

**Program of the Twelfth Symposium on Polar Meteorology and Glaciology,
held at National Institute of Polar Research, Tokyo,
July 18–19, 1989**

- I. Ice Sheet (Gorow WAKAHAMA)
 1. Development of a radar for crevasse detection. Takeshi SUITZ, Seiho URATSUKA, Akira TAKAHASHI, Hiromichi YAMASAKI, Mitsuhiro KAMATA, Ken'ichi OKAMOTO, Fumihiko NISHIO and Okitsugu WATANABE.
 2. Development of crevasse radar—Experiments on the artificial crevasse made by snow—. Seiho URATSUKA, Takeshi SUITZ, Akira TAKAHASHI, Ken'ichi OKAMOTO, Fumihiko NISHIO and Okitsugu WATANABE.
 3. On the simulation of temperature profile in the ice sheet by a radio echo sounder. Mitsuo HOSHIYAMA, Akira NISHITSUJI, Fumihiko NISHIO, Makoto WADA and Okitsugu WATANABE.
 4. The application of the dielectric profiling technique to ice core studies. John MOORE and Norikazu MAENO.
 5. Flow simulation of the Shirase Glacier area. Shinji MAE, Norikazu IKEDA, Takeo HONDOH and Shuji FUJITA.
 6. Dynamics of the ice flow through the central part of the Sør Rondane. Hugo DECLEIR.

- II. Minor Constituents in the Snow and Ice (Yasushi KITANO)
 1. Microparticles in Antarctic ice cores. Akira HIGASHI, Yoshiyuki FUJII, Ritsuko WATANABE.
 2. Air-hydrate in Vostok ice core. Tsutomu UCHIDA, Takeo HONDOH, Shinji MAE, N. I. BARKOV and P. DUVAL.
 3. Extraction of air bubbles in Antarctic ice core samples and detection of methane. Yasunori TOHJIMA, Takeshi TOMINAGA, Yoshihiro MAKIDE and Yoshiyuki FUJII.
 4. The state of minor constituents in the Antarctic snow and ice. Satoru KANAMORI, Nobuko KANAMORI, Masataka NISHIKAWA, Okitsugu WATANABE and Fumihiko NISHIO.

- III. Surface Aspects on the Ice Sheet (Renji NARUSE)
 1. Correlation of tephra layers in the ice of the Yamato meteorite ice field by trace element compositions and refractive index of glass shards. Takaaki FUKUOKA, Kazuya SHIMIZU, Fusao ARAI and Fumihiko NISHIO.
 2. Estimation of drifting-snow redistribution in East Queen Maud Land. Shuhei TAKAHASHI.
 3. On the icing observed in the accumulation area of Åsgårdfonna, Spitsbergen. Kaoru IZUMI.

- IV. Outline of Survey (Masayoshi NAKAO)
 1. Japanese Glaciological Program in Greenland—Outline of program—. Okitsugu WATANABE, Yoshiyuki FUJII, Fumihiko NISHIO, Hitoshi SHOJI, Hideki NARITA, Takao KAMEDA, Kokichi KAMIYAMA, Yoichi TANAKA and Morihiro MIYAHARA.
 2. Outline of the field observations by 29th Japanese Antarctic Research Expedition. Okitsugu WATANABE, Katsumoto SEKO, Teruo FURUKAWA, Shuhji AOKI, Tetsuro UEKUBO, Nobuo ICHIKAWA and Ohsuke SAKA.

- V. Automatic Weather-stations and Observation of Asuka Station (Tetsuo OHATA)
 1. Settlement of AWS around Asuka route. Tatsuo ENDOH.
 2. Recent advances in automatic weather stations. Tokio KIKUCHI and Tatsuo ENDOH.
 3. A rough calculation of long term creep of unrestrained shallow snow tunnels in Antarctica. Toshio HANNUKI, Masakatsu UCHIDA, Hiroshi KODERA and Toshio SATO.

4. Wind pressure measurement on side wall of the observation hut at Asuka Camp, Antarctica. Hiroshi KODERA, Ryoki SAKAI, Kenji ISHIZAWA and Toshio HANNUKI.

VI. Sea Ice and Ocean (Takatoshi TAKIZAWA)

1. Water budget over the Antarctic. Masaru CHIBA and Kiyotaka SHIBATA.
2. Fluctuations of sea ice extent in the Antarctic. Hiroyuki ENOMOTO and Atsumu OHMURA.
3. Distribution of sea ice off Queen Maud-Enderby Lands from NOAA AVHRR imagery. Takayuki ISHIKAWA, Shuki USHIO, Kay I. OHSHIMA, Takatoshi TAKIZAWA, Takashi YAMANOUCHI and Katsumoto SEKO.
4. Mixed layer process predicted from summer profiles in the Polar Ocean. Tatsuro WATANABE, Nobuo ONO, Takatoshi TAKISAWA and Kay I. OHSHIMA.
5. Rapid frazil ice production in the coastal polynya (V). Shuki USHIO and Masaaki WAKATSUCHI.
6. A note on the oceanographic circulation in Lützow-Holm Bay, Antarctica. Kay I. OHSHIMA, Nobuo ONO, Takatoshi TAKIZAWA and Shuki USHIO.

VII. Climate, Cloud and Snow Crystal (Shun'ichi KOBAYASHI)

1. Variation of natural levees of submarine canyons around the Antarctica—An indicator of Antarctic contour-current—. Hideo KAGAMI and Tetsuya IWASAKI.
2. An apparent 1-year lag relationship of heavy snow years between Eurasia and North America. Tomohiko IWASAKI.
3. Recent trend of surface air temperature in northern high latitudes. Iwao TSUCHIYA.
4. Variations of distribution and $\delta^{18}\text{O}$ of continental ice in the last ice age (II). Kikuo KATO.
5. Cloud distribution around Syowa Station from NOAA AVHRR. Takashi YAMANOUCHI.
6. On the snow crystals of "Double Gohei Twin" type. Katsuhiko KIKUCHI and Hiroshi UEDA.

VIII. Studies in the Troposphere (Tetsuzo YASUNARI)

1. A paradoxical nature of Antarctic katabatic wind. Jiro INOUE.
2. On the formation of coastal low-level jet associated with the upper tropospheric jet streams in the Antarctica. Hyo CHOI.
3. The double-jet and semi-annual oscillations in the Southern Hemisphere simulated by the Meteorological Research Institute general circulation model. Akio KITOH, Koji YAMAZAKI and Tatsushi TOKIOKA.

IX. Poster Session

1. Modelling of polar stratospheric clouds. Hiroshi TANAKA, Masaki OOTA, Masahiko HAYASHI, Shinji USHIMARU and Yasunobu IWASAKA.
2. Results of ozone observation from equatorial region to Antarctica in 1987. Kouji MATSUBARA, Motohisa DOI, Tetsuro UEKUBO, Kenji OKADA, Sadao KAWAGUCHI and Shuhji AOKI.
3. Characteristics of ozone and temperature change in 1988 at Syowa Station. Kouji MATSUBARA, Motohisa DOI, Tetsuro UEKUBO and Kenji OKADA.
4. Large stratospheric sudden warming in Antarctic late winter and shallow ozone hole in 1988. Hiroshi KANZAWA and Sadao KAWAGUCHI.
5. International Arctic ozone campaign. Yutaka KONDO and Yasunobu IWASAKA.
6. Measurement of atmospheric methane between Tokyo and Syowa Station. Michio HIROTA, Teruo AOKI, Yukio MAKINO and Shohei MURAYAMA.
7. The concentration of atmospheric carbon dioxide at Japanese Antarctic Station, Syowa. Shuhji AOKI, Takakiyo NAKAZAWA, Shohei MURAYAMA, Masayuki TANAKA, Takashi YAMANOUCHI, Sadao KAWAGUCHI, Masataka SHIOBARA, Masashi FUKABORI and Haruta MURAYAMA.
8. Radiative determined temperature in the stratosphere. Kiyotaka SHIBATA.

9. Giant particles in the lower stratosphere. Makoto WADA, Shuhji AOKI, Katsumoto SEKO, Kouji MATSUBARA, Motohisa DOI, Kenji OKADA and Sadao KAWAGUCHI.
 10. Nitric acid particles in the winter Arctic stratosphere. Yasunobu IWASAKA, Masahiko HAYASHI, Masahiko YAMATO, Seizi KOGA, Yutaka KONDO, Takashi OGUTI, W. A. MATTHEWS and Akira ONO.
 11. Precipitation at Syowa Station. Makoto WADA, Shuhji AOKI, Katsumoto SEKO, Kouji MATSUBARA, Motohisa DOI, Tetsuro UEKUBO, Kenji OKADA and Sadao KAWAGUCHI.
 12. The variation of Antarctic cloud observed by NOAA AVHRR data. Katsumoto SEKO, Makoto WADA and Shuhji AOKI.
 13. 3-D Analysis of falling snowflake. Ken'ichiro MURAMOTO, Toru SHIINA, Tatsuo ENDOH, Hiroyuki KONISHI and Koh'ichi KITANO.
 14. Radiation budget observation at Asuka Camp, Antarctica. Teruo AOKI and Takashi YAMANOUCHI.
 15. Some observations for sea ice-air interaction on board research vessel "SHIRASE". Yuki MORINAGA.
 16. Report on the first data of MOS-1 received at Syowa Station, Antarctica. Takashi YAMANOUCHI, Hiroshi KANZAWA, Hidetoshi ARIYOSHI, Masaki EJIRI, Takeo HIRASAWA and Sadao KAWAGUCHI.
 17. Annual mean surface temperature of the Antarctic ice sheet as seen from a satellite. Tokio KIKUCHI, Takashi YAMANOUCHI and Kazuhide SATOW.
 18. Snow observation by MSR. Masahiro SUZUKI, Masami SASAKI, Tadashi MATSUMOTO, Kazuo FUJINO, Toshiyuki KAWAMURA and Takeo ABE.
 19. Subglacial water layer derived from back-scattering coefficients of radio echo sounding in the Shirase Glacier, East Antarctica. Fumihiko NISHIO and Seiho URATSUKA.
 20. Interpretation of internal radar echoes. Seiho URATSUKA, Fumihiko NISHIO and Shinji MAE.
 21. Measurement of dielectric constant in microwave region for ice core analysis. Akira GOTO, Ryouta KAWASE, Shinji MAE and Takeo HONDOH.
 22. Preliminary study of the G6, Antarctic ice core. Hitoshi SHOJI and Yoshiyuki FUJII.
 23. Ice fabric pattern of the bare ice area around the Sør Rondane Mts., East Antarctica. Shuji FUJITA, Nobuhiko AZUMA and Shinji MAE.
 24. Japanese Glaciological Program in Greenland—*In-situ* processing and physical properties of ice cores—. Hideki NARITA, Yoshiyuki FUJII, Okitsugu WATANABE, Fumihiko NISHIO, Hitoshi SHOJI, Takao KAMEDA, Kokichi KAMIYAMA, Yoichi TANAKA and Morihiro MIYAHARA.
 25. Japanese Glaciological Program in Greenland—*In-situ* processing and chemical analysis of ice cores—. Kokichi KAMIYAMA, Hitoshi SHOJI, Okitsugu WATANABE, Yoshiyuki FUJII, Fumihiko NISHIO, Hideki NARITA, Takao KAMEDA, Yoichi TANAKA and Morihiro MIYAHARA.
 26. Observation of surface features of snow cover in the traverse by JARE-29. Teruo FURUKAWA, Okitsugu WATANABE, Shuhji AOKI and Katsumoto SEKO.
- X. Minor Constituents in the Atmosphere (Takakiyo NAKAZAWA)
1. Carbonaceous aerosol over Antarctic Sea. Masataka NISHIKAWA, Tsuguo MIZOGUCHI, Shohei MURAYAMA, Shuhji AOKI, Sadao KAWAGUCHI and Satoru KANAMORI.
 2. Measurements of carbon dioxide partial pressure in the air and the sea surface water on board ice breaker "SHIRASE". Gen HASHIDA, Takakiyo NAKAZAWA, Shohei MURAYAMA, Masayuki TANAKA, Sadao KAWAGUCHI, Takashi YAMANOUCHI, Shuhji AOKI, Shotaro UTO and Kenkichi TAMURA.
 3. Continuous measurement of atmospheric methane concentration at Syowa Station. Shuhji AOKI, Sadao KAWAGUCHI, Makoto WADA, Takakiyo NAKAZAWA, Shohei MURAYAMA and Katsumoto SEKO.
 4. Measurements of the number concentration of aerosol particles in arctic Norway. Takashi

TANIGUCHI and Katsuhiko KIKUCHI.

5. On SO₂ measurement in the ocean atmosphere. Yasunobu IWASAKA, Masahiko HAYASHI, Seizi KOGA and Hiroshi TANAKA.
6. Growth and descending motion of PSCs (Polar stratospheric clouds) particles. Masahiko HAYASHI and Yasunobu IWASAKA.
7. Spectroscopic measurements of the atmospheric minor constituents at Syowa Station, Antarctica (II). Masashi FUKABORI, Yukio MAKINO, Masayuki TANAKA, Sadao KAWAGUCHI and Takashi YAMANOUCI.
8. Sulfur compounds of phyto-plankton origin in the atmospheric boundary-layer. Seizi KOGA and Hiroshi TANAKA.

XI. Ozone (Hisashi MURAMATSU)

1. Visible spectrometer for observations of trace species in the polar stratosphere. Kei-ichi OHSAWA, Yutaka KONDO, Yasunobu IWASAKA, Akira IWATA and Masahiko HAYASHI.
2. A plan for observation of the Antarctic ozone hole under the Polar Patrol Balloon (PPB) project. Hiroshi KANZAWA, Yutaka KONDO, Yasunobu IWASAKA, Yukio MAKINO, Manabu D. YAMANAKA, Takashi YAMANOUCI, Ryoichi FUJII and the PPB WORKING GROUP.
3. Comparison of ground-based Dobson and Nimbus 7 TOMS total ozone measurements over Syowa Station. Kazuo SHIBASAKI.
4. On the effect of lower stratospheric temperature to the vertical ozone distribution at Syowa Station. Shigeru CHUBACHI.
5. Ozone observation on board research vessel "SHIRASE" in 1988. Sadao KAWAGUCHI, Yasuo SHUDO, Yoshiyuki FUKUYAMA, Yoshio KATO, Hitomi MIYAMOTO and Shohei MURAYAMA.

XII. Studies in the Stratosphere (Koji YAMAZAKI)

1. Mid-winter warmings in the southern hemisphere stratosphere in 1988. Isamu HIROTA, Keiko KUROI, Masato SHIOTANI and Tetsu HIRAKI.
2. Recent interannual changes of stratospheric temperatures. Toshihiko HIROOKA and Kohji KAWAHIRA.
3. Year-to-year changes of the tropopause height at Syowa, Antarctica. Kohji KAWAHIRA, Kouji KONDOH and Yasunobu IWASAKA.
4. On the net heating effect auroral jet currents in polar mesopause regions. Kyo SEKIHARA.