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Group 1.1 Solar Wind Physics

IPS observations at a UHF frequency ($327MHz$) have been continued at three stations. A data book entitled "Solar Wind Speed from IPS Measurements, Feb.-Dec. 1988" has been published. We succeeded in observing several interplanetary disturbances relevant to solar flares on April 9 and August 12 and proton events on September 29 and October 19.

We studied the solar wind acceleration at distances between 0.1 and $0.3AU$ by comparing speeds at $0.1 \sim 0.3AU$ and those at $0.3 \sim 1AU$. Data sets which satisfy the following conditions were found. Each data set consists of observations at $0.1 \sim 0.3AU$ and those at $0.3 \sim 1AU$; observations at each distance range were made at the same longitude and latitude region; observations were made during a short period within one Carrington rotation. Fifteen data sets which have a higher speed than 550 km/s at $0.3 \sim 1.0AU$ are found, and fourteen sets which have a lower speed than 400 km/s at $0.3 \sim 1.0AU$ are found. Nine of 15 high-speed data sets have a speed difference larger than 100 km/s between distances of $0.1 \sim 0.3$ and $0.3 \sim 1.0AU$, whereas only three low-speed data sets have a speed difference larger than 100 km/s.

We studied the yearly variation in the temperature anomaly of the earth in relation to sunspot activity. Twenty-one peaks in temperature are reported for the 100 years since 1880. We found that 11 of them occurred at declining phases of the sunspot activity and 7 cases coincided with maximum phases. Only 3 events are found at ascending phases. These features are very similar to the yearly variation of geomagnetic activity which also has peaks at the sunspot maximum and the declining phases. These features are probably related to three-dimensional structure of the solar wind.

The interplanetary structures of the magnetic field and the current near the sun have been analyzed by MHD computer simulation for the case of the magnetic dipole configuration on the photosphere. It has been shown that the solar wind in the closed field region corotates with the sun. The azimuth magnetic field is formed in the open region but remains very weak in the closed region. The poloidal current, which associates with the azimuth magnetic field, is found to come into and go out of the sun in the open and closed regions, respectively.

A symposium entitled "Comparative study of the solar wind and the stellar wind" was organized by H. Washimi and M. Kojima and held in March 1989 at the

Institute of Space and Astronautical Science. More than 20 papers were presented at this symposium. We also organized a school for studying the heliosphere and the solar wind which was held in August 1989 at Sugadaira Space Radio Wave Observatory of the University of Electro-Communications.

M. Kojima attended the IAGA symposium held in the United Kingdom in July and August 1989 and presented a review talk on radio sounding of corona and inner solar wind.

Mr. Hiroaki Misawa joined our group as of September 1989. He has been engaged in interferometric observations of Jovian decametric emission at Tohoku University.

March 13, 1990

- Haruichi Washimi -

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