

Long-term observation of the solar radio emission by the Nobeyama Radio Polarimeters

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Long-term monitoring observation of the Sun provides the basic data for investigating the variation of the solar activity. However, it is very difficult to consistently observe the solar activity, which has about 11 years cycle, because observational instruments and projects usually have limited durations. The Nobeyama Radio Polarimeters (NoRP) are radio telescopes to monitor the total flux of the Sun at the micrometer range. This frequency range is thought to be a good indicator of the solar activity at the upper chromosphere and corona. In this study, we summarize the 64 years of the NoRP observation and give a perspective of its future observation.

The NoRP was constructed at Toyokawa by Nagoya University on 1951 to observe at 3.75 GHz. Then, the observational frequency has been increased at Toyokawa and Nobeyama. The telescopes in Toyokawa were moved to Nobeyama on 1994. Then, the present 7 frequencies observation which contains 1.0, 2.0, 3.75, 9.4, 17, 35, and 80 GHz was started. The time resolution of this system is 0.1s. This high time resolution data are often used for flare studies. In addition, the calibration method has been kept consistently since the beginning of the observation. Hence, the continuous observation over about 6 solar cycles can also be an important data for the study of the solar activity. Daily operations of the NoRP are fully automated, which is suitable for the long-term monitoring observation. All parts used in the NoRP are listed and spare parts are stored for all parts as possible in order to minimizing the loss of the observation due to the mechanical troubles.

F10.7 index, which is a total radio flux of the Sun at 2.8 GHz (wavelength is 10.7cm), is widely used as an indicator of the solar activity. The observation bands of the NoRP cover around the 2.8GHz. The continuous observation of the NoRP will be a useful data to study the variation of the solar activity and its influence to the upper atmosphere of the Earth.

Keywords: Sun, Radio radiation, Long term variation