

## TRIP SCHEDULE

- 1) 17 Mar. 2003: Tsukuba--Narita--Ulaanbaatar (OM502)
- 2) 18 Mar. 2003: Ulaanbaatar--Baganuur--Mongonmorit Forest Site
- 3) 18 to 23 Mar. 2003: Mongonmorit Forest Site
  - Installing sensors for the measurements of canopy CO<sub>2</sub> and H<sub>2</sub>O fluxes
  - Collecting data from the flux measurement system
- 4) 23 Mar. 2003: Mongonmorit Forest Site--Baganuur--Kerlenbayan-Ulaan Grassland Site
- 5) 23 to 28 Mar. 2003: Kerlenbayan-Ulaan Grassland Site
  - Installing sensors for the measurements of canopy CO<sub>2</sub> and H<sub>2</sub>O fluxes
  - Collecting data from the flux measurement system
- 6) 28 Mar. 2003: Kerlenbayan-Ulaan Grassland Site -- Baganuur--Mongonmorit Forest Site -- Mongonmorit Forest Site--Baganuur--Ulaanbaatar
  - Collecting data from the flux measurement system
- 7) 29 to 30 Mar. 2003: the Institute of Meteorology and Hydrology of Mongolia (IMH)
  - Discussion about the flux measurement plan and the protection of measurement site

Put the stuff stored at IMH in order
- 8) 31 Mar. 2003: Ulaanbaatar--Narita (OM501) --Tsukuba

## TRIP NOTE

1) Our Mongolian field trip started from 17 March. The airplane (Boeing-727-200) took off around 5:30 pm stopped at Seoul for one hour to take passengers, and arrived in the Ulaanbaatar International Airport about 11:30 pm (Mongolian time). Drs. Davaa and Oyunbaatar met us at the airport. It took more than 1 hr to take luggage and so it was almost 2:00 am on March 18 when we arrived in the Flower Hotel. It was still very cold and contrastingly different from the weather in Japan. Although the spring was approaching, snow did not yet melt in many places, especially in the mountains.

2) Fifteen persons (2 from the University of Tohoku, 10 from the University of Tsukuba, and 3 from the Climatic Company) joined the March Mongolian field trip and were divided into two groups: Asanuma group and Sugita group.

Asanuma group (10 persons) was mainly responsible for setting up three flux measurement systems at the Mongonmorit mountain forest site and the protected and grazed grasslands at Kerlenbayan-Ulaan. Sugita group was primarily for construction of four automatic weather systems (AWS) in the whole Herlen River region. I was in the Asanuma group. We took some measurement stuff in the Institute of Meteorology and Hydrology (IMH) at 8:30 am and then began to move to the Mongonmorit village via Baganuur. It was very cold, cloudy and windy with slight snow. The ground was still covered by deep snow (10-20 cm), suggesting that there were much snow last winter (Fig. 1). Some persons went to the forest site to check the scaffolding tower (Fig. 2). Asanuma group got accommodation at the Mongonmorit village and Sugita Group continued their trip to Baganuur.



Fig. 1 A field view at the Mongonmorit



Fig. 2 flux tower

3) March 19 was a fine day. We started from the Mongonmorit village about 8:30 am, and about 1 hour later, we arrived at the forest site. After some preparation work (unloading the stuff and putting it in order), we began to install the solar panels on the tower. We finished installing of six solar panels. They were installed at three heights (two at each height) in parallel facing the south, beginning from the top of the tower (Fig. 3). Because wind was small, the placement of solar panels was not as difficult as we expected at the beginning and we felt not so cold even under  $-5^{\circ}\text{C}$ . Having a lunch on the forest floor covered with deep snow was pretty interesting (Fig. 4). Today's work was finished around 7:00 pm and we were back to the Mongonmorit about 8:30 pm.



Fig. 3 Installing the solar panel



Fig. 4 lunch time.

4) It was clear day on March 20 with slight wind and was somewhat colder than last day. In the morning, we installed another five small solar panels on the iron tower. A view of all the solar panels in the tower is shown in Fig. 5. After lunch, under the tower the following work was done: (1) cleaning the cables of

underground sensors, which were installed last October. We found two blue sheets, that were used to wrap the cables, disappeared. Due to this exposure, two tension meter tube and one gypsum suction tube were out of the soil. These sensors have to be reinstalled in the May trip when ground surface snow melts. (2) Installing batteries of the solar batteries, a power box and a logger box for the underground sensors. (3) Connecting the cables of the underground sensors to the data logger. Cables that laid on the ground surface were put into plastic tubes to prevent damage due to the mice. (4) Installing a rain gauge. The rain gauge was installed at a corner (SE) inside the fence that protects the tower. Work on the tower in the afternoon included installing of a 4-component radiation sensor, a LI-7500 infrared CO<sub>2</sub>/H<sub>2</sub>O analyzer, a 3-D extrasonic anemometer/thermometer, a 3-cup anemometer, and an infrared radiation thermometer for canopy surface temperature measurements. This work was not completely done till 7:00 pm and would be continued next day. Everyone displayed tiredness on the face and it was close to 8:30 pm as we were back to the Mongonmorit village. The keeper (an aunt) of the guest house heated the rooms warm and comfortable. Her hospitality helped us to remove the coldness as well as the fatigue. Next to the guest house was a restaurant where we could taste some typical Mongolian foods after one day's work. Miss Iemoto was ill today because of her inadaptability to the mountain weather and she recovered in the following two days.



Fig. 5 A view of solar panels

5) Weather of March 21 was similar to that of last day but seemed a bit colder. We continued to install the flux measurement system and the installation was completed in the morning. The tower after the installation of sensors looked more smart than before (Fig. 6). In the afternoon, central work was focused on checking sensor connection, cables, power lines as well as sensor orientation. Keeping the radiation sensor level and the SAT anemometer/thermometer vertical appeared to be not easy and took much time. Due to impact of local weather, the sensor position might be slightly displaced. Periodical check is needed. LI-7500 had an inclination of about 25° to the north to avoid direct exposure of its lens to sunshine and rain water accumulation. There was an abandoned wood processing site just about 500 m to the east of the Mongonmorit Meteorological Station. Although it was not used about 10 years ago, the warm stream is still erupting from the inside of it (Fig. 7), indicating its initial scale was very large. The wood processed was uniquely from the surrounding mountain forest, and hence we might be able to expect that over past several decades the Mongonmorit mountain forest experienced a large scale of lumbering.



Fig. 6 Tower with sensors



Fig. 7 Wood processing relics

6) March 22 was the fifth day that we had been the forest site. Asanuma group was divided into two sub-groups. One sub-group went to the forest tower site for checking the data collecting status of sensors and data loggers. This sub-group worked very hard and overcome difficulties caused by disappearance of some cables and the ropes and it was after 9:00 pm when they were back to the guest house. The other sub-group stayed at the Mongonmorit village to clean the stuff left after the installation of the sensors. The stuff were stored at the Mongonmorit Meteorological Station and had a list, mainly including some spare parts of the sensors, safety belts, safety helmets, common tools, and keys. You can get this list through me if you want to use them in your field work. In the afternoon, we went a spring, which is located at the foot of the mountain and is the source of drinking water for the Mongonmorit village (Figs. 8 and 9).



Fig. 8 Mongonmorit spring



Fig. 9 Horse like spring water

7) We began to move to the measurement sites at KBU on the morning of March 23. We had our lunch in Baganuur, where we met the Sugita group by chance. They told us their work went very smoothly. We arrived at KBU about 7:00 pm. It was warm and the snow began to melt in many places. Baganuur was still wrapped in the snow (Fig. 10), but there was only little snow on the mountain about 60 km away from Baganuur (Fig. 11), indicating sharp difference in local environmental conditions.



Fig. 10 Baganuur slope site



Fig. 11 A Mountain near KBU

8) Installation of the flux measurement sensors at the grazing grassland at KBU (A-1) was completed on March 24. Installed sensors included one 4-component radiation sensor at a height of 240 cm, a LI-7500 CO<sub>2</sub>/H<sub>2</sub>O analyzer at 350 cm, a Kaijo 3-D anemometer/thermometer at 350 cm, a Viasala HMD45D air temperature and humidity sensor at 235 cm, an infrared radiation thermometer (IRT) at 250 cm, and a 3-cup anemometer at 275. The site is located at N 47° 12' 50.3", E 108° 44' 14.4", abs 1250 m. The site was enclosed by a fence (H 1.5 m, 3.1x3.1 m). Fig. 12 presents the sensor installation at A-1. A view of the flux measurement system is shown in Fig. 13.



Fig. 12 Sensor installation at A-1



Fig. 13 A-1 Flux measurement system

9) Installation of the flux measurement sensors at the grazing grassland at KBU (A-2) was completed on March 25. Installed sensors included one 4-component radiation sensor at a height of 199 cm, a OP-II CO<sub>2</sub>/H<sub>2</sub>O analyzer at 345 cm, a Gill 3-D anemometer/thermometer at 345 cm, a Viasala HMD45D air temperature and humidity sensor at 198 cm, and an infrared radiation thermometer (IRT) at 206 cm. The site is located at N 47° 12' 43.2", E 108° 44' 07.3", abs 1244 m. A view of the flux measurement system is shown in Fig. 14. The weather became windy on March 25 and the following two days, making the installation become harder.

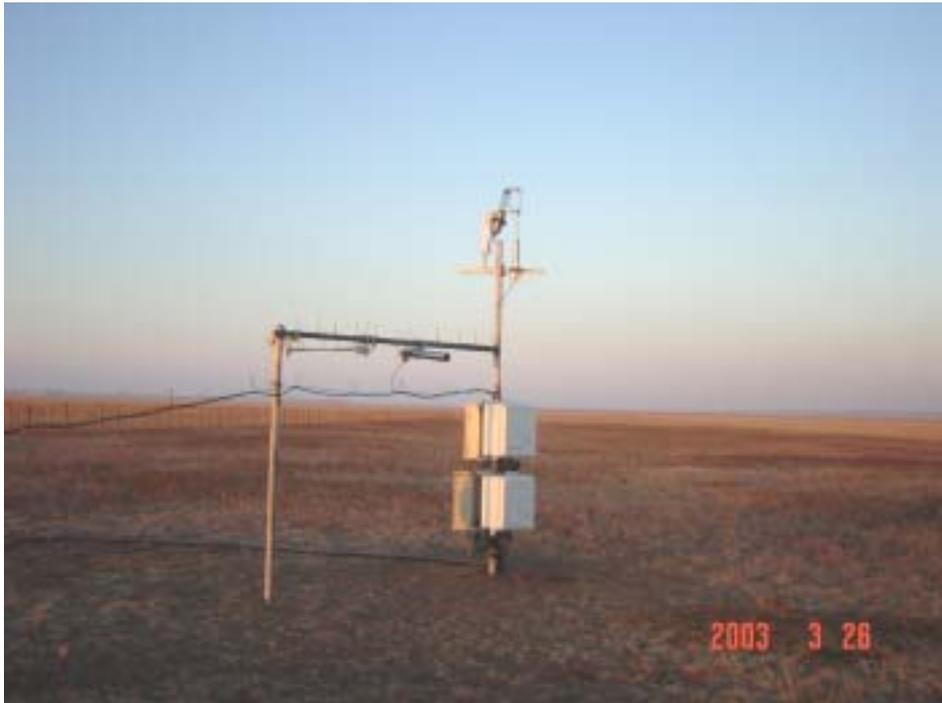


Fig. 14 A-2 Flux measurement system

10) March 26 and March 27 were the days we checked the data-taking status of both flux measurement systems (A1 and A2) and arranged the stuff stored at the KBU Meteorological Station. We also tested the performance of the scintillometer, which was used to measure areal sensible heat flux as shown in Figs. 15 and 16.



Fig. 15 The scintillometer receiver



Fig. 16 The scintillometer transmitter

11) March 28 was a long journey. Most time of that day was spent in the minivan car. We started from KBU at 9:00 am and went to the Mongonmorit forest site about 3:30 pm. This journey to the forest site was to check flux measurement sensor and collect data for later processing. Field work took about 1.5 hours. Then we continued our trip to Ulaanbaatar and arrived at the Flower Hotel about 11:00 pm.

12) We stayed at Ulaanbaatar on March 29 and 30 to discuss some measurement plan for this fiscal year and put the stuff stored in IMH in good order.