

## Preliminary results from IMG

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Interferometric Monitor for Greenhouse gases (IMG) aboard Advanced Earth Observing Satellite (ADEOS) is a Fourier Transform-type Spectrometer (FT-IR) which has been developed for measuring the greenhouse gases in the atmosphere, particularly in the troposphere. It was operated for about 7 months from November 1996 up to the end of the lifetime of the ADEOS on June 1997. During the operational period IMG had measured over 138000 terrestrial thermal emission spectra of which the signal to noise ratio is sufficiently large for retrieving the atmospheric parameters such as temperature and gas concentrations. As most of the data had been obtained during the 4-day operational period scheduled twice in each REQQ period, we have obtained about 15 global data sets of the IMG data during the whole IMG operational period.

Preliminary results from IMG retrieval analyses show the relationship between the stratospheric ozone depression and low temperature field over the arctic region in the northern hemispheric spring of 1997. On the other hand, the analyses for the troposphere show that the methane concentration in the northern hemisphere was relatively higher than that in the southern hemisphere in the 1997 spring. In future analysis, we would try to raise the accuracy of the data analysis by customizing the 'a priori' data and constraint parameters used in the retrieval analyses, and would validate these retrieved results using routinely obtained meteorological data such as rewin and ozone sonde data.

### References

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- 3)Imasu, R. : Preliminary Results on the Greenhouse Gas Measurements by IMG Sensor aboard ADEOS Satellite, J. NIRE (Shigen to Kankyo), 7, 13-21 (1998) (in Japanese).
- 4)Revercomb, H.E., Buijs, H., Howel, H.B., LaPorte, D.D., Smith, W.L., and Sromovsky, L.A. :Radiometric calibration of IR Fourier transform spectrometers:solution to a problem with the High-Resolution Interferometer Sounder, Appl. Opt., 27, 3210-3218 (1988)
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(a)

REQQ No.	Date
IMG init.c/o	10/4~10
Sys-1	10/15, 16, 17, 18
Sys-2	10/30, 31, 11/1
REQQ 1	11/6~26
REQQ 2	11/27, 28, 29, 30 12/11, 12, 13, 14
REQQ 3	12/25, 26, 27, 28 1/8, 9, 10, 11
REQQ 4	1/25, 26, 27, 28 2/8, 9, 10, 11
REQQ 5	2/22, 23, 24, 25 3/8, 9, 10, 11
REQQ 6	3/22, 23, 24, 25 4/1~10 (Campaign)
REQQ 7	4/21, 22, 23, 24 5/5, 6, 7, 8
REQQ 8	5/19, 20, 21, 22 6/2, 3, 4, 5
REQQ 9	6/16, 17, 18, 19

(b)

## IMG Data Analysis Procedure

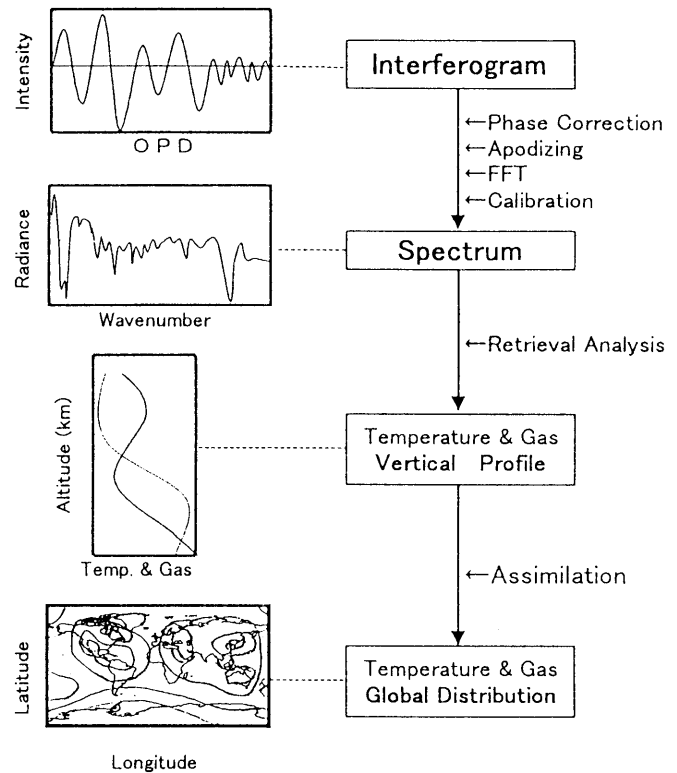


Fig. 1 (a)List of the IMG operation dates and (b)IMG data analysis procedure.

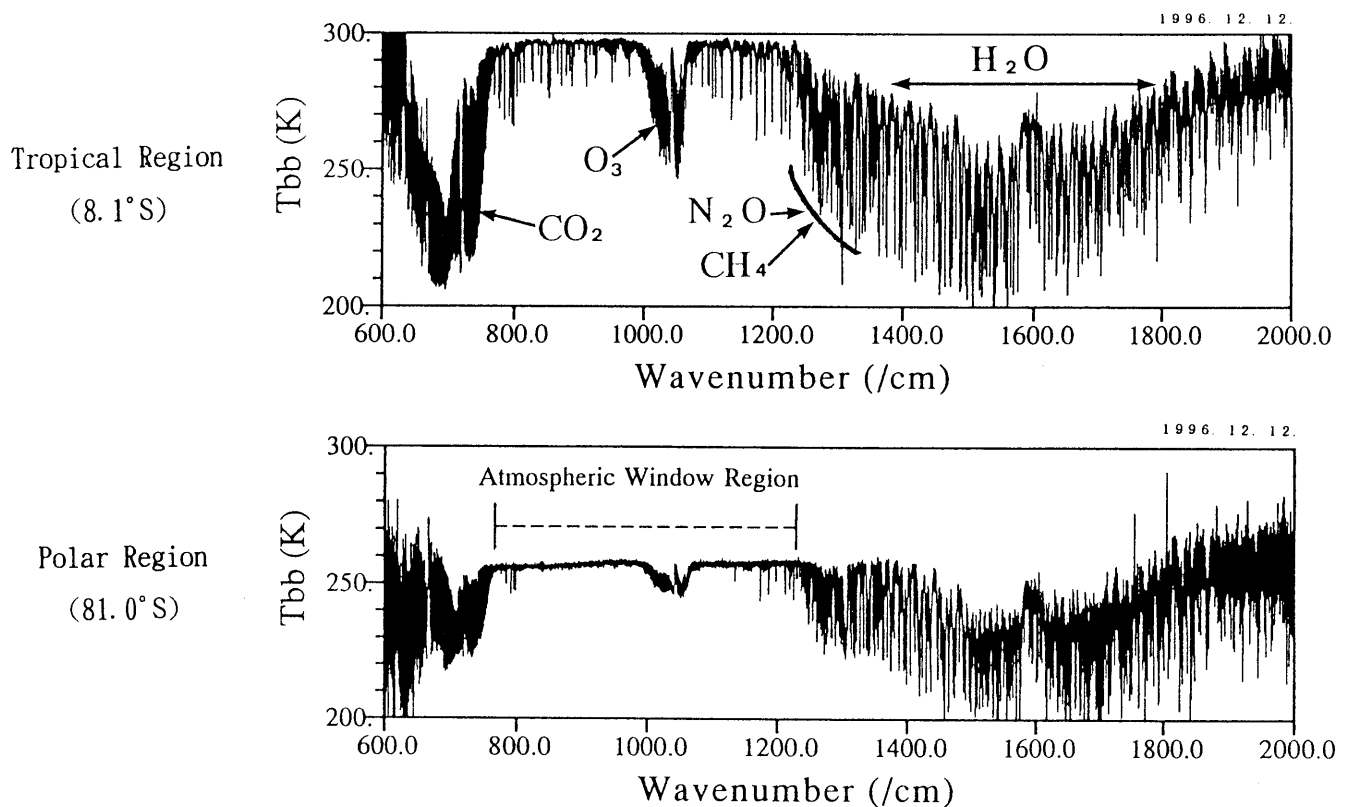


Fig. 2 IMG spectra observed over the tropical and polar regions. The spectra are expressed in terms of equivalent black body temperature (Tbb).

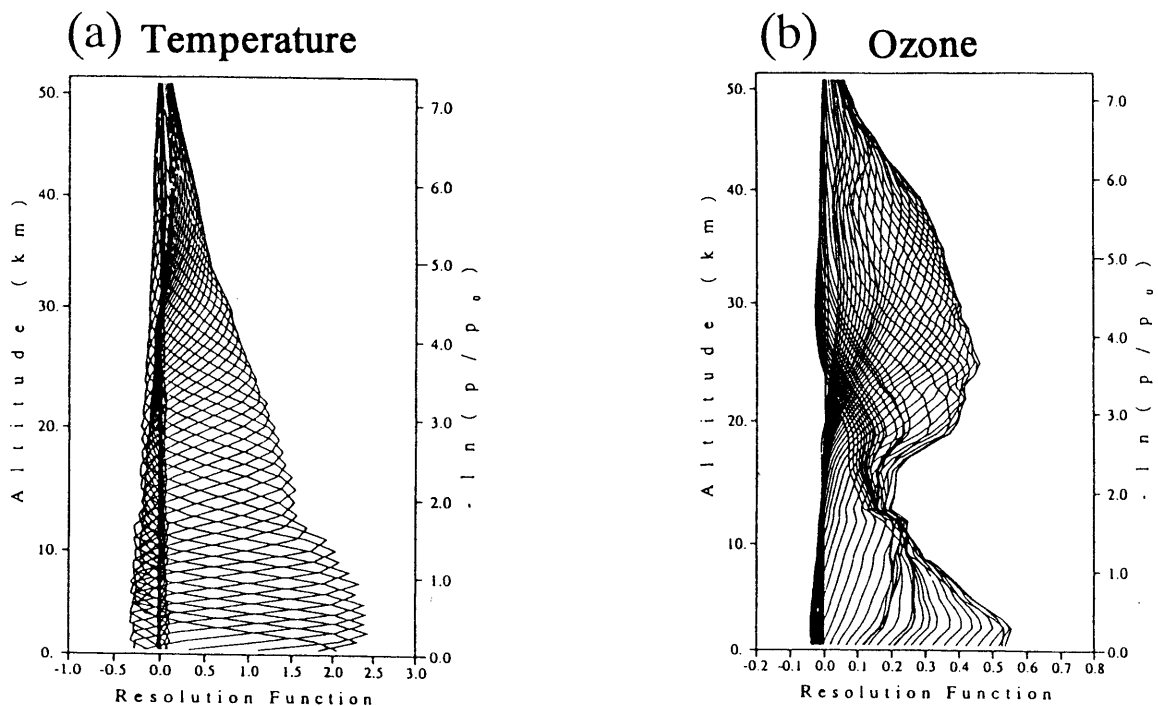


Fig. 3 Vertical resolution functions for (a)temperature and (b)ozone retrieval. The latter includes the widening effect caused by temperature change which occurs at each atmospheric layer.

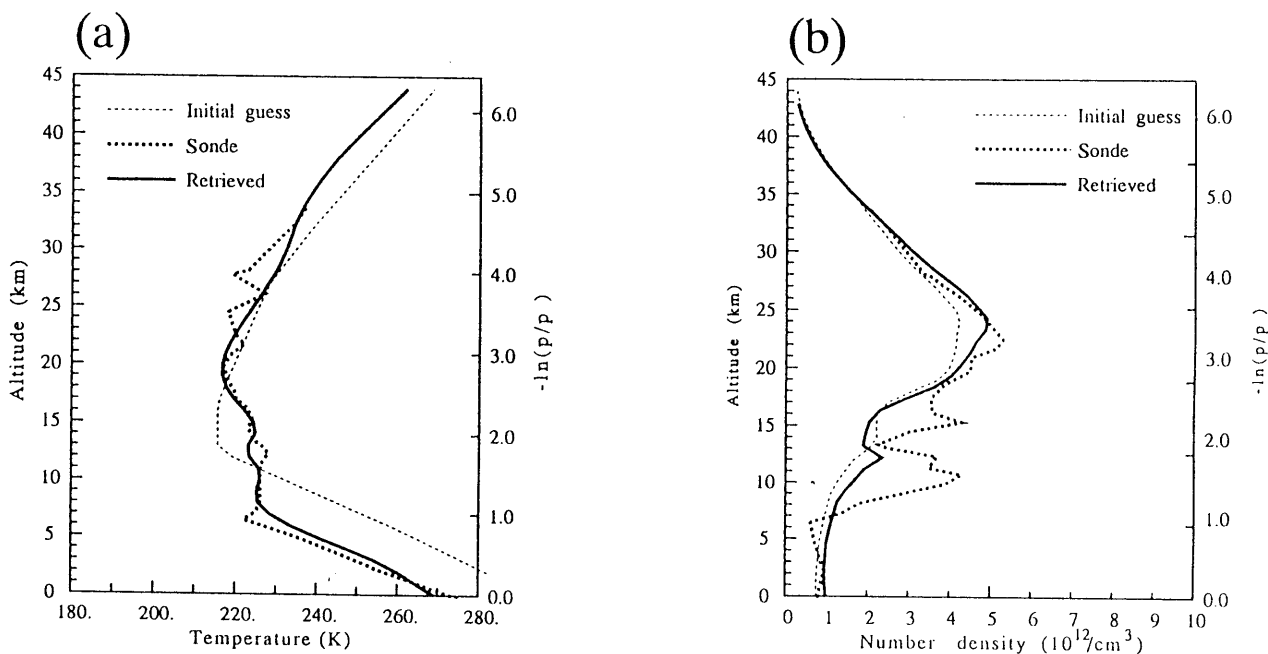


Fig. 4 An example of retrieved (a)temperature and (b)ozone density profiles. The IMG data were obtained on March 11, 1997. Also shown are the initial guess (a priori) profile and sonde observed profiles. The sonde observation was carried out about 4.5 hours after the IMG observation.

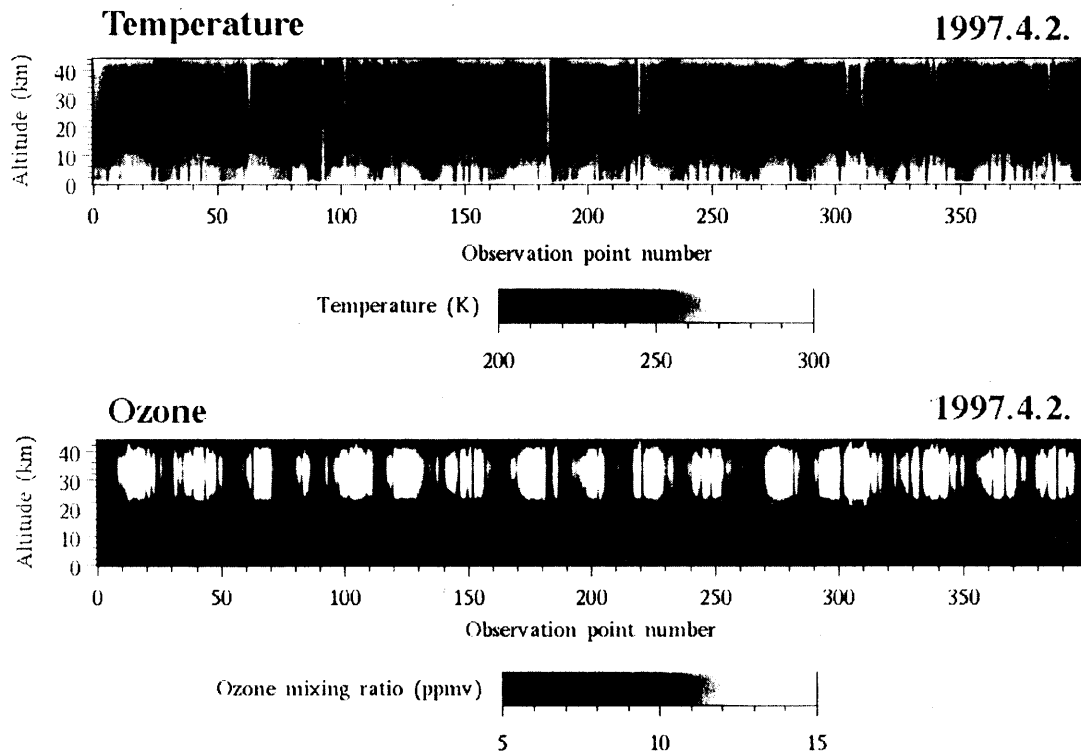


Fig. 5 (a)Temperature and (b)ozone retrieval results based on a continuous 18 hours observation along the satellite orbit. The data were observed on April 2, 1997.

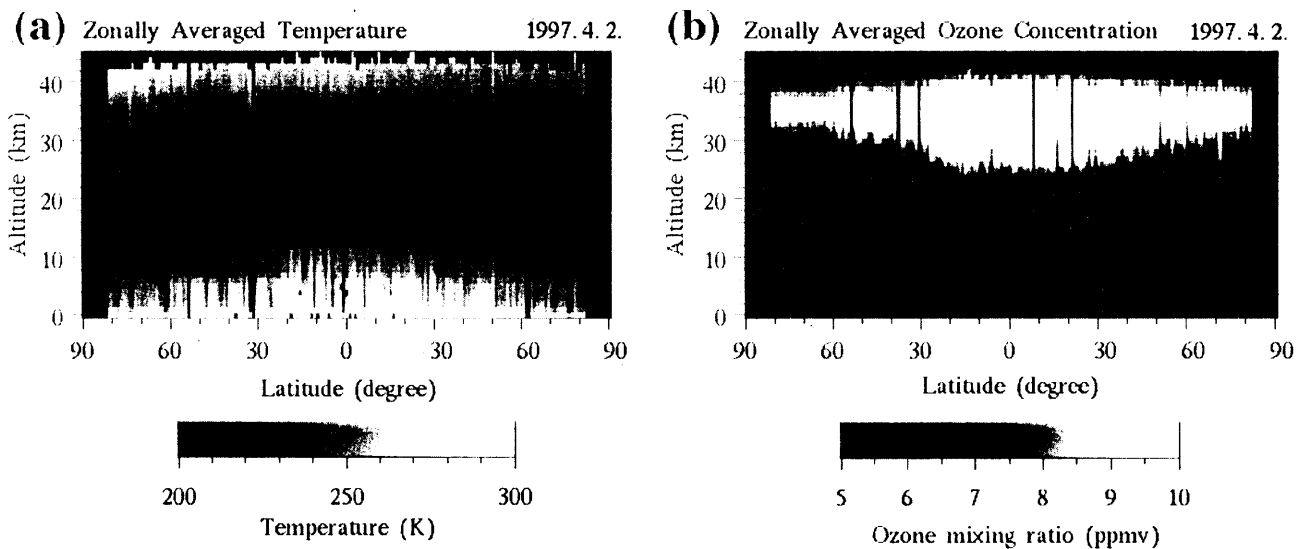


Fig. 6 Latitude-altitude display of the zonally averaged retrieval results for (a)temperature and (b)ozone concentration. The data are the same as shown in Fig. 5.