	---	---	Conversion in Logger mV to hPa	3.07	---

2.2.3. Radiation and Precipitation

The Radiation was measured separated from the turbulent quantities with a CNR1 Net Radiometer from Kipp & Zonen, mounted to a black pole northeast of the turbulence complex. The precipitation was measured with a weighing rain gauge northeast of the profile tower. In Table 2-6 devices and measurement heights are specified.

Table 2-6: Instrumentation of radiation and precipitation complex

Parameter	**Device**	**Calibration/ Conversion**	**Height [m]**	**Angle against north**
Radiation	CNR1	Calibration in Logger	1.22	156°
Rain	Rain Gauge	---	0.60/0.80	---

2.2.4. Profile tower

The profile tower which is located to the northeast of the EC complex is equipped with measurement devices in 5 heights. In Table 2-7 devices and heights are specified.

Table 2-7: Instrumentation of the profile tower

Parameter	**Device**	**Height [m]**
Humidity	HMP45	1.5, 2, 4, 10, 20
Temperature	HMP45	1.5, 2, 4, 10, 20
Wind direction	Wind vane WAV151	1.5
Wind velocity	Anemometer WAA 151	1.5, 2, 4, 10, 20

2.2.5. Soil measurement complex

Soil temperature and moisture are measured at 6 depths. The soil temperature measurement at 10cm depth cannot be used as readings are clearly incorrect with a mean of approximately 0 °C. It is unknown whether this is a mere offset or whether there are additional problems with this sensor.
The soil properties are discussed in section 3.2.

Table 2-8: Instrumentation of soil pit

Parameter	**Device**	**Height [m]**
Soil Temperature	Pt100	0, -0.1, -0.2, -0.4,-0.8, -1.6
Soil Moisture	TDR	0, -0.1, -0.2, -0.4,-0.8, -1.6

3. Site characteristics

3.1. Vegetation

The vegetation cover at ITP is medium dense to sparse. There are some areas where vegetation cover approaches 95%, whilst other areas are dominated by stones and bare soil. The total vegetation cover in the eddy footprint is estimated to be ~60%. There are frequent burrows of picas of picas (*Ochotona curzoniae)* in the footprint of the eddy, which seemed to have increased compared to the last visual inspection in 2010.
The vegetation in the footprint of the EC Station is comprised of:
Adrocaea and *Arenaria biophyta* as cushion plants, *Leontopodium pusillum*, Potentilla bifurca, *Potentilla sauderriana, Astragalus sp, Oxytropid bifurca, Oxitropis glacialis*, *Dacoceaphallum, Incarvillea younghusbandii, Sibaldia adpressa* and sagebrush as forbs, *Potentilla sp* as scub, *Stipa purpurea, Poa sp, Poa litwanii* as grasses and a few *Carex* as sedges. Additionally there is a black lichen crust. The vegetation is classified as Alpine Steppe (Personal communication: Kelly Hopping, Colorado State University, 2012).
The height of the vegetation's grass component was 3 cm at the start of the experiment on the 4th of July and 7 cm on the 23rd of July, with the tallest stems at 40 cm height. Many herbaceous species that make up about 50% of the vegetation remained much shorter. The average height of the vegetation on 23rd of July was about 7 cm. This remained unchanged until the end of the experiment.

3.2.Soil properties

No soil profile was dough at the ITP site. Soil properties were obtained from Yang Kun (personal communication) and used in Gerken et al. (2012): The soil has a sandy texture with a porosity of 0.39. Field capacity and permanent wilting point were assumed to be 0.05 and 0.02 $m^3\ m^{-3}$. The thermal heat capacity of dry soil was determined at 2.2×10^6 J m^{-3} K^{-1} and dry thermal conductivity is 0.20 W m^{-1} K^{-1}.

4. Weather conditions

Weather observations were conducted between 08 and 20 BST (06 and 18 LST) every hour on launch days, and every 3 hours on the remaining days (See table 2-2 for radiosounde ascent days). We frequently observed thunderstorms in the lake basin, especially over the mountains from the late afternoon to the evening. Even thought, often no precipitation was recorded at Nam Tso Station. The weather observation records are shown in Table 4-1. In Appendix B, the detailed observations of low (Table B-1), middle (Table B-2) and high clouds (Table B-3) are listed. Additionally Weather maps can be found in the DVD Archive.

Table 4-1: Weather observations at Nam Tso Station (NyT refers to the Nanyang Tangla mountains, σ to the cloud fraction in octa, C to the international cloud codes, the time conversion from BST to LST is -2 hours)

Date	**Time**	**Wind**	**Visibility**				**Key**	**Octa**	**Low Clouds**		**Middle Clouds**		**High Clouds**		**Tendency**	**Remarks/Observer**
	BST		lake	SW	NyT	NE	ww	σ_C	σ_L	C_L	σ_M	C_M	σ_H	C_H		
10.07.12	11	WSW, strong	>15	> 50	> 10	>20	25	7	4	8	7	7	/	8	increasing cover	mountain tops above cloud cover TG KF
10.07.12	14	WSW, strong		> 50	> 10	15?	60	5	4	8	/	7	/	9	clearing from W	rain stopped during observations, TG KF WB
10.07.12	17	lake, weak	>15	45	>10	>20	3	3	1	8	1	6	3	6	increasing cover	TG, KF, WB
10.07.12	20	lake, strong	>15	30?	>10	>20	3	7	4	9	7	2	/	0	increasing cover	rain from Cb in W and N, TG KF
11.07.12	8	weak	>15	45	>10	>20	16	8	8	5	/	/	/	0	clearing	rain over western NyT and western lake, ca. 9 hail and shower, TG
11.07.12	11	lake, weak	>15	?	>10	>20	21	8	8	5	/	/	/	0	clearing	TG KF
11.07.12	14	WSW, weak	>15	> 50	>10	>20	1	5	3	9	/	7	/	1	clearing	TG KF
11.07.12	17	W, strong	10	10	10	10	60	8	8	5	/	0	/	/	no tendency	TG KF
11.07.12	20	lake, weak	>15	?	>10	>20	3	7	7	5	/	/	/	8	increasing cover	TG KF
12.07.12	8	S, weak	15	45/15	>10	20	1	7	7	9	/	4	/	/	clearing	Mountain tops above cloud cover (NyT), W clear, else fog TG KF
12.07.12	11	E, weak	>15	>50	>10	>20	2	3	3	2	/	0	/	0	no tendency	S+E Cu med move from the mountains over the plain, dew until 10h, TG KF
12.07.12	14	lake, moderate	>15	40 ?	>10	>20	15	2	2	2	0	4	1	3	no tendency	Clouds disperse above the lake TG KF
12.07.12	17	lake, moderate	>15	>50	>10	>20	2	1	1	2	/	1	/	0	no tendency	Cu also above the lake, TG KF
12.07.12	20	SE, weak	>15	30?	>10	>20	3	2	2	5	1	4	1	1	no tendency	Cloud fragments above the lake, TG KF, 30 min later Sc move from both mountain

Continuation of Table 4-1: Weather observations at Nam Tso Station (NyT refers to the Nanyang Tangla mountains, σ to the cloud fraction in octa, C to the international cloud codes, the time conversion from BST to LST is -2 hours)

Date	**Time**	**Wind**	**Visibility**				**Key**	**Octa**	**Low Clouds**		**Middle Clouds**		**High Clouds**		**Tendency**	**Remarks/Observer**
	BST		lake	SW	NyT	NE	ww	σ_C	σ_L	C_L	σ_M	C_M	σ_H	C_H		
																chains to the lake
13.07.12	8	WSW, moderate	10	25	10	20	15	7	7	5	/	5	/	/	?	mountain tops covered TG KF
13.07.12	11	WSW, weak	15	35	10	15	50	7	6	5	/	7	/	/	clearing	E: mountains in the fog, TG KF
13.07.12	14	lake, moderate	>15	35	> 10	>20	15	2	2	2	1	6	/	3	Cu development	rain on the mountains next to lake, TG
13.07.12	17	changing, weak	>15	35	> 10	>20	14	7	3	8	7	1	/	0	increasing cover	TG
13.07.12	20	WNW, gusty	>15	30?	> 10	20	63	8	8	7	/	/	/	/	clearing	moderate rain, TG
14.07.12	8	SE, weak – moderate	5-15	25	> 10	10-15	15	7	6	6	/	4	/	/	clearing	rain big lake, TG
14.07.12	11	calm	10	25	> 10	15?	63	8	8	5	/	/	/	/	?	rain, TG KF
14.07.12	14	lake, strengthening	>15	50/30	> 10	>20	3	3	1	2	1	4	1	9	Cu development	TG KF
14.07.12	17	W, weak	>15	> 50	> 10	>20	3	7	4	5	7	2	/	/	Cu development	KF
14.07.12	20	NW, strong	>15	40	> 10	>20	17	8	3	5	8	2	/	/	Cu development	shelf cloud moves from NyT on the plain, TG
15.07.12	8	S, weak	>15	20/30	10	15	50	8	8	6	/	/	/	/	no tendency	TG,KF
15.07.12	11	NW, weak	15	30	10	15?	15	8	7	5	/	2	/	/	no tendency	TG KF
15.07.12	14	N, weak	>15	45	>10	>20	15	6	2	9	5	6	2	9	Cu development	Cu move from NyT on the plain, 3-4 Cb in northern hemisphere, TG KF
15.07.12	17	NW, weak	15	50	> 10	20	15	5	1	9	2	7	5	3	Cu development	rain in E from Cb, TG KF
15.07.12	20	moderate-strong	15	50	> 10	20	15	7	1	9	3	6	/	1	Cu development	thunderstorm in the night over NyT, W and lake, TG KF
16.07.12	8	E, moderate	15	30	>10	20	0	7	7	6	/	2	/	/	no tendency	snow on top of the mountains in NyT and E, TG KT

Continuation of Table 4-1: Weather observations at Nam Tso Station (NyT refers to the Nanyang Tangla mountains, σ to the cloud fraction in octa, C to the international cloud codes, the time conversion from BST to LST is -2 hours)

Date	**Time**	**Wind**	**Visibility**				**Key**	**Octa**	**Low Clouds**		**Middle Clouds**		**High Clouds**		**Tendency**	**Remarks/Observer**
	BST		lake	SW	NyT	NE	ww	σ_C	σ_L	C_L	σ_M	C_M	σ_H	C_H		
16.07.12	11	SW, moderate	15	25	>10	15	63	8	8	7	/	2	/	/	clearing	clearing in E, KF
16.07.12	14	W, weak	>15	30	> 10	>20	15	7	1	2	7	7	/	/	Cu development	rain in W, Tg KF
16.07.12	17	W, strong	>15	40	> 10	>20	3	7	2	2	7	7	/	1	Cu development	TG
16.07.12	20	SW, weak	>15	> 50	> 10	>20	3	7	1	2	6	7	/	1	Cu development	TG, KF
17.07.12	8	calm	>15	> 50	> 10	>20	0	5	/	8	1	1	5	9	?	dew, TG, KF
17.07.12	9	calm	>15	> 50	> 10	>20	2	5	/	8	1	7	5	9	Cu clearing	TG, KF
17.07.12	10	lake, weak	>15	> 50	> 10	>20	3	4	1	8	1	5	4	6	Cu development	dew disappeared, TG, KF
17.07.12	11	N, weak	>15	> 50	> 10	>20	3	3	2	2	1	5	3	7	Cu development	Conv.over NyT, TG, KF
17.07.12	12	lake, weak	>15	> 50	> 10	>20	3	3	1	2	/	5	2	7	Cu development	11-12 Cu con development and dispersal NyT, TG KF
17.07.12	13	lake, weak	>15	> 50	10	15?	3	3	2	9	/	5	/	7	Cu development	NyT thunder, 13:15 thunder NyT, 13:35 storm between station and NyT, sonde ascents N of the storm, KF
17.07.12	14	SW, strong	>15	> 50	> 10	>20	3	3	1	9	3	6	3	3	Cu development	TG, KF
17.07.12	15	SW, moderate						3	1	9	3	6	1	3	Cu development	KF
17.07.12	16	lake, weak	>15	> 50	> 10	>20	15	6	2	3	3	6	/	2	Cu development	TG, KF
17.07.12	17	W, strong	>15	30-40	> 10	15	15	6	2	3	3	6	6	2	Cu development	rain above NyT, TG
17.07.12	18	W, strong	>15	30-40	> 10	15	15	7	2	8	6	6	/	2	Cu development	rain above NyT, TG KF
17.07.12	19	W, strong	>15	> 50	> 10	>20	3	8	2	8	8	7	/	/	Cu development	KF
17.07.12	20	W, moderate	>15	> 50	> 10	>20	15	8	2	7	8	7	/	/	no tendency	rain in E, TG, KF
17.07.12	21	SW, weak	>15	> 50	> 10	>20	2	7	2	2	7	7	/	8	clearing	KF
18.07.12	8	SE, weak	>15	> 50	> 10	>20	0	3	1	1	3	5	/	2		KF
18.07.12	9	E, very weak	>15	> 50	> 10	>20	1	6	1	4	6	5	/	2		KF
18.07.12	10	N, very weak	>15	> 50	> 10	>20	3	3	2	2	2	5	/	2	Ac str un	KF

Continuation of Table 4-1: Weather observations at Nam Tso Station (NyT refers to the Nanyang Tangla mountains, σ to the cloud fraction in octa, C to the international cloud codes, the time conversion from BST to LST is -2 hours)

Date	**Time**	**Wind**	**Visibility**				**Key**	**Octa**	**Low Clouds**		**Middle Clouds**		**High Clouds**		**Tendency**	**Remarks/Observer**
	BST		lake	SW	NyT	NE	ww	σ_C	σ_L	C_L	σ_M	C_M	σ_H	C_H		
															spersedi, Cu development	
18.07.12	11	changing, weak	>15	> 50	> 10	>20	3	2	2	2	1	5	1	9	Cu development	KF
18.07.12	12	WNW, weak	>15	> 50	> 10	>20	3	2	1	9	1	5	1	9	Cu development	KF
18.07.12	13	W, weak	>15	> 50	> 10	>20	3	2	1	9	1	6	1	9	Cu development	KF
18.07.12	14	NW, moderate	>15	> 50	> 10	>20	3	2	2	9	1	6	1	9	Cu development	KF
18.07.12	15	W, weak	>15	> 50	> 10	>20	15	1	1	9	/	0	1	9	Cu development	rain from Cb in W and on the lake, Cu med above lake, TG
18.07.12	16	E, moderate	>15	> 50	> 10	>20	15	3	1	9	1	6	3	9	Cu development	Dispersal of Cu above the lake, TG
18.07.12	17	lake, weak	>15	40	> 10	>20	3	6	1	9	1	6	6	2	Cu development	TG
18.07.12	18	lake, weak	>15	> 50	> 10	>20	15	3	1	9	1	6	3	3	clearing	TG
18.07.12	19	lake, weak	>15	> 50	> 10	>20	2	3	1	9	/	6	3	3	no tendency	TG
18.07.12	20	W, weak	>15	40	> 10	>20	2	3	1	9	1	6	3	2	no tendency	TG
19.07.12	7	SE, weak	>15	> 50	10	>20	0	7	1	5	1	4	7	2		KF
19.07.12	8	S, strong	>15	> 50	> 10	>20	2	6	2	5	2	4	5	2		KF
19.07.12	9	SE, strong	>15	> 50	> 10	>20	1	5	3	5	2	4	3	9		KF
19.07.12	10	SE, strong	>15	> 50	> 10	>20	3	3	1	2	1	8	2	2	Ci disperse, moderate Cu development	KF
19.07.12	11	S, strong	>15	> 50	> 10	>20	3	2	2	2	1	8	1	2	Cu development, Ci almost dispersed	KF
19.07.12	12	calm	>15	> 50	> 10	>20	3	4	4	9	1	4	1	9	Cu development, Ci almost dispersed	KF
19.07.12	13	W, weak	>15	> 50	> 10	>20	3	6	6	9	1	6	1	9	Cu development, Ci almost	KF

Continuation of Table 4-1: Weather observations at Nam Tso Station (NyT refers to the Nanyang Tangla mountains, σ to the cloud fraction in octa, C to the international cloud codes, the time conversion from BST to LST is -2 hours)

Date	**Time**	**Wind**	**Visibility**				**Key**	**Octa**	**Low Clouds**		**Middle Clouds**		**High Clouds**		**Tendency**	**Remarks/Observer**
	BST		lake	SW	NyT	NE	ww	σ_C	σ_L	C_L	σ_M	C_M	σ_H	C_H		
															dispersed	
19.07.12	14	N, weak	>15	> 50	> 10	>20	3	2	2	9	0	/	1	2	Cu development, Ci almost dispersed	KF
19.07.12	15	NW, moderate	>15	40	> 10	>20	15	6	2	9	1		6	3	increasing cover	TG
19.07.12	16	lake, weak	>15	40	> 10	20	16	7	5	9	/	4	/	2	increasing cover	Rain on the plain, W, E, TG
19.07.12	17	S, moderate	>15	40	> 10	20	29	4	3	2	2		3	8	increasing cover	lake: rain, 30 min ago: thunderstorm at station, TG
19.07.12	18	SW, strong	>15	40	> 10	20	62	7	3	9	7	6	/	/	no tendency	TG
19.07.12	19	E, moderate	>15	40	> 10	20	16	7	2	9	7	6	/	/	no tendency	rain in NyT, E, TG
19.07.12	20	NyT, strong	>15	40	> 10	20	14	8	/	2	6	6	/	2	no tendency	TG
19.07.12	21	NyT, strong	>15	40	> 10	20	15	8	1	8	8	8	/	/	no tendency	TG
20.07.12	8	S, strong	>15	> 50	> 10	>20	0	5	1	5	2	8	5	8		KF
20.07.12	9	W, moderate	>15	> 50	> 10	>20	3	6	3	1	2	4	2	9		KF
20.07.12	11	W, moderate-strong	>15	> 50	> 10	>20	3	6	3		2	4	2			KF
20.07.12	14	W, strong	>15	40	> 10	20	15	7	5	2	/	4	/	2	Cu development	TG
20.07.12	17	SW, moderate	>15	40	> 10	20	81	6	5	9	/	6	/	5	Cu development	TG
20.07.12	20	SE, strong	>15	> 50	> 10	>20	15	7	2	9	6	7	/	2		TG
21.07.12	8	W, strong	10-15	10-15	10	10-15	50	8	8	6	/	/	/	/	no tendency	TG
21.07.12	11	W, strong	10-15	10-15	10	10-15	60	8	3	5	8	2	/	/	clearing	above lake: clearing,TG
21.07.12	14	W, moderate	15	> 50	> 10	>20	3	7	2	9	6	8	/	3		KF
21.07.12	17		10	> 50	> 10	>20	15	7	2	5	2	7	/	3	increasing cover from N	rain in N, KF
21.07.12	20	S, moderate	>15	30	> 10	>20	15	7	2	8	7	7	/	/		TG
22.07.12	7	W, weak	>15	> 50	> 10	>20	0	5	5	5	/	/	/	/	clearing	in W clearing, TG

Continuation of Table 4-1: Weather observations at Nam Tso Station (NyT refers to the Nanyang Tangla mountains, σ to the cloud fraction in octa, C to the international cloud codes, the time conversion from BST to LST is -2 hours)

Date	**Time**	**Wind**	**Visibility**				**Key**	**Octa**	**Low Clouds**		**Middle Clouds**		**High Clouds**		**Tendency**	**Remarks/Observer**
	BST		lake	SW	NyT	NE	ww	σ_C	σ_L	C_L	σ_M	C_M	σ_H	C_H		
22.07.12	8	W, weak	>15	> 50	> 10	20	1	7	7	5	/	/	/	/		KF
22.07.12	9	W, weak	>15	> 50	> 10	20	2	7	7	5	/	/	/	/		KF
22.07.12	10	W, weak	>15	> 50	> 10	>20	2	7	7	8	/	/	/	/		KF
22.07.12	11	W, weak	>15	> 50	> 10	>20	1	6	6	8	/	/	/	/	clearing	in W and N clearing, KF
22.07.12	12	W, weak	>15	> 50	> 10	>20	3	2	1	2	1	4	/	0	Cu development	Dispersal of Cu above plain, TG
22.07.12	13	W, weak	>15	> 50	> 10	>20	1	1	1	2	1	4	/	0	clearing	TG
22.07.12	14	W, weak	>15	> 50	> 10	>20	3	2	2	9	1	8	1	2		KF
22.07.12	15	lake, weak	>15	40	> 10	>20	14	2	2	9	1	4	1	3	Cu development	TG
22.07.12	16	W, weak	>15	40	> 10	>20	15	6	1	9	5	7	1	3	increasing cover	TG
22.07.12	17	W, weak	>15	40	> 10	>20	3	2	2	9	1	7	1	3		KF
22.07.12	18	W, weak	>15	40	> 10	>20	3	2	2	9	1	6	1	3		KF
22.07.12	19	W, moderate	>15	40	> 10	>20	15	6	2	9	6	8		2	increasing cover	Increasing wind, TG
22.07.12	20	W, strong	10	40	> 10	>20	3	7	4	9	7	1	/	/		strong thunderstorm at the station during nighttime, KF
23.07.12	7		>15	> 50	> 10	>20	1	7	7	5	/	/	/	/	clearing	KF
23.07.12	8	WSW,weak	>15	> 50	> 10	>20	15	7	6	5	/	/	/	/		KF
23.07.12	9	WSW,weak	>15	> 50	> 10	>20	2	7	7	5	/	/	/	/		KF
23.07.12	10	WSW,weak	10	> 50	10	>20	2	7	7	5	/	/	/	/		KF
23.07.12	11	calm	>15	> 50	> 10	>20	14	5	5	6	1	4	/	0	clearing	TG
23.07.12	12	lake, weak	>15	40	> 10	>20	15	2	2	9	1	4	/	0	clearing	TG
23.07.12	13	lake, weak	>15	40	> 10	>20	15	2	2	9	1	4	1	2	Cu development	TG
23.07.12	14	N, weak	>15	40	> 10	>20	?	1	1	9	1	4	1	2	Cu development	TG
23.07.12	15	calm	>15	40	> 10	>20	15	1	1	9	1	7	/	0	Cu development	TG
23.07.12	16	W, moderate	>15	40	> 10	>20	16	1	1	9	5	7	1	9	Cu development	TG
23.07.12	17	calm	>15	> 50	> 10	>20	15	6	5	9	/	6	/	3	Cu development	KF

Continuation of Table 4-1: Weather observations at Nam Tso Station (NyT refers to the Nanyang Tangla mountains, σ to the cloud fraction in octa, C to the international cloud codes, the time conversion from BST to LST is -2 hours)

Date	**Time**	**Wind**	**Visibility**				**Key**	**Octa**	**Low Clouds**		**Middle Clouds**		**High Clouds**		**Tendency**	**Remarks/Observer**
	BST		lake	SW	NyT	NE	ww	σ_C	σ_L	C_L	σ_M	C_M	σ_H	C_H		
23.07.12	18	lake, weak	>15	40	> 10	>20	14	2	1	2	1	4	/	2	increasing cover	TG
23.07.12	19	W, weak	>15	> 50	> 10	>20	15	3	2	9	2	7	/	3	Cu development	KF
23.07.12	20	W, weak	>15	> 50	> 10	>20	15	5	4	9	/	7	/	/		rain in N, KF
24.07.12	7	E, weak	>15	> 50	> 10	>20	0	7	1	1	7	7	/	/		KF
24.07.12	8	E, moderate	>15	> 50	> 10	>20	1	7	2	5	7		/	/	East: clearing	KF
24.07.12	9	E, weak-moderate	>15	> 50	> 10	>20	2	6	1	2	6		/	/		Cu con at 7.00 LST! KF
24.07.12	10	E, weak	>15	40	> 10	>20	14	7	1	5	6	8	/	9	clearing	TG
24.07.12	11	E, moderate	>15	40	> 10	>20	1	5	3	8	2	8	3	8	clearing	TG
24.07.12	12	E, moderate	>15	40	> 10	>20	?	7	1	3	/	1	7	8	Cu development	TG
24.07.12	13	SE, moderate	>15	40	> 10	>20	2	7	2	9	6	1	/	9	Cu development	KF
24.07.12	14	S, weak	>15	40	> 10	>20	3	6	2	9	6	7	/	/	Cu development	KF
24.07.12	15	S, weak	10	40	> 10	>20	15	6	2	9	6	1	/	2	Cu development	rain in N, KF
24.07.12	16	E, weak	>15	40	> 10	>20	2	7	3	9	7	1	/	2		KF
24.07.12	17	calm	>15	40	> 10	>20	15	7	3	9	7	7	/	9		rain in E, KF
24.07.12	18	SW, weak	>15	40	> 10	>20	15	7	6	9	/	7	/	9		rain in E, KF
24.07.12	19	E, strong	>15	40	> 10	>20	16	7	2	9	6	6	/	1	Cu development	approaching thunderstorm from lake, TG
24.07.12	20	calm	>15	30-40	> 10	>20	25	7	1	9	3	6		3	increasing cover	TG
25.07.12	8	W, weak	>15	> 50	10	>20	1	7	3	8	/	7	/	/		KF
25.07.12	11															
25.07.12	14	lake, weak	>15	15	> 10	>20	16	8	5	8	/		/	/	no tendency	TG
25.07.12	17	S, moderate	>15	40	> 10	15?	15	6	1	9	4	5	1	3		TG
25.07.12	20	W, weak	>15	40	> 10	>20	53	8	6	5	8		/	/		KF
26.07.12	8	calm	10	40	10	10	50	8	2	5	8	2	/	/		rain in S and E, KF
26.07.12	11	lake, weak	>15	40	> 10	>20	15	7	7	5	/	/	/	/	clearing	snow on the mountain tops

Continuation of Table 4-1: Weather observations at Nam Tso Station (NyT refers to the Nanyang Tangla mountains, σ to the cloud fraction in octa, C to the international cloud codes, the time conversion from BST to LST is -2 hours)

Date	**Time**	**Wind**	**Visibility**				**Key**	**Octa**	**Low Clouds**		**Middle Clouds**		**High Clouds**		**Tendency**	**Remarks/Observer**
	BST		lake	SW	NyT	NE	ww	σ_C	σ_L	C_L	σ_M	C_M	σ_H	C_H		
																in NyT and E, TG
26.07.12	14	SW, weak-moderate	>15	30	> 10	>20	3	7	7	8	/	5	/	/		KF
26.07.12	17		>15	40	> 10	>20	15	8	3	8	8	7	/	/		KF
26.07.12	20															
27.07.12	7	SE, weak	>15	30	>10	10	80	8	8	5	/	7	/	/	no tendency	TG
27.07.12	8	E, weak	>15	35	> 10	10	53	8	7	5	/	7	/	/	no tendency	KF
27.07.12	9	E, weak-moderate	15	30	10	8	65	8	8	5	/	/	/	/	no tendency	KF
27.07.12	10	E, moderate	10	30	> 10	10	51	8	8	5	/	/	/	/	no tendency	TG
27.07.12	11	N, weak	10	30	> 10	10	62	8	7	5	/	7	/	/	clearing	TG
27.07.12	12	SE, weak	15	30	10	10	51	7	7	5	/	7			no tendency	KF
27.07.12	13	W, moderate	>15	30	<10	15	15	7	5	5	/	7	/	/	no tendency	KF
27.07.12	14	SE, strong	>15	30	> 10	15	15			5		7	/			TG
27.07.12	15	SE, weak	>15	30	> 10	15	15	7	3	8	7	7	/	/	clearing	TG
27.07.12	16	W, weak	>15	30	> 10	15	1	7	5	2	7	7	/	/		KF
27.07.12	17	SW, strong	>15	30	> 10	>20	15	7	2	8	4		/	8	clearing	TG
27.07.12	18		10	30	> 10	>20	15	6	4	9	/	7	/	2	Cu development	KF
27.07.12	19	W, moderate	>15	30	> 10	>20	15	6	3	9	6	7	/	3		KF
27.07.12	20	SW, weak	>15	30	> 10	>20	14	6	2	9	/	7	/	3		KF
27.07.12	21	calm	>15	30	> 10	>20	14	7	3	9	7	7	/	/		KF
28.07.12	7	W, weak	10	10	10	10	61	8	8	7	/	/	/	/		weak rain, KF
28.07.12	8	S, weak	10	10	10	10	61	7	7	7	/	/	/	/	SW clearing	weak rain, KF
28.07.12	9	S, weak	10	10	25	10	63	7	7	7	/	7	/	/	SW and S clearing	moderate rain, KF
28.07.12	10	SE, weak	>15	30	> 10	>20	1	7	1		7		/	/		TG: cloud classification inconsistent between KF and

Continuation of Table 4-1: Weather observations at Nam Tso Station (NyT refers to the Nanyang Tangla mountains, σ to the cloud fraction in octa, C to the international cloud codes, the time conversion from BST to LST is -2 hours)

Date	**Time**	**Wind**	**Visibility**				**Key**	**Octa**	**Low Clouds**		**Middle Clouds**		**High Clouds**		**Tendency**	**Remarks/Observer**
	BST		lake	SW	NyT	NE	ww	σ_C	σ_L	C_L	σ_M	C_M	σ_H	C_H		
																TG
28.07.12	11	W, weak	>15	15	> 10	>20	15	7	3	5	7	7	/	/	W and SW clearing	KF
28.07.12	12	lake, weak	>15	40	> 10	>20	1	7	1		7		/	/	clearing from W	TG
28.07.12	13	W, weak-moderate	>15	> 40	> 10	>20	3	7	5	9	/	7	/	9		KF
28.07.12	14	lake, weak	>15	30	> 10	>20	1	7	5		/		/			TG
28.07.12	15	SE, moderate	>15	40	> 10	>20	2	6	5		/		/			TG
28.07.12	16	S, strong	>15	> 40	> 10	>20	15	6	5	9	/	7	/	9	Cu development	KF
28.07.12	17	SE, strong	>15	30	> 10	>20	15	4	2		2		1			TG
28.07.12	18	SE, moderate	>15	30	> 10	>20	1	3	1		1		1			TG
28.07.12	19	S, moderate	>15	> 40	> 10	>20	3	3	2	9	/	6	/	3		KF
28.07.12	20	calm	>15	> 40	> 10	>20		7	1		4		3		increasing cover, massive Cb in SW	TG

5. DVD Archive

The raw data and additional information can be found in the DVD archive of the Department of micrometeorology, University of Bayreuth, labeled “Experiment Nam Tso 2012”.

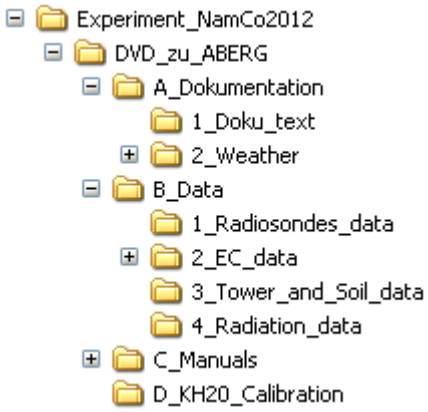

Figure 5-1: Structure of the DVD “Experiment Nam Tso 2012” (Data collected at Nam Tso in 2012).

6. Literature

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http://www.tip.uni-tuebingen.de/
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A. KH20 Calibration

Date: 11-13 July 2012
Place: Nam Co ITP station
Device: KH20 Krypton hygrometer s/n 1649, mounted at ITP EC station
Calibration Unit: s/n 002/2009

Settings for the new setup and start values, July 13th 2012

Table A-1: KH20 Calibration

Parameter	**Value**	**Remark**
kw [ln(mV)m3g-1cm-1]	-0.2011	Calibration nr. 4
ko [ln(mV)m3kg-1cm-1]	-16.585	Calibration nr. 4
Path length [cm]	1.508	
Distance at fixing [cm]	1.744	
Mounting height [m]	3.06	unchanged
Angle against north[°]	210	unchanged
Angle to the Csat [°]	330	Corresponds to parameter !drctn for TK2/TK3
Vo [mV]	5348	from original calibration, March 11th 2009
kw_start [ln(mV)m3g-1cm-1]	-0.165	from original calibration, March 11th 2009
ko_start [ln(mV)m3kg-1cm-1]	-13.607	from first ko calibration, May 8th 2009

B. Weather observations

1. Low clouds

Table B-1: Low clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**Low Clouds**		**Sectors**				
	BST	**σ_L**	**C_L**	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
10/07/12	11	4	8	Sc	Cu hum, Cu med	Sc	Sc	
10/07/12	14	4	8	Sc, Cum con, Cu med, St (above lake)	Cu hum, Cu med	Cb, Cu fra, Cu hum	Cu hum, Cu med, Cu Nb, Cu fr, St (above lake)	Cu fra, Cum hum
10/07/12	17	1	8	Cu hum, med, con, Cb	Cu med, Cu con	Cu fra, Cu hum, Cu med, Cu con		Cu hum, (Cb?)
10/07/12	20	4	9	Cb, Sc	Cb, Sc, Precip	Cu med, con, fra	Cb, Cu med, con, fra	Cu med, Cu fra
11/07/12	8	8	5	Sc, Cu fra	Sc, Cu fra	Sc, Cu fra	Sc, Cu fra	Sc, Cu fra
11/07/12	11	8	5	Sc, Cu fra (dir. N Sc, Ns)	Sc, Cu fra	Sc, Ns	Sc, St, Ns	
11/07/12	14	3	9	Sc, Cb	Cu hum, con	Cu hum	Cu hum	Cu con + hum pervading
11/07/12	17	8	5	Sc, Ns	Ns	Sc, Ns	Ns	Sc, Ns
11/07/12	20	7	5	Sc/Cb (not sure)	Cu med, Sc	Cu hum, Sc	Cu hum, Sc	
12/07/12	8	7	9	Sc, Cb ? In dispersal	Sc, St	Sc, St	Sc, Cu hum	Sc
12/07/12	11	3	2	Cu hum, med, con	Cu hum	Cu hum, Cu med	Cu hum, Cu med	Cu med
12/07/12	14	2	2	Cu hum, med, con, Cb fib,	Cu med, Cu con	Cu hum, med, fra (dispersal)	Cu hum, med, fra	Cu fra, Cu hum
12/07/12	17	1	2	Cu hum, Cu med	Cu hum, Cu med	Cu hum, med, con, Sc	Cu hum, Cu med	/
12/07/12	20	2	5	Cu hum	Cu hum, Sc	Cu hum, Cu con, Sc	Cu hum, Cu med	Cu hum
13/07/12	8	7	5	Sc (lake), Cu hum	Sc	Sc, Cu fra	Sc vir, Cu fra	Sc
13/07/12	11	6	5	Sc	Sc	Ns	St/Ns?	Sc
13/07/12	14	2	2	Cu med, Cu con, Cb inc	Cu med	Cu con	Cu hum, med, con	Cu subsidence
13/07/12	17	3	8	Cu hum, Cu med, Sc	Cu hum, Sc	Sc cum	Sc, St	Sc
13/07/12	20	8	7	Ns; Cu hum, med, con (horizon)	Ns	Ns	Ns	Ns

Table B-1: Low clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**Low Clouds**		**Sectors**				
	BST	**σ_L**	**C_L**	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
14/07/12	8	6	6	St neb, Sc, Cu fra	St neb, Sc, Cu fra	Sc	Sc, Cu fra	Sc
14/07/12	11	8	5	Sc	Sc	Sc	Sc, Cu fra	Sc
14/07/12	14	1	2	Cu med, Cu con, Cb incus	Cu con, Cb incus	Cu med pil,	Cu med pil, Cu con, Cb calv	Cu med, con
14/07/12	17	4	5		Sc	Cu fra, Cu med	Cu hum, fra, med, con	Cu fra
14/07/12	20	3	5	Sc, Cu fra, Ns	Sc, Cu fra,	Sc, Cu fra, Cb, Cu con	Sc, Cu fra, Ns/Cb	Cu fra
15/07/12	8	8	6	Sc, Cu fra	Sc, St neb	Sc	Sc, St neb	Sc
15/07/12	11	7	5	Sc	Sc	Sc	Sc	Sc
15/07/12	14	2	9	Cu med, con, Cb inc	Cu med, Cu con, Cb inc	Sc, Cu hum, med, con	Cu hum, med	/
15/07/12	17	1	9	Cu hum, con	cu hum, med, con	Cb inc, Cu hum med con	Cb cal, Cu hum, Cu con	
15/07/12	20	1	9	Cu hum (I. dispersal)	Cu hum, Cb inc	Cu hum, med, Cb (I. dispersal)	Cu hum, con	Cu fra
16/07/12	8	7	6	Sc, St neb	Sc	Sc, St neb	Sc, Cu fra	Sc
16/07/12	11	8	7	Ns, Sc	Ns	Ns	Ns, Sc	Ns
16/07/12	14	1	2	Cu hum, med, con, Cb	Cu hum, Cu med	Cu hum, Cu med	Cu hum, med, con	/
16/07/12	17	2	2	Cu hum, med, con, Cb	Cu hum	Cu med, con, Cb inc	Cu med, con, Cb	/
16/07/12	20	1	2	Cu med, Cu con	Cu med, Cu con	Cu med, Cb	Cu hum, med, con	
17/07/12	8	/	8			Cu hum, med, fra	Cu hum, Sc	
17/07/12	9	/	8	Sc (lake)	Sc	Cu hum, Cu med	Sc	
17/07/12	10	1	8	Sc (lake)	Cu hum	Cu hum, Cu med	Cu hum, med, fra	Cu fra
17/07/12	11	2	2	Cu hum, med, Sc (lake)	Cu hum, Cu med	Cu hum, med, fra, con	Cu hum, med, con	
17/07/12	12	1	2	Cu hum, med, con	Cu hum, med, con	Cu hum, med, con, fra	Cu hum, med, con, Cb	/
17/07/12	13	2	9	Cu hum, med, con, Cb inc, calv	Cu hum, med, con, Cb inc	Cu hum, med, con, Cb cal, inc		Cu hum, med, con, Cb cal
17/07/12	14	1	9	Cu hum, med, con, Cb inc	Cu med, con, Cb inc	Cu hum, med con, Cb inc mammatus, Cb calv	Cu hum,med, con	Cu fra , (Cb ebene)
17/07/12	15	1	9	Cu med, con, Cb inc	Cu hum, Cb (I. dispersal)	Cu hum, med, con	Cu hum, med, con, Cb	Cu fra

Continuation of table B-1: Low clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**Low Clouds**		**Sectors**				
	BST	**σ_L**	**C_L**	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
17/07/12	16	2	3	Cu hum,		Cu fra, med, con	Cu hum, med, con, Cb calv	
17/07/12	17	2	3	Cu hum, Cb, Cu fra (lake)	Cu fra, hum	Cu fra, med, con	Cu hum, med, con, Cb calv	
17/07/12	18	2	8	Cu hum, med, con, Cb	Sc	Cu hum, med, con, Cb	Cu hum, med, con, Cb inc	Cu fra
17/07/12	19	2	8	Sc, Cu fra	Sc	Cu hum, med, con	Cu hum, med, con	
17/07/12	20	2	7	Cu fra, Cu med		Cu fra	Cu med , fra	
18/07/12	8	1	1	Cu hum, fra	Cu hum			
18/07/12	9	1	4	Cu hum, fra	Cu hum, fra	Cu hum	Sc	
18/07/12	10	2	2	Cu hum, med, con	Cu hum, fra	Cu hum, med, con	Cu hum, med	Cu hum, fra
18/07/12	11	2	2	Cu hum, med, con	Cu hum, med	Cu hum, med, con, fra	Cu hum, med, con	Cu fra, Cu hum
18/07/12	12	1	9	Cu hum, med, con, Cb	Cu hum, med, con	Cu hum, med, con, fra	Cu hum, med, con, Cb	Cu fra
18/07/12	13	1	9	Cu hum, med, con, Cb	Cu hum, med, con	Cu hum, med, con	Cu hum, med, con, Cb	Cu fra
18/07/12	14	2	9	Cu hum, med, con, Cb	Cu hum, med, con, Cb	Cu hum, med, con, Cb	Cu hum, med, con	
18/07/12	15	1	9	Cb inc, Cu med	Cb inc, Cu med	Cu med, con, Cb calv, inc	Cb calv, Cu med	/
18/07/12	16	1	9	Cu med, con (lake), Cb inc	Cb inc	Cu med, con, fra	Cu hum, med	Cu hum, fra
18/07/12	17	1	9	Cu hum, med	Cb inc, calv, Cu med	Cu hum, med, con	Cu hum, med, con	/
18/07/12	18	1	9	Cu hum, med, con	Cb inc	Cu med, con	Cu hum, med	/
18/07/12	19	1	9	Cu hum, med con	Cu hum	Cb inc, Cu hum med con	Cu hum, Cb inc, calv	Cu hum (Ebene)
18/07/12	20	1	9	Cb inc (I. dispersal), Cu hum, med, con		Cb inc, Cu hum med con	Cb inc, Cu hum, con	/
19/07/12	7	1	5	Sc	Sc	Sc	Cu fra, Sc	
19/07/12	8	2	5	Sc, Cu fra	Sc, Cu fra	Sc, Cu fra	Sc, Cu fra	
19/07/12	9	3	5	Sc	Sc, Cu med	Sc, Cu hum, med,fra	Sc, Cu hum, med,fra	Cu fra
19/07/12	10	1	2	Cu hum , med, con	Cu hum, fra	Cu hum, med, fra	Cu hum, med, fra	

Continuation of table B-1: Low clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**Low Clouds**		**Sectors**				
	BST	**σ_L**	**C_L**	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
19/07/12	11	2	2	Cu hum, med, con	Cu hum, fra	Cu hum, med, fra	Cu hum, med, fra	Cu hum, fra
19/07/12	12	4	9	Cu hum, med, con	Cb, Cu hum, med, con,fra	Cu med, fra	Cu hum, med, con,fra	Cu hum, fra
19/07/12	13	6	9	Cb inc, Cu fra, hum, med, con	Cb, Cu fra, hum, med, con	Cu hum, med, con,fra	Cb inc, Cu fra, hum, med, con	Cu hum, fra
19/07/12	14	2	9	Cb inc, hum, med, con	Cu hum, med, con	Cu hum, med, con,fra	Cb inc, hum, med, con	Cu hum, fra
19/07/12	15	2	9	Cb inc , Cu hum, med, con	Cb inc, Sc	Cu hum, med , con	Cu hum, med , con	/
19/07/12	16	5	9	Cb inc, Cu hum, med, con	Sc, Cu hum, med	Cb (plain), Cu con	Cb , Cu hum, med, Sc	Sc/Cb
19/07/12	17	3	2	Cu con, Cb, Sc	Cu hum	Cu hum, Cu fra	Cu inc	Cu fra, hum
19/07/12	18	3	9	Cu hum(lake), con	Sc vir, Cu fra	Cb/Ns, Sc, Cu fra	Cu hum, Cu fra	Sc, Cb/Ns
19/07/12	19	2	9	Cu hum, med	Cu med	Cu hum, med, con, Cb	Cu med, Cb cal	
19/07/12	20	/	2	Cu med, fra	Cu med	Cu med pil,	Cu hum, med	
19/07/12	21	1	8	Sc, Cu fra	Sc	Cu med	Cu hum	
20/07/12	8	1	5	Cu hum, fra		Sc	Cu hum, fra	Cu fra
20/07/12	9	3	1	Cu hum, med, fra	Cu hum	Cu med	Cu hum, med	Cu hum, fra
20/07/12	11	3		Cu hum, med, fra	Cu hum	Cu med	Cu hum, med	Cu fra
20/07/12	14	5	2	Cu hum, med, con, Cb	Cu med, con	Cu med, con, Cb, Sc	Cu hum, med	
20/07/12	17	5	9	Cb, Cu hum, med	Cu hum, med, Sc vir	Cu hum, med , con	Cu hum, med, con	Cb/Ns pre,/vir
20/07/12	20	2	9	Sc, Sc fra, Cb/Ns? pre	Cu hum, med	Cb, Cu hum, med	Cu med	
21/07/12	8	8	6	St	St	St	St	St
21/07/12	11	3	5	Sc	Sc	Sc	Sc	Sc
21/07/12	14	2	9	Cb, Cu hum, med, con	Cb, cu hum, med	Sc	Cb , Cu hum, med, con	
21/07/12	17	2	5	Cu hum, fra, St	Sc	Cu med, con	Sc	
21/07/12	20	2	8	Sc (lake), Cu med	Cu med	Cu fra	Cu med	
22/07/12	7	5	5	Sc, Sc fra	Sc, Sc fra	Sc, Sc fra	Sc	Sc
22/07/12	8	7	5	Sc	Sc, Cu hum	Sc	Sc	Sc
22/07/12	9	7	5	Sc	Sc, Cu hum	Sc	Sc	Sc
22/07/12	10	7	8	Sc	Sc, Cu hum	Sc, Cu	Sc, Cu fra	Sc

Continuation of table B-1: Low clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**Low Clouds**		**Sectors**				
	BST	**σ_L**	**C_L**	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
						hum, med, con		
22/07/12	11	6	8	Sc	Sc	Sc, Cu hum, med	Sc	Sc
22/07/12	12	1	2	Cu med, Cu con → Cb	Cu med, Cb	Cu med , fra, con	Cu med, con	Cu hum
22/07/12	13	1	2	Cu med, Cu con	Cu med, Cu con	Cu med	Cu med, Cu con	/
22/07/12	14	2	9	Cb, Cu hum, med, Cu con	Cu hum, med, con	Cb, Cu hum, med, con, fra	Cb, Cu hum, med, con, fra	Cu fra
22/07/12	15	2	9	Cb (lake), Cu med, con	Cb (lake)	Cu hum, med, Cb	Cu med, con pre	Cu fra (dispersal)
22/07/12	16	1	9	Cu hum, med	Cb pre, Cu hum, med, con	Cu hum, med, con, Cb	Cu hum, med, con	
22/07/12	17	2	9	Cu hum, med, con	Sc	Cb, Cu hum, med, con, fra	Cu hum, med, con, fra	
22/07/12	18	2	9	Cb, Cu hum, med, fra	Cb, Cu hum, med, fra	Cu hum, med, con, fra	Cu hum, med	Cu fra
22/07/12	19	2	9	Cu hum, med, Cb pre	Cu hum, med, Cb pre	Cu hum, med, con, Cb	Cu hum, med, Cb pre	
22/07/12	20	4	9	Cb, Cu hum, Sc	Sc	Cb, Cu hum, med, Sc	Cu hum	Sc
23/07/12	7	7	5	Sc	Sc	Sc	Sc	Sc
23/07/12	8	6	5	Sc	Sc	Sc	St	Sc
23/07/12	9	7	5	Sc	Sc	Sc	Sc	Sc
23/07/12	10	7	5	Sc pre	Sc	Sc pre, Cu hum	Sc	Sc
23/07/12	11	5	6	Cu hum, Cu med, Sc(lake)	Sc virg, Cu hum, med	Sc, Cu hum	Sc, Cu hum, Cu med	Sc fra
23/07/12	12	2	9	Sc, Cu hum, med, con	Cu med, Cu con virg	Cu med, con, Cb cal pre		Cu fra (I.dispersal)
23/07/12	13	2	9	Cu hum, med, con, Cb inc pre	Cb hum, med, con → Cb	Cu hum, med, con	Cu hum, med, con	Cu fragments
23/07/12	14	1	9	Cu hum, med, con, Cb	Cu hum, med, con	Cu hum, med, con	Cu hum, med, con	Cu fragments
23/07/12	15	1	9	Cb inc pre, Sc, Cu hum, med	Cu hum, med, con	Cu hum, Cu med	Cu hum, med, con	/
23/07/12	16	1	9	Cb inc pre, Cu hum, med	Cb, Cu med, con	Cu hum, med	Cu med	/
23/07/12	17	5	9	Cb, Cu hum, med,	Cu hum	Cb, Cu hum, med,	Cu hum, med, con	

Continuation of table B-1: Low clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**Low Clouds**		**Sectors**				
	BST	**σ_L**	**C_L**	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
				con		con		
23/07/12	18	1	2	Cu hum, med, con	Cu med, con	Cu med, con, Cb	Cu med	/
23/07/12	19	2	9	Cb, Cu hum, med, con	Cu hum, med	Cb, Cu hum, med, con	Cu hum, med, fra	Cu fra
23/07/12	20	4	9	Cb, Cu hum	Cu hum, med, con	Cu hum, med, con	Cb, Cu hum, med, con	Cu fra, hum
24/07/12	7	1	1	Cu hum	Cu hum	Cu fra	Cu fra	Cu fra, hum
24/07/12	8	2	5	Cu hum	Cu fra	Sc	Cu hum	
24/07/12	9	1	2	Cu hum	Cu hum, con	Cu hum, med , fra	Cu hum, med	
24/07/12	10	1	5	Cu hum, med (con)	Sc	Cu hum	Cu hum, med, con	Cu fetzen
24/07/12	11	3	8	Cu med, con	Cu med, con	Cu hum, med	Cu hum, med	Cu fezten, Sc
24/07/12	12	1	3	Cu med, con, Cb cal	Cu med, con	Cu med, con, Cb	Cu hum, med, con pre	Cu hum
24/07/12	13	2	9	Cb inc, Cu hum, med, fra	Cb, Cu hum, med, con	Cu hum, med, con	Cb pre, Cu hum, med	Cu hum
24/07/12	14	2	9	Cu hum, med, con	Cu hum, med	Cu hum	Cb, Cu hum	Cu fra
24/07/12	15	2	9	Cb pre, Cu hum, med	Cu hum, med	Cu hum, med	Cu hum, med, con	Cu hum, fra
24/07/12	16	3	9	Cb pre, Cu hum, med, con	Cu hum, med	Cb, Cu hum, med	Cb, Cu hum, med	Cu fra
24/07/12	17	3	9	Cu hum, med, con	Cu hum, med, con	Cb, Cu hum, med, con	Cb pre, Cu hum, med, con	Cu hum
24/07/12	18	6	9	Cu hum, med, con	Cu hum, con	Cb, Cu hum, med	Cb pre, Cu hum, med	Cu hum, med
24/07/12	19	2	9	Cu med, fra, Sc, Cb	Cu med, Cb pre	Cu hum, med, con	Cu hum, med, con	Cu fra
24/07/12	20	1	9	Cu hum, med, Cb (dispersal)	Cu hum,	Cu fra, con	Cb inc, Cu hum, med	/
25/07/12	8	3	8	Cu fra	St, Sc	St, Cu fra	Cu fra	Cu fra
25/07/12	11							
25/07/12	14	5	8	Cu hum, Ns pan	Ns pan pre	Ns pan	Ns pan	Sc
25/07/12	17	1	9	Cu fra, Cb (in dispersal), Cu med, con	Cu hum, med, con, Cb	Cb inc pre, Cu fra	Cb inc pre,	/
25/07/12	20	6	5	Ns	Sc	Sc	Ns	Ns
26/07/12	8	2	5	Cu fra	St	Ns	Ns	
26/07/12	11	7	5	Sc, Cu fra	Sc, Cu fra	Sc, Cu fra	Sc, Cu fra	Sc, Cu fra
26/07/12	14	7	8	Sc, Cu con	Sc, Cu con	Cu hum,	Sc	Sc

Continuation of table B-1: Low clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**Low Clouds**		**Sectors**				
	BST	**σ_L**	**C_L**	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
						med		
26/07/12	17	3	8	Sc, Cu med, fra	Ns pre, Cu hum	Ns pre	Sc	Sc
26/07/12	20							
27/07/12	7	8	5	Sc, Cu fra	Sc	Ns pre	Ns	Ns
27/07/12	8	7	5	Sc, Cu fra	Sc	Sc, Ns, Cu fra	Ns pre	Ns
27/07/12	9	8	5	Sc, Cu fra	Sc, Ns	Ns	Ns pre	Ns pre
27/07/12	10	8	5	Ns, St neb	Ns pan, Sc	Sc, Ns	Ns, St neb	Ns pre
27/07/12	11	7	5	Ns pre, Sc	Cu hum, med, con	Ns pre, Sc	Ns pre	Ns pre
27/07/12	12	7	5	Sc	Sc	Ns pre	Ns pre	Ns pre
27/07/12	13	5	5	Sc	Sc	Ns pre	Sc, Ns pre	As
27/07/12	14		5	Sc, Cb	Sc	Ns pre	Sc, Ns pre	
27/07/12	15	3	8	Cu fra, Cu med	Sc, Cu fra	Ns pre	Ns, Cu med	Cu fra
27/07/12	16	5	2	Cu hum, med	Cu fra	Cu fra	Cu hum, med	Cu fra
27/07/12	17	2	8	Cu hum, med	Cu hum	Sc	Cu hum, Cu med, Cb	Cu con (Plain)
27/07/12	18	4	9	Cb, Cu hum, con	Sc	Cb pre, Cu hum ,med, con	Cu hum, med	Cu fra
27/07/12	19	3	9	Cu hum, med, con	Cu hum	Cu hum, med	Cb , Cu hum, med, con	Cu fra
27/07/12	20	2	9	Cb pre, Cu hum, con	Cu hum, med	Cb, Cu hum, med	Cb, Cu hum, med	
27/07/12	21	3	9	Cb inc, Cu hum	Cu fra	Cb, Sc	Cb, Sc	
28/07/12	7	8	7	St	St	St	St	St
28/07/12	8	7	7	St	St	St	Ns pre	St
28/07/12	9	7	7	St	Ns	St	Ns	St
28/07/12	10	1		Cu hum, med	Sc	Sc	Cu hum, med, fra	
28/07/12	11	3	5	Sc	Sc	Sc, Cu fra	Sc	
28/07/12	12	1		Cu hum, med	Cu hum, med, con	Sc	Cu med	
28/07/12	13	5	9	Cb inc, Cu hum, med, con	Cu hum, med, con	Sc, Cu hum, med	Sc, Cu hum, med	Sc
28/07/12	14	5		Cu hum med con	Cu med con, Cb	Sc	Cu hum med	Sc
28/07/12	15	5		Cb inc, Cu hum, med, con	Cb inc, Cu hum, med, con	Sc	Cu hum med con	Sc
28/07/12	16	5	9	Cb inc pre, Cu hum, med, con	Cb inc, Cu hum, med, con	Cu hum, med, con	Cu hum, med, con	Cu hum, fra
28/07/12	17	2		Cb inc (dispersal), Cu hum, med	Cu hum, Sc	Sc, Cu hum	Cu hum, med	

Continuation of table B-1: Low clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**Low Clouds**		**Sectors**				
	BST	**σ_L**	**C_L**	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
28/07/12	18	1		Cb cal, Cu hum, med, con	Cb cal, Cu med, con	Cu hum, med	Cu hum, med, con	Cu hum (dispersal)
28/07/12	19	2	9	Cu hum, con	Cu fra, hum	Cu hum, med, con, fra	Cb inc, Cu hum, med	Cu hum
28/07/12	20	1		Cu hum, med, con, Cb	Cb inc	Cu con	Cu med, con, Cb mam	

Table B-1: Low clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

2. Middle clouds

Table B-2: Middle clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**Middle Clouds**		**Sectors**				
	BST	σ_M	C_M	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
10/07/12	11	7	7	As	Ac → As	Ac → As	Ac → As	As transl.
10/07/12	14	/	7		Ac (several layers)	As/ Ns	As	As, Ac
10/07/12	17	1	6	Ac	As → Ac	Ac aus Cb	Ac aus Cb	
10/07/12	20	7	2	As		As	As	As
11/07/12	8	/	/					
11/07/12	11	/	/					
11/07/12	14	/	7		As	Ac, As	As	
11/07/12	17	/	0					
11/07/12	20	/	/		As			
12/07/12	8	/	4	Ac				
12/07/12	11	/	0					
12/07/12	14	0	4	Ac len				
12/07/12	17	/	1	As				
12/07/12	20	1	4	Ac	As	Ac	Ac	
13/07/12	8	/	5	Ac				
13/07/12	11	/	7	Ac		Ac		
13/07/12	14	1	6	Ac	Ac cum	As	Ac , As	
13/07/12	17	7	1	As trans.	As trans virg.	As	As	As transl.
13/07/12	20	/	/					
14/07/12	8	/	4			Ac		
14/07/12	11	/	/					
14/07/12	14	1	4	Ac len	Ac len, Ac		Ac len	
14/07/12	17	7	2	As, Ac	As, Ac	As	As	As
14/07/12	20	8	2	Ac len, As	As, Ac virg	As		As
15/07/12	8	/	/					
15/07/12	11	/	2		As		As	
15/07/12	14	5	6	Ac (above lake),	Ac str perl.	Ac virg, Ac str perl	Ac str, Ac	Ac str
15/07/12	17	2	7	As cum, Ac (above lake)	Ac, As cum		Ac, As	
16/07/12	8	/	2		As			
16/07/12	11	/	2					
16/07/12	14	7	7	Ac	Ac, As	Ac	Ac	Ac str. tra, perl.
16/07/12	17	7	7	Ac, As trans	Ac, As	Ac	Ac, Ac und, As	Ac
16/07/12	20	6	7	As, Ac	Ac, As	Ac	Ac	Ac str
17/07/12	8	1	1	Ac		As	As	
17/07/12	9	1	7	Ac str		As, Ac flo	Ac, As	

Continuation of table B-3: High clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**Middle Clouds**		**Sectors**				
	BST	σ_M	C_M	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
17/07/12	10	1	5	Ac str	Ac str	As	Ac (len?)	
17/07/12	11	1	5	Ac str	Ac str		Ac	
17/07/12	12	/	5	Ac str				
17/07/12	13	/	5		Ac	Ac		
17/07/12	14	3	6	Ac	Ac cum un		Ac	
17/07/12	15	3	6	Ac cum		Ac str cum		
17/07/12	16	3	6	Ac cum	Ac cum,	Ac	Ac cum, Ac	Ac cum
17/07/12	17	3	6	Ac cum	Ac cum, Ac (cast?)	Ac, Ac cum	Ac cum	Ac str tra
17/07/12	18	6	6	Ac cum vir	Ac cum, As	Ac cum	Ac cum	Ac cum
17/07/12	19	8	7	As, Ac	As, Ac	As, Ac	As, Ac str und	As, Ac
17/07/12	20	8	7	As virg, Ac	As, Ac str un, len, vir	As	Ac, As	
17/07/12	21	7	7	Ac	Ac, As	Ac	As, Ac	As
18/07/12	8	3	5	Ac str un	Ac str un	Ac str un, As	Ac str un	
18/07/12	9	6	5	Ac str un	Ac str un	Ac str un	Ac str un	Ac str un
18/07/12	10	2	5	Ac str un	Ac str un	Ac str un	Ac str un	
18/07/12	11	1	5		Ac str		Ac str	
18/07/12	12	1	5		Ac str un			
18/07/12	13	1	6	Ac cum		Ac		
18/07/12	14	1	6	Ac cum	Ac cum	Ac cum	Ac cum	
18/07/12	15	/	0					
18/07/12	16	1	6		Ac str und	Ac cum	Ac cum	
18/07/12	17	1	6	Ac cum	Ac	Ac	Ac str	Ac str
18/07/12	18	1	6	Ac	Ac cum	Ac cum	Ac cum	
18/07/12	19	/	6	Ac, Ac cum vir	Ac cum			
18/07/12	20	1	6	Ac cum	Ac cum		Ac str	
19/07/12	7	1	4	Ac	Ac	Ac	Ac	
19/07/12	8	2	4	Ac, As			Ac	
19/07/12	9	2	4	Ac flo vir			Ac	Ac flo
19/07/12	10	1	8	Ac flo	As	Ac str flo	Ac str flo	
19/07/12	11	1	8			Ac len, flo	Ac	
19/07/12	12	1	4	Ac	Ac str un			
19/07/12	13	1	6		Ac str un, As cum			
19/07/12	14	0	/					
19/07/12	15	1						
19/07/12	16	/	4	Ac				
19/07/12	17	2				Ac cum		

Continuation of table B-2: Middle clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**Middle Clouds**		**Sectors**				
	BST	σ_M	C_M	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
19/07/12	18	7	6	Ac cum	Ac cum trans	Ac	Ac len, Ac cum	Ac cum transl
19/07/12	19	7	6	Ac cum str	Ac cum vir	Ac cum		
19/07/12	20	6	6	Ac len, Ac str vir	Ac len, und, str	Ac und, len, str	Ac len, un, flo	Ac str
19/07/12	21	8	8	Ac flo, As	Ac flo, As	Ac flo, As	As/Ns	Ac flo, As
20/07/12	8	2	8	Ac len, flo		Ac fra, len	Ac len	
20/07/12	9	2	4	Ac	Ac	Ac len	Ac len	
20/07/12	11	2	4	Ac	Ac	Ac len	Ac len	
20/07/12	14	/	4	Ac len				
20/07/12	17	/	6	Ac str	Ac cum, Ac			
20/07/12	20	6	7	As	Ac str und	Ac	Ac str und, Ac	
21/07/12	8	/	/					
21/07/12	11	8	2	As	As	As pre	As	As
21/07/12	14	6	8	Ac	As	Ac flo	Ac str un	Ac flo
21/07/12	17	2	7	Ac, As	Ac vir	Ac	Ac flo	
21/07/12	20	7	7	Ac, Ac str	Ac/As pre	Ac/As	Ac/As und	
22/07/12	7	/	/			Ac/As	Ac/As	
22/07/12	8	/	/					
22/07/12	9	/	/					
22/07/12	10	/	/					
22/07/12	11	/	/					
22/07/12	12	1	4					Ac str
22/07/12	13	1	4		Ac len	Ac		
22/07/12	14	1	8		Ac len, Ac flo vir			
22/07/12	15	1	4		Ac len, Ac			
22/07/12	16	5	7	Ac str	Ac str, Ac	Ac len , Ac fra		
22/07/12	17	1	7	As	As, Ac	Ac fra		
22/07/12	18	1	6	As cum	As cum	As cum		
22/07/12	19	6	8	Ac str vir, Ac		Ac str, Ac flo	Ac str	Ac str
22/07/12	20	7	1		As		As	
23/07/12	7	/	/					
23/07/12	8	/	/					
23/07/12	9	/	/					
23/07/12	10	/	/					
23/07/12	11	1	4	Ac str	Ac			Ac flo
23/07/12	12	1	4	Ac len	Ac		Ac	
23/07/12	13	1	4	Ac	Ac			
23/07/12	14	1	4	Ac str				

Continuation of table B-2: Middle clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**Middle Clouds**		**Sectors**				
	BST	σ_M	C_M	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
23/07/12	15	1	7	Ac	Ac cum			
23/07/12	16	5	7		Ac	Ac	Ac	Ac cum
23/07/12	17	/	6	Ac fra	Ac str un	Ac	Ac cum	Ac str
23/07/12	18	1	4	Ac, Ac vir	Ac	Ac	Ac str un	/
23/07/12	19	2	7	Ac flo vir,Ac str un	As, Ac str un	Ac str un	As	
23/07/12	20	/	7	Ac fra	As	Ac fra	Ac fra	
24/07/12	7	7	7	Ac str fra	Ac fra, As	Ac fra	Ac fra	Ac fra
24/07/12	8	7		Ac str fra	Ac str	Ac str fra	Ac str, fra	Ac fra
24/07/12	9	6		Ac str	Ac str	Ac str fra	Ac str fra	Ac fra
24/07/12	10	6	8	Ac str flo	Ac str flo	Ac str flo	Ac str flo	Ac str flo
24/07/12	11	2	8			Ac str flo	Ac str un	
24/07/12	12	/	1	Ac				
24/07/12	13	6	1	As cum	As	As		As
24/07/12	14	6	7	Ac flo vir, As	Ac str un, As	As	As	As
24/07/12	15	6	1	As	As	As		As
24/07/12	16	7	1	As	As	As	As	As
24/07/12	17	7	7	Ac str un, As	As, Ac flo vir	As	As	As
24/07/12	18	/	7	As, Ac cum	As	As		
24/07/12	19	6	6	As ?	Ac str cum	Ac str cum	Ac str vir	Ac str
24/07/12	20	3	6	Ac cum	Ac str cum	Ac str cum, Ac/As	Ac len, Ac flo, Ac str cum	/
25/07/12	8	/	7	Ac			Ac str	As
25/07/12	11							
25/07/12	14	/				Ac str		Ac str
25/07/12	17	4	5	Ac str		Ac str	Ac str cum	Ac str
25/07/12	20	8			As	As		
26/07/12	8	8	2	As	As			As
26/07/12	11	/	/					
26/07/12	14	/	5	Ac		Ac str un	Ac	
26/07/12	17	8	7	Ac, As	Ac			
26/07/12	20							
27/07/12	7	/	7		Ac			
27/07/12	8	/	7		Ac			
27/07/12	9	/	/					
27/07/12	10	/	/					
27/07/12	11	/	7		Ac str			

Continuation of table B-2: Middle clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**Middle Clouds**		**Sectors**				
	BST	σ_M	C_M	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
27/07/12	12	/	7	As, Ac	Ac str			
27/07/12	13	/	7	As, Ac	Ac str, As		As	As
27/07/12	14		7	Ac, As	As, Ac	Ac str und	Ac str un	As
27/07/12	15	7	7	As	As, Ac str un	As	As	As
27/07/12	16	7	7	Ac str, As	Ac str, Ac	As	As, Ac	As
27/07/12	17	4		Ac str, Ac	Ac str, Ac	Ac str	Ac, Ac str	Ac
27/07/12	18	/	7	As	Ac	Ac str	Ac str	As
27/07/12	19	6	7	Ac str, As	Ac len, str, As	Ac, As	Ac	As, Ac
27/07/12	20	/	7	Ac vir, As	Ac flo, As	Ac, As	Ac len, str	Ac flo
27/07/12	21	7	7	Ac, As	Ac, As	Ac, As	Ac, As	Ac flo
28/07/12	7	/	/					
28/07/12	8	/	/					
28/07/12	9	/	7			As, Ac	Ac	
28/07/12	10	7		Ac str und, As	As	Ac str und	Ac str und,	Ac
28/07/12	11	7	7	Ac, As pre	As, Ac	Ac		Ac
28/07/12	12	7		Ac str	Ac str und	Ac str	Ac str	Ac str
28/07/12	13	/	7	Ac, As	Ac str			
28/07/12	14	/		Ac len				
28/07/12	15	/					Ac str un	
28/07/12	16	/	7	Ac cum		As, Ac cum		
28/07/12	17	2		Ac	Ac str		Ac str	Ac flo
28/07/12	18	1		Ac cum	Ac cum	Ac		Ac flo
28/07/12	19	/	6	Ac str, Ac cum	Ac	Ac str	Ac cum	
28/07/12	20	4		Ac un	Ac	Ac str	Ac str un	Ac str un

3. High clouds

Table B-3: High clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**High Clouds**		**Sectors**				
	BST	σ_H	C_H	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
10.07.12	11	/	8		Cs			
10.07.12	14	/	9		Cs			Ci , Cc
10.07.12	17	3	6	Cs, Ci	Cs, Cc	Cc aus Cb, Ci/Cs	Ci, Cs	
10.07.12	20	/	0					
11.07.12	8	/	0					
11.07.12	11	/	0					
11.07.12	14	/	1				Ci	
11.07.12	17	/	/					
11.07.12	20	/	8			Cs	Cs	
12.07.12	8	/	/					
12.07.12	11	/	0					
12.07.12	14	1	3	Ci spi cum				
12.07.12	17	/	0					
12.07.12	20	1	1		Ci fib	Ci fib		
13.07.12	8	/	/					
13.07.12	11	/	/					
13.07.12	14	/	3			Ci spis.		
13.07.12	17	/	0					
13.07.12	20	/	/					
14.07.12	8	/	/					
14.07.12	11	/	/					
14.07.12	14	1	9	Ci unc	Ci fib	Ci unc	Ci fib	Ci fib
14.07.12	17	/	/			Cc		
14.07.12	20	/	/					
15.07.12	8	/	/					
15.07.12	11	/	/					
15.07.12	14	2	9	Ci fib	Ci fib, Cs	Ci fib	Cs, Ci fib	
15.07.12	17	5	3	Ci spi	Ci fib	Ci fib, unc	Ci fib	Ci fib, unc
15.07.12	20	/	1			Ci fib		Ci fib
16.07.12	8	/	/					
16.07.12	11	/	/					
16.07.12	14	/	/					
16.07.12	17	/	1			Ci fib		
16.07.12	20	/	1			Ci fib	Ci fib	Ci fib
17.07.12	8	5	9	Ci fib	Cc str und	Ci fib	Ci fib	Ci fib
17.07.12	9	5	9		Cc str und	Ci fib	Ci fib	Cs, Cc str und
17.07.12	10	4	6		Cs fib	Ci fib	Ci fib	Ci fib
17.07.12	11	3	7		Cc str und	Cc str und	Cc str und, Ci fib	Cc str und
17.07.12	12	2	7		Cc str und		Cs (duenn)	
17.07.12	13	/	7	Ci fib	Cc str und	Ci fib	Cc str und	

Continuation of table B-3: High clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**High Clouds**		**Sectors**				
	BST	**σ_H**	**C_H**	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
17.07.12	14	3	3	Ci fib	Ci fib		Cc str und	Ci spi (aus Cb)
17.07.12	15	1	3	Ci fib				Ci spi cum
17.07.12	16	/	2	Ci spi				
17.07.12	17	6	2	Ci spi			Ci spi /fib?	Ci fib
17.07.12	18	/	2		Ci fib			
17.07.12	19	/	/					
17.07.12	20	/	/					
17.07.12	21	/	8			Cs		
18.07.12	8	/	2	Ci fib	Ci spi			Ci flo
18.07.12	9	/	2			Ci spi		
18.07.12	10	/	2			Ci fib		
18.07.12	11	1	9	Cc un				
18.07.12	12	1	9	Ci unc	Cc str un			
18.07.12	13	1	9		Cc str un			
18.07.12	14	1	9		Cc str un			
18.07.12	15	1	9		Ci spi, Cc str un	Ci spi		
18.07.12	16	3	9	Ci spi cum,	Cc str un		Ci spi cum,	
18.07.12	17	6	2		Ci fib vert, Ci spi			Ci fib vert
18.07.12	18	3	3	Ci fib	Ci spi cum	Cc str		Cc str
18.07.12	19	3	3	Ci fib	Ci spi	Ci spi cum	Ci fib	
18.07.12	20	3	2	Ci spi	Ci spi, Ci fib	Ci spi	Ci fib	
19.07.12	7	7	2	Ci fib, Ci vert	Ci spi	Ci fib, Ci ver, unc	Ci fib, Ci ver	Ci spi
19.07.12	8	5	2	Ci unc, Ci spi	Cc str und, Ci fib	Ci flo, Cs un	Ci spi	Ci fib
19.07.12	9	3	9		Ci fib, unc		Cc flo, Ci fib, spi	
19.07.12	10	2	2	Ci spi, unc		Ci unc	Ci spi, unc	Ci unc
19.07.12	11	1	2	Ci fib, unc			Ci unc	
19.07.12	12	1	9	Cs		Cc str un, flo	Cc str un	
19.07.12	13	1	9	Ci fib, Cs	Ci fib, Ci fra	Cc str un	Ci fib	
19.07.12	14	1	2	Ci fib vert			Ci fib	
19.07.12	15	6	3	Ci fib cum, Ci unc	Ci fib cum		Ci fib cum	Ci fib cum, Ci spi
19.07.12	16	/	2		Ci spi			
19.07.12	17	3	8	Cs, Ci spi cum	Ci spi cum	Ci spi cum	Ci spi cum	Ci spi cum

Continuation of table B-3: High clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**High Clouds**		**Sectors**				
	BST	**σ_H**	**C_H**	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
19.07.12	18	/	/					
19.07.12	19	/	/					
19.07.12	20	/	2				Ci fib	
19.07.12	21	/	/					
20.07.12	8	5	8	Ci unc, fib	Ci fib	Ci fib, unc, Cs	Ci spi, Cs	Ci fib
20.07.12	9	2	9	Cc		Ci fib, unc	Ci unc	Ci fib
20.07.12	11	2		Cc		Ci fib, unc	Ci unc	Ci fib
20.07.12	14	/	2	Ci fib	Ci fib		Ci fib	
20.07.12	17	/	5				Cs	
20.07.12	20	/	2			Ci fib, Ci unc		
21.07.12	8	/	/					
21.07.12	11	/	/					
21.07.12	14	/	3	Ci spi	Ci fib			
21.07.12	17	/	3		Ci spi	Ci fib		Ci spi
21.07.12	20	/	/					
22.07.12	7	/	/					
22.07.12	8	/	/					
22.07.12	9	/	/					
22.07.12	10	/	/					
22.07.12	11	/	/					
22.07.12	12	/	0					
22.07.12	13	/	0					
22.07.12	14	1	2	Ci spi				
22.07.12	15	1	3		Ci fib, Ci spi cum		Ci fib ver	
22.07.12	16	1	3		Ci spi cum		Ci fib	
22.07.12	17	1	3			Ci fib		Ci fib
22.07.12	18	1	3	Cu fib, unc, spi	Ci unc	Ci unc, fib	Ci unc	
22.07.12	19		2			Ci spi	Ci fib	
22.07.12	20	/	/					
23.07.12	7	/	/					
23.07.12	8	/	/					
23.07.12	9	/	/					
23.07.12	10	/	/					
23.07.12	11	/	0					
23.07.12	12	/	0					
23.07.12	13	1	2			Ci fib		
23.07.12	14	1	2	Ci fib				
23.07.12	15	/	0					
23.07.12	16	1	9	Cc				
23.07.12	17	/	3		Ci spi	Ci fib		
23.07.12	18	/	2	Ci fib	Ci spi			
23.07.12	19	/	3	Ci flo				

Continuation of table B-3: High clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**High Clouds**		**Sectors**				
	BST	**σ_H**	**C_H**	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
23.07.12	20	/	/					
24.07.12	7	/	/					
24.07.12	8	/	/			Ci fib		
24.07.12	9	/	/	Ci fib				
24.07.12	10	/	9	Ci unc	Ci spi/ Cc cum		Ci spi	
24.07.12	11	3	8	Ci unc, Ci spi	Cs	Ci fib	Ci fib	Ci unc
24.07.12	12	7	8	Ci fib, Cs	Cs	Cs	Ci fib	Cs
24.07.12	13	/	9	Ci spi		Ci fib		Ci fib, Cc str un
24.07.12	14	/	/					
24.07.12	15	/	2	Ci spi				
24.07.12	16	/	2			Ci spi		
24.07.12	17	/	9		Ci fib, spi	Cc, Ci fib	Ci fib	
24.07.12	18	/	9	Cc str un, Ci spi, fib	Ci fib, spi	Ci spi		
24.07.12	19	/	1			Ci fib		
24.07.12	20		3	Ci spi cum	Ci spi cum	Ci spi cum	Ci spi cum	Ci spi cum, Ci fib
25.07.12	8	/	/					
25.07.12	11							
25.07.12	14	/	/					
25.07.12	17	1	3	Ci spi cum	Ci fib			
25.07.12	20	/	/					
26.07.12	8	/	/					
26.07.12	11	/	/					
26.07.12	14	/	/					
26.07.12	17	/	/					
26.07.12	20							
27.07.12	7	/	/					
27.07.12	8	/	/					
27.07.12	9	/	/					
27.07.12	10	/	/					
27.07.12	11	/	/					
27.07.12	12							
27.07.12	13	/	/					
27.07.12	14	/						
27.07.12	15	/	/					
27.07.12	16	/	/					
27.07.12	17	/	8		Ci fib		Ci fib	Ci fib, Cs
27.07.12	18	/	2	Ci fib	Ci fib	Ci fib	Ci spi	
27.07.12	19	/	3	Ci fib	Ci spi		Ci fib	
27.07.12	20	/	3		Ci spi		Ci fib	
27.07.12	21	/	/					
28.07.12	7	/	/					

Continuation of table B-3: High clouds, weather observations at Nam Tso Station (σ refers to the cloud fraction in octa)

Date	**Time**	**High Clouds**		**Sectors**				
	BST	**σ_H**	**C_H**	**lake**	**SW**	**NyT**	**NE**	**Azimuth**
28.07.12	8	/	/					
28.07.12	9	/	/					
28.07.12	10	/	/					
28.07.12	11	/	/					
28.07.12	12	/	/					
28.07.12	13	/	9	Ci spi	Ci spi		Cc str un	
28.07.12	14	/			Ci spi			
28.07.12	15	/		Ci spi cum	Ci spi cum			Ci fib
28.07.12	16	/	9	Ci spi cum	Cc str un			
28.07.12	17	1		Ci spi cum	Ci ?, Ci spi			
28.07.12	18	1		Ci spi, Ci fib	Ci fib		Ci fib	
28.07.12	19	/	3	Ci spi		Ci unc, spi	Ci spi	Ci unc
28.07.12	20	3		Cs	Ci spi	Ci fib	Ci spi cum	Ci unc, Ci spi

Volumes in the series ‚University of Bayreuth, Department of Micrometeorology, Arbeitsergebnisse'

Nr	Author(s)	Title	Year
01	Foken	Der Bayreuther Turbulenzknecht	01/1999
02	Foken	Methode zur Bestimmung der trockenen Deposition von Bor	02/1999
03	Liu	Error analysis of the modified Bowen ratio method	02/1999
04	Foken et al.	Nachfrostgefährdung des ÖBG	03/1999
05	Hierteis	Dokumentation des Experimentes Dlouhá Louka	03/1999
06	Mangold	Dokumentation des Experimentes am Standort Weidenbrunnen, Juli/August 1998	07/1999
07	Heinz et al.	Strukturanalyse der atmosphärischen Turbulenz mittels Wavelet-Verfahren zur Bestimmung von Austauschprozessen über dem antarktischen Schelfeis	07/1999
08	Foken	Comparison of the sonic anomometer Young Model 81000 during VOITEX-99	10/1999
09	Foken et al.	Lufthygienisch-bioklimatische Kennzeichnung des oberen Egertales, Zwischenbericht 1999	11/1999
10	Sodemann	Stationsdatenbank zum BStMLU-Projekt Lufthygienisch-bioklimatische Kennzeichnung des oberen Egertales	03/2000
11	Neuner	Dokumentation zur Erstellung der meteorologischen Eingabedaten für das Modell BEKLIMA	10/2000
12	Foken et al.	Dokumentation des Experimentes VOITEX-99	10/2000
13	Bruckmeier et al.	Documenation of the experiment EBEX-2000, July 20 to August 24, 2000	01/2001
14	Foken et al.	Lufthygienisch-bioklimatische Kennzeichnung des oberen Egertales	02/2001
15	Göckede	Die Verwendung des Footprint-Modells nach Schmid (1997) zur stabilitätsabhängigen Bestimmung der Rauhigkeitslänge	03/2001
16	Neuner	Berechnung der Evaporation im ÖBG (Universität Bayreuth) mit dem SVAT-Modell BEKLIMA	05/2001
17	Sodemann	Dokumentation der Software zur Bearbeitung der FINTUREX-Daten	08/2002
18	Göckede et al.	Dokumentation des Experiments STINHO-1	08/2002
19	Göckede et al.	Dokumentation des Experiments STINHO-2	12/2002
20	Göckede et al	Characterisation of a complex measuring site for flux measurements	12/2002
21	Liebethal	Strahlungsmessgerätevergleich während des Experiments STINHO-1	01/2003
22	Mauder et al.	Dokumentation des Experiments EVA_GRIPS	03/2003
23	Mauder et al.	Dokumentation des Experimentes LITFASS-2003, Dokumentation des Experimentes GRASATEM-2003	12/2003
24	Thomas et al.	Documentation of the WALDATEM-2003 Experiment	05/2004
25	Göckede et al.	Qualitätsbegutachtung komplexer mikrometeorologischer Messstationen im Rahmen des VERTIKO-Projekts	11/2004
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