

ON-LINE DATA SERVICES OF NOAA AVHRR IMAGES THROUGH VALUE ADDED NETWORKS

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INTRODUCTION

Japan Weather Association (JWA) has been promoting satellite data service of NOAA Advanced Very High Resolution Radiometer (AVHRR) images on daily basis since November 1984. Potential users are included in ocean, land, and water application fields. In the past, JWA has been providing both photographs and floppy disks on non-realtime basis and telefax dotted pattern images on near-realtime basis. Recently, personal computer technology and telecommunication technology are well developed and it is easy to distribute information through several networks and to receive it by personal computer. In this study, we attempt to develop on-line data service system of NOAA AVHRR images through Value Added Network (VAN). This paper describes outline of a prototype system.

DATA RECEIVING, PROCESSING, AND DISTRIBUTING

NOAA's operational polar orbiting satellite TIROS/NOAA series HRPT (High Resolution Picture Transmission) data has been received at Meteorological Satellite Center, Japan Meteorological Agency (JMA). HRPT data has been stored in cassette magnetic tapes of 32,000 bpi at the center and Japan Weather Association (JWA) has been receiving HRPT data through digital high-speed network on real-time basis since 1986. The flow of Data receiving, processing and distributing is shown in Fig. 1. In image processing, firstly HRPT data is generated with in-flight calibration (Lauritson et al., 1979) and secondly processed with geometric correction (Tozawa et al., 1981). Output temperature range in calibration is generally -10.0°C to 41.0°C as 8 bits data for surface temperature mapping. This temperature range is acceptable for both ocean and land application. Geometric correction is carried out for six areas around Japan Island using mercator projection (Fig. 2). Each geometric corrected images is covering 1200 Km by 1200 Km with about 2.5 Km spatial resolution.

ON-LINE DATA SERVICES

Single AVHRR image is 8 bits image of 512 columns by 480 lines which contains about 256k bytes. If we send this data to the users through 2400 bps telecommunication line, it takes about 16 minutes to finish the job. Even if using 9600 bps line, it takes about 4 minutes but not realistic. Accordingly, we employ dotted pattern image using dither matrix method, then data value becomes 32k bytes and it is possible to send this image about 1.7 minutes through 2400 bps line.

In this on-line data service system, It is possible to receive following images:

1. Dotted pattern image (32k bytes)
2. Color coded image (8 colors:32k x 3 = 96k bytes)
3. False color image (32k x 2 = 64k bytes)
4. Iso-thermal image (32k bytes)

Dotted pattern image and Iso-thermal image are shown in Fig. 3 and 4, respectively. User can make overlay image in combination Dotted pattern image with Iso-thermal image(Fig. 5). It is easy to understand thermal gradient.

We are developed on-line and realtime data service within 24 hours through VAN. AVHRR images is storing in the VAN center for a week (Fig. 1). Newly data will be always exchanged with old data gathered before last week.

USER FACILITIES AND SOFTWARE ON PERSONAL COMPUTER

In this on-line system, it is necessary to prepare the following facilities:

1. NEC PC-9801 personal computer
or IBM PC-5550 personal computer
2. High resolution CRT
3. Printer
4. Modem(2400 bps/half-duplex MA mode)
5. Special interface only for PC-9801
6. Software(communication and image display) which is provided by JWA.

PROCEDURE OF RECEIVING IMAGES

User can search the necessary images belonging to the procedure shown in Fig 6. Firstly, user must obtain menu which indicates what kinds of image is available or not. After that, they can query images giving selection conditions like as area and date and receive dotted pattern image. Then, they can display the image and check the cloud conditions. If useful image, they will receive another kinds of images. User can stored the received

whole image in floppy disks and can make the multi-temporal analysis.

REMARKS

Telecommunication and computer technology is developing day by day, so that this on-line system must be improved soon. Our potential users are included national and prefectural agencies, research institutions, commercial fisheries industry, agricultural industry, water resource industry, and hydroelectric power industry. We hope our both non-realtime and realtime satellite data services can promote not only technology transfer of remote sensing to several industries but also academic development and educational effects in Japan.

REFERENCES

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2. Tozawa Y., Iisaka J., Saitoh S., Muneyama K., and Sasaki Y., Tokyo Scientific Center Report G318-1556(1981), IBM Japan, 14pp.

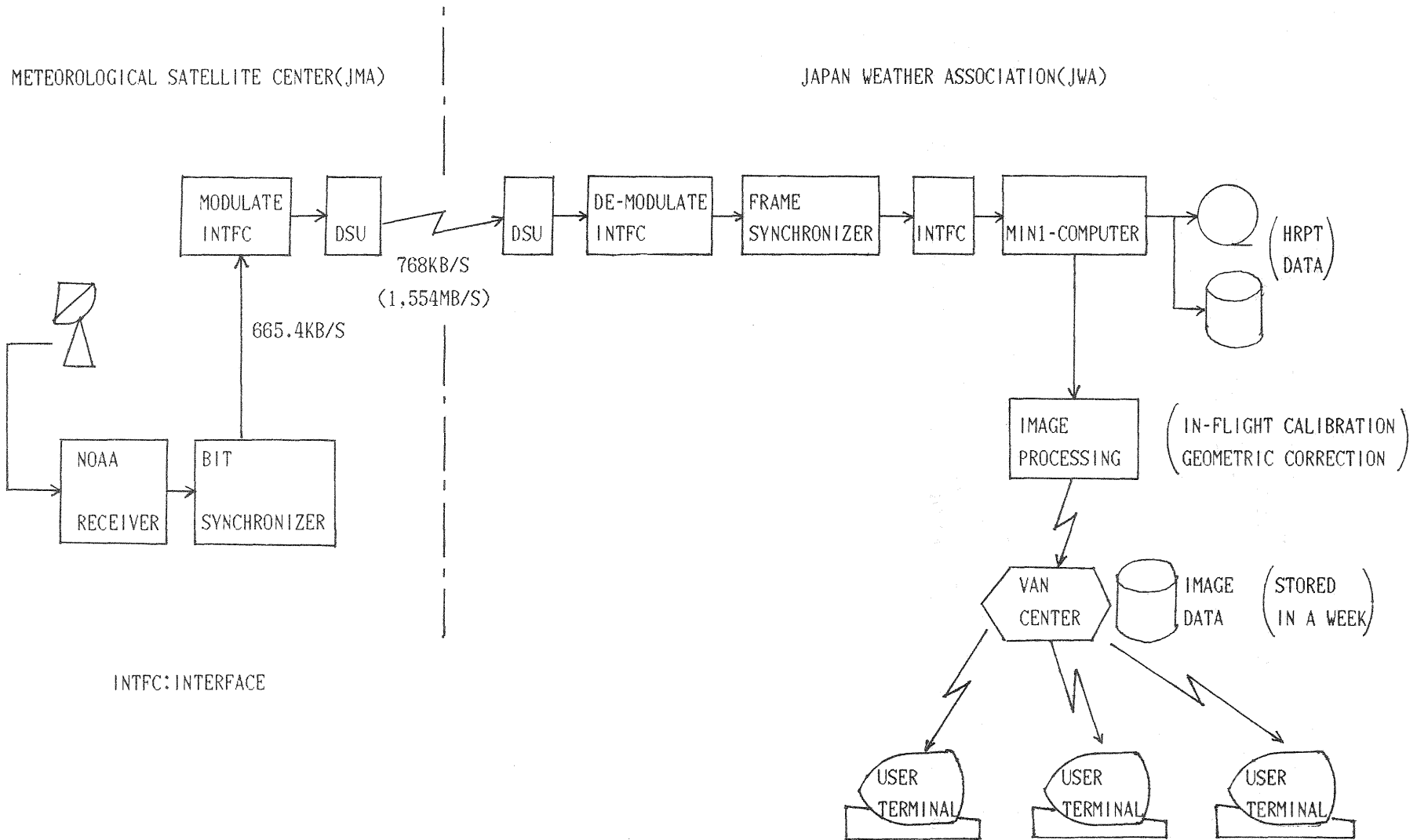


Fig. 1 Flow of NOAA data receiving, processing and distributing. VAN network is connecting to user's PC terminals.

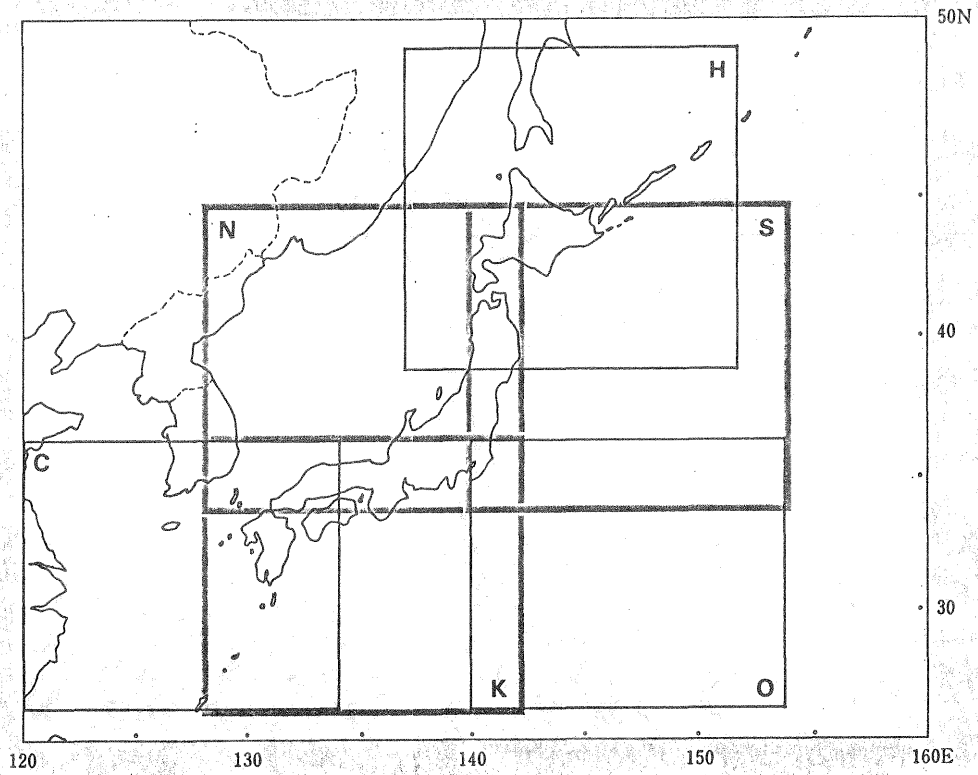


Fig. 2 Data service area. These six area are covering Japan Island.

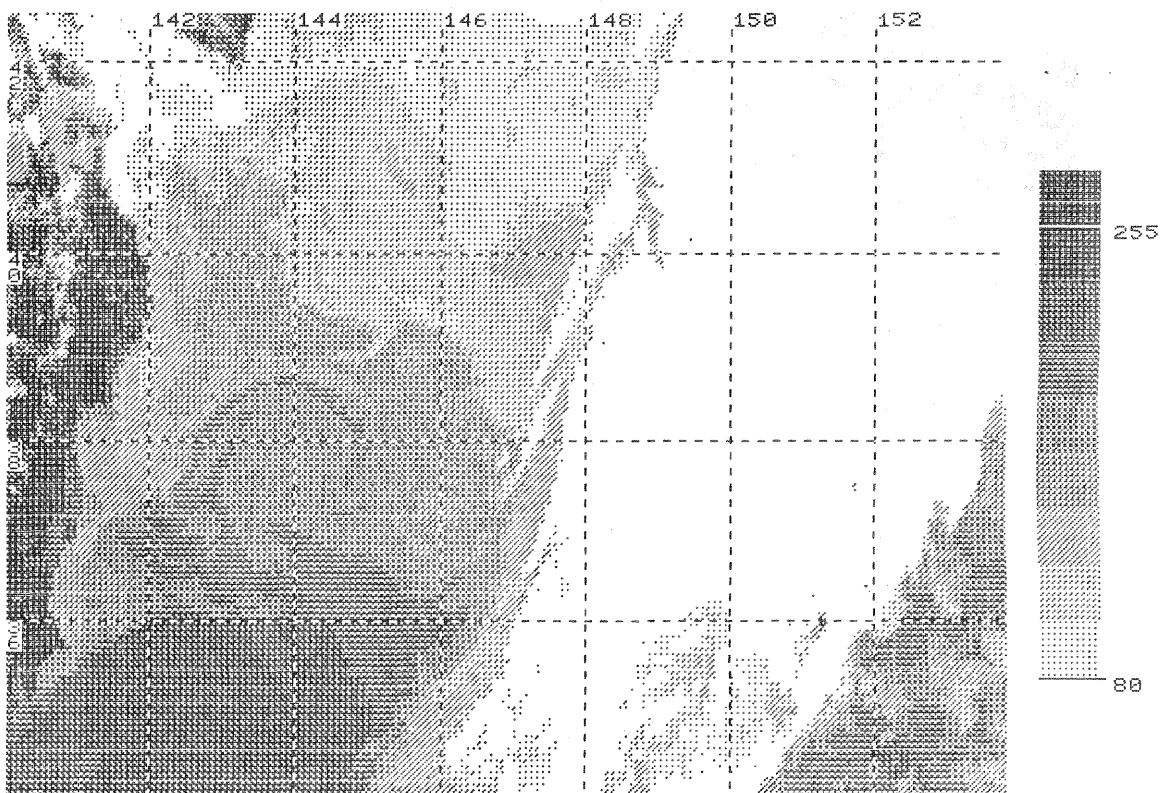


Fig. 3 Dotted pattern image

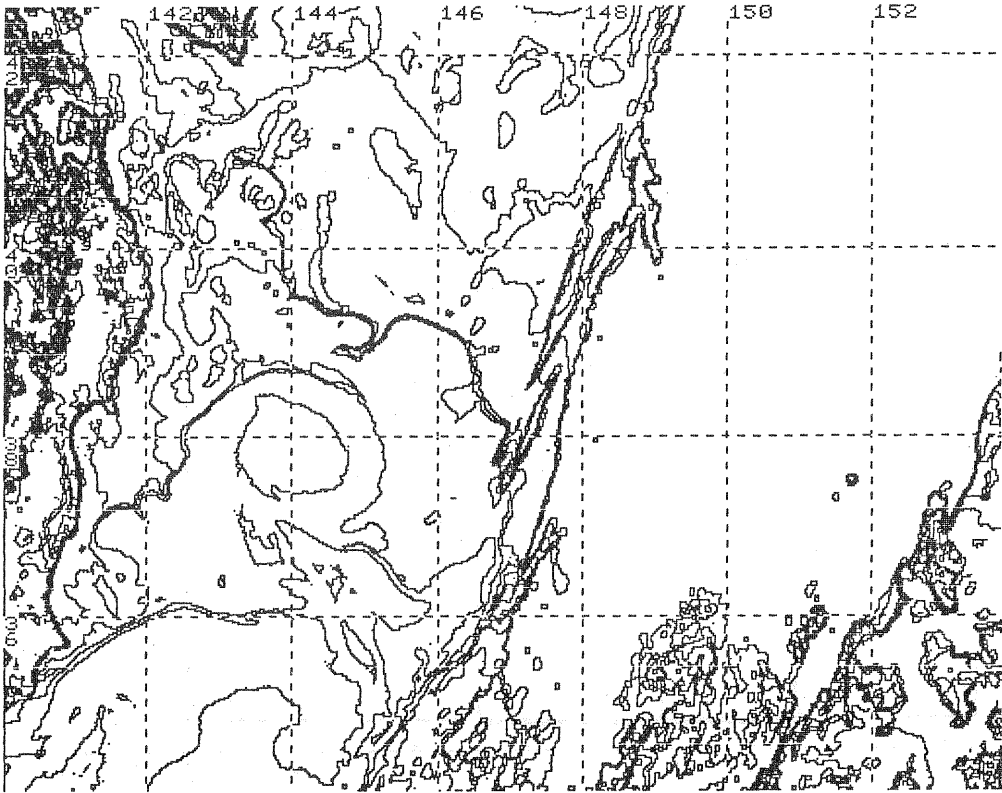


Fig. 4 Iso-thermal image

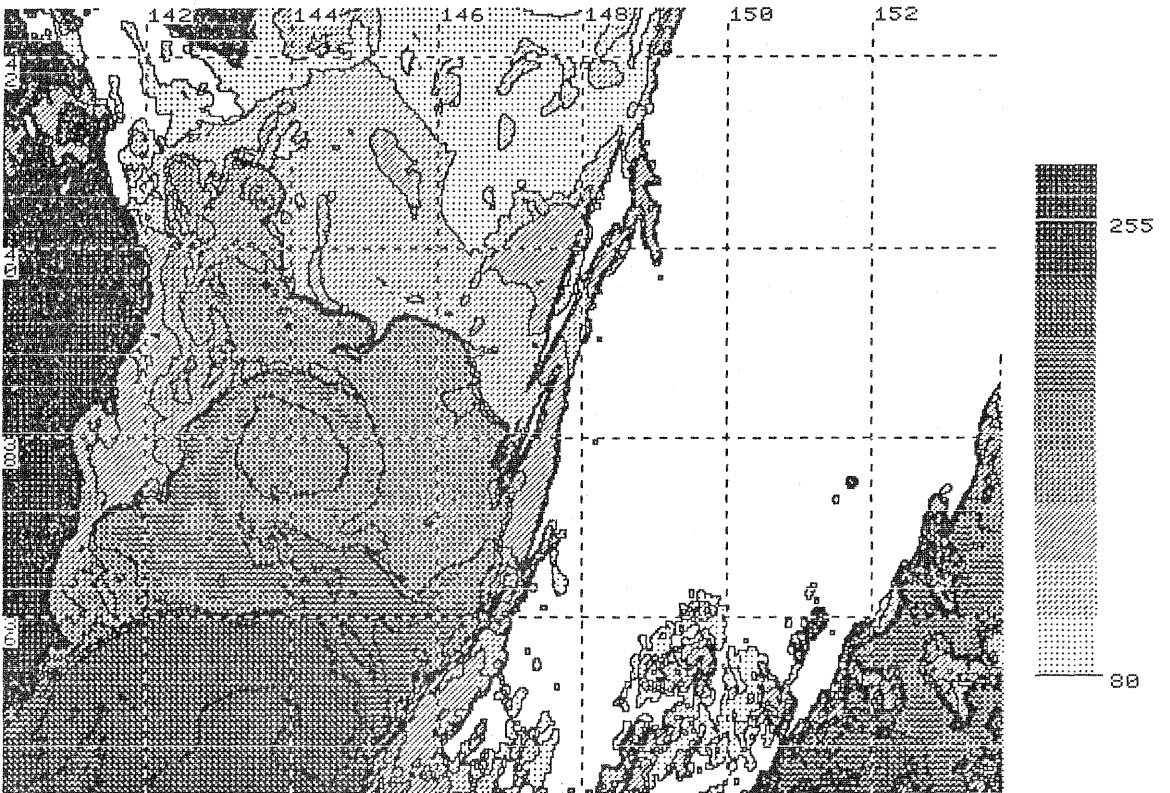


Fig. 5 Overlaid image generated both dotted pattern and iso-thermal images

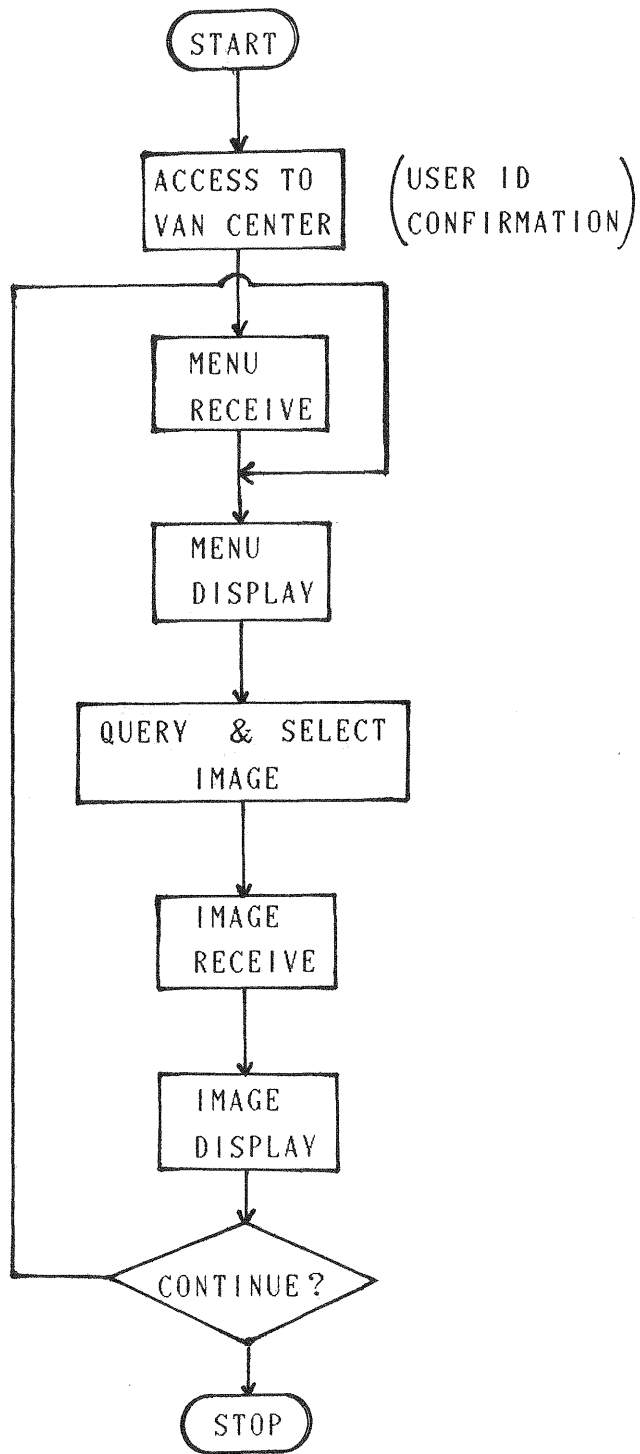


Fig. 6 Procedure of receiving images