



Analysis of Kodaikanal Observatory Ca-K Spectroheliograms for Solar Cycles 15 - 23

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We present here the latitudinal and temporal dependence of the chromospheric activities from the Ca-K images obtained at Kodaikanal Observatory. We take Ca-K data for the period of 1913 - 2004 covering Solar Cycles 15 to 23. The chromospheric activities are classified into plage, Enhanced Network (EN), Active Network (AN), and Quiet Network (QN) areas to differentiate between large strong and small weak active regions. The strong active regions represent toroidal and weak active regions poloidal component of the magnetic field. We find that plage areas varies with 11-year periodicity mostly up to 50° latitude belt. Also the weak activity represented by EN, AN and QN varies with about 11-year with significant amplitude up to about 50° latitude in both hemispheres. The amplitude of this variation decreases as we move away from the equatorial belts and is minimum around 50° latitude. Afterwards, it increases again by a small amount in the polar region. In addition, we computed the phase difference and the cross-correlation coefficients between activities at different latitude belts with 35° latitude belt. We find that the activity shifts from mid-latitude belts towards equatorial belts at high speed at the beginning of a solar cycle and at lower speed as the cycle progresses. The speed of the shift varies between ≈ 19 and 3 m s^{-1} . This speed can be linked with the speed of meridional flows, believed to occur between convection zone and the surface of the Sun.