



# Quasi periodic oscillations of solar active regions in connection with their flare activity - NoRH observations

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The sunspot-associated sources at the frequency of 17 GHz give information on plasma parameters in the regions of magnetic field about  $B=2000$  G at the level of the chromosphere-corona transition region. The observations of short period (from 1 to 10 minutes) oscillations in sunspots reflect propagation of magnetohydrodynamic (MHD) waves in the magnetic flux tubes of the sunspots. We investigate the oscillation parameters in active regions in connection with their flare activity. We confirm the existence of a link between the oscillation spectrum and flare activity. We find differences in the oscillations between pre-flare and post-flare phases. In particular, we demonstrate a case of powerful three-minute oscillations that start just before the burst. This event is similar to the cases of the precursors investigated by Sych, R. et al. (Astron. Astrophys., vol.505, p.791, 2009). We also found well-defined eight-minute oscillations of microwave emission from sunspot. We interpret our observations in terms of a relationship between MHD waves propagating from sunspot and flare processes.

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