

## ”The long-term oscillations in sunspots and related inter-sunspot sources in microwave emission”

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This work presents the microwave long-term oscillations with periods of a few tens of minutes obtained from Nobeyama radioheliograph (NoRH) at frequency 17 GHz. In number of active regions the fluctuations of radio emission of different types of sources (spots, compact and extended intersunspot sources (ISS)) were compared with the fluctuations in magnetic fields of sunspots. More significant correlation between the variations in magnetic field and radio emission was observed for sunspots and compact ISS. We adopt the cross-correlation analysis, wavelet analysis, and statistical tests to deduce the results. The model of the shallow sunspot's eigen oscillations is discussed for explanation of the origin of quasi-periodic oscillations in sunspots and ISS.

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