

# **Intensification of Joule heating due to auroral currents based on wavelet-based semblance analysis**

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In this paper, we compared the over all intensity of auroral currents and Joule heating during solar maximum of 23<sup>rd</sup> solar cycle and extreme quiet period (EQP) between solar cycles 23 and 24 .We computed the over all Joule heating in ionosphere by Poynting's model. As such purpose of this research work is to determine the relation between the Joule heating and Auroral Electrojet index(AE). We carried out a linear regression analysis of Joule heating rates with AE index which yields a correlation coefficient of  $r = 0.6$  for solar maximum and  $r = 0.3$  for EQP. The assumption of linearity, stationarity, and homogeneity of variances over time is critical in the regression context. We performed semblance analysis as a function of wavelength and time. It is noted that solar maximum years the rate of Joule heating intensified in accordance with AE index, inferring the effect of geomagnetic storms and sub-storms. The model values indicate that the intensified production of Joule heating during the aforesaid timeline more influenced the auroral and subauroral region..