

Report on the SOWER observation Campaign at Biak in January 2013

SOWER Science Team:

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1. Introduction

Based on the “PLAN OF OPERATION FOR RESEARCH COOPERATION ON RADIOSONDE AND LIDAR OBSERVATIONS OF THE EQUATORIAL ATMOSPHERE AMONG NATIONAL INSTITUTE OF AERONAUTICS AND SPACE (LAPAN), INDONESIA, AND SOUNDINGS OF OZONE AND WATER IN THE EQUATORIAL REGION (SOWER) SCIENCE TEAM, JAPAN AND RESEARCH INSTITUTE FOR SUSTAINABLE HUMANOSPHERE (RISH), KYOTO UNIVERSITY, JAPAN” (PoO hereafter), SOWER science team has conducted observation campaign at Biak in January 2013. By following the section 2.1 (f) of PoO, this report summarizes the campaign research activity.

2. Members who attended the campaign

The following member of the SOWER team attended the campaign in January 2013:

Dr. Takashi Shibata	(Professor, Nagoya University)
Dr. Masahiko Hayashi	(Professor, Fukuoka University)
Dr. Kensaku Shimizu	(Associate researcher, Hokkaido University)
Mr. Takuji Sugiuchi	(Doctor course student, Hokkaido University)
Ms. Mayuko Sakurai	(Master course student, Nagoya University)
Mr. Ayumi Kawaguchi	(Under graduate student, Fukuoka University)
Dr. Ninong Komala	(LAPAN)
Mr. Dian Yudha Risdianto	(LAPAN)
Mr. Hideyuki Honda	(JAXA)

3. Instruments and period of the campaign

The SOWER members other than Dr. Shimizu and Dr. Honda arrived at Biak in the early morning on the 5th. Dr. Shimizu and Dr. Honda arrived Biak on 6th. They started the campaign activity on the same day at the Biak observatory of LAPAN. The instruments used in the campaign were as follows:

- a) Cloud/Aerosol Lidar (LIDAR)
installed and operated by Nagoya University
- b) Cloud Particle image Sonde (HYVIS)
prepared by Nagoya University
- c) Cryogenic Frostpoint Hygrometer (CFH),
- d) Fluorescent Advanced Stratospheric Hygrometer for Balloon Lyman-alpha
hygrometer (FLASH)
- e) Peltier cooled frost point Hygrometer (FINEDEW)
- f) Low cost Peltier cooled frost point Hygrometer (DEW)
- g) Radiosonde (RS-11G)
- h) Electrochemical Concentration Cell Ozone Sonde (ECC)
c)-h) prepared by Hokkaido University
- i) Optical Particle Counter (OPC)
prepared by Fukuoka University
- j) Cloud Particle Counter (CPC)
prepared by Hokkaido University
- k) ECC with Radiosonde produced by Intermet (iMET)
prepared by LAPAN.

These instruments are summarized in the Table 1. Table 1 shows the instruments prepared for the campaign. Each instrument is listed under the organization in charge. The weather condition for the launching is also shown.

LIDAR (a) is used to observe vertical profiles of clouds and aerosols. LIDAR is operated continuously through the campaign. Balloon borne cloud image sonde HYVIS (b) is used to take images of cloud particles. Balloon borne CFH (c), FLASH (d), FINEDEW (e) and DEW (f) are used to precisely observe density profile of water vapor. Radiosondes (g) are used to observe meteorological parameters (temperature, pressure, wind). ECC ozonesonde (h) is used to observe the profile of ozone. Optical Particle Counter OPC (i) is used to observe the vertical profile of aerosol particles and their size distribution. Radiosondes and ECC are launched with CFH, HYVIS and FLASH. A new type of Radiosonde (RS11G) is also launched independently. The CPC (j) is used

to observe cloud particle number density.

The set of ECC and iMET (k) radiosonde is prepared to check its performance and to solve the problem of the set that they found in their own operation by LAPAN at Watukosek.

Table 2 shows the daily chart of the launched balloon borne instruments. Table 2 also shows the start and end date of the LIDAR observation, and arrival and departure dates of the members. In the campaign 5 CFHs, 2 FLASHs, 2 FND, 3 OPCs, 5 RS11G, 4 HYVIS were launched. Observation by LIDAR was started on 5th and ended on 14th. The LIDAR was operated continuously through this period.

4. Results of the campaign

Fig. 1 and 2 shows the configuration of the balloon and payloads launched on 8 and 9 January 2013. Fig. 3 shows the temperature and frost point temperature observed by CFH (left), and profiles of ozone observed by ECC (right). As shown by these figures, almost all the balloon borne instruments including ECC with iMET prepared by LAPAN were successfully launched, and the observations were also successful.

5. Transportation and custom

All the instruments from Japan that we sent before the campaign by EMS directly to Biak without problem. There was no problem at the custom check in the airport in this year.

6. Summary

As shown in the section 4 the observation in the campaign was totally very successful. The observed data are now in the phase of the detailed analysis, and several months will be needed to obtain the final results.

Acknowledgements

We would like to express our appreciation for the helps by the LAPAN staff members of Biak observatory for the campaign. We would express our sincere appreciation for the helps by the LAPAN stuffs at Bandung for total supports for the operation. Fig. 4 is the photograph of the all the Japanese members joined the campaign. Thank you very much for your cooperation.

Hokkaido Univ.	Nagoya Univ.	Fukuoka Univ.	LAPAN
CFH x5 (ECC x4) FLASH x2 (ECC x1) FINEDEW x2 DEW x2 RS-11G x5 CPC x3	HYVIS x4 LIDAR	(Dual OPC) x3	iMET+ECC
Thin clouds without rain only night for FLASH	Thin clouds without rain All weather for LIDAR	Thin cloud without rain	without rain

Table 1 The instruments prepared for the campaign. Each instrument is listed under the organization in charge. The weather condition for the launching is also shown.

date	5	6	7	8	9
day	Shibata Hayashi Sugidachi Sakurai Kawaguchi Ninong Dian arrival/ starting LIDAR	Honda and Shimizu arrival/ RS06G / Preparing HYVIS	HYVIS	Honda Departure/ RS11G x3 / HYVIS&CPC	CFH&ECC/ Dual OPC
night			CFH+ECC+DE W		HYVYS&CP C

date	10	11	12	13	14
day	Dual OPC / CFH&ECC	Dual OPC / RS-11G x2		Shimizu Hayashi Kawaguchi departure CPC& ECC&iMET Stopping Lidar	Shipping out instruments (receiver etc.)
night	FLASH / CFH&ECC		FLASH&ECC		

date	15
day	Shibata Sakurai Sugitachi Ninong Dian departure
night	

Table 2 Daily chart of the launched balloon borne instruments. Table also shows the start and end date of the lidar observation, arrival and departure date of the members and the picking up the receiver for transportation.

HYVIS + Cloud sensor

date: January 8, 2013

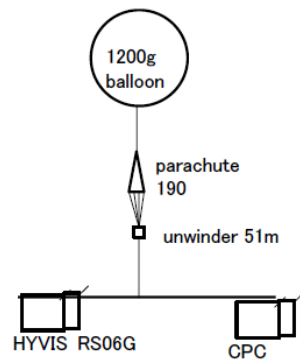


Fig. 1. The configuration of balloon and payloads (left) and the photo just before the launching the set of HYVIS and CPC (right) in the morning on 8 Jan. 2013.

CFH, ECC

date: January 9, 9:51 LT

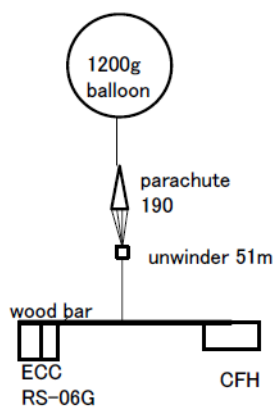


Fig. 2. The configuration of balloon and payloads (left) and the photo just before the launching the set of CFH and ECC (right) in the morning on 9 Jan. 2013.

CFH/ECC

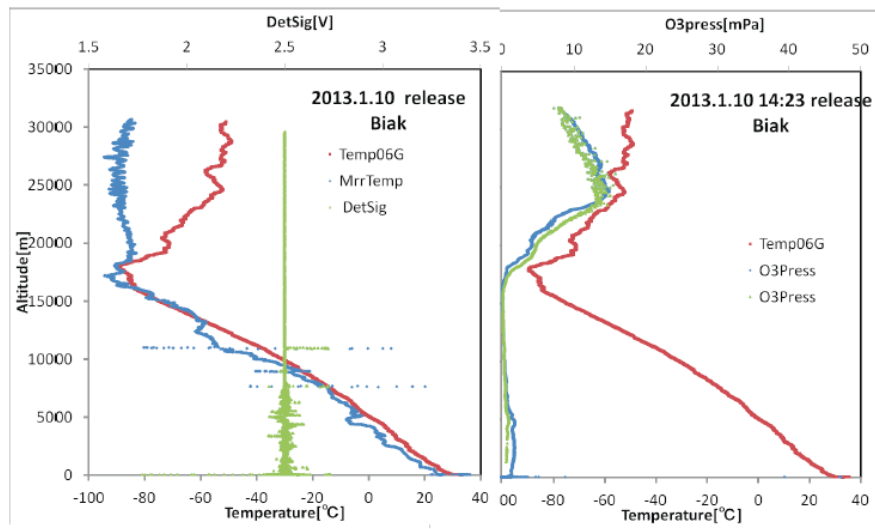


Fig.3. The temperature and frost point temperature observed by CFH (left), and profiles of ozone observed by ECC (right).



Fig. 4 All the members joined SOWER Biak campaign 2013.