The Transition Region Contribution to Observed Brigtness Temperature of Quiet Sun (Coronal Holes, Plage Regions) at Microwaves May by Significant

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Two excelent sets of multifrequency spectra at microwaves of the brigtness temperature of quiet sun were obtained recently from observations with RATAN-600 and OVRO radio telescopes (Borovik, 1994, Zirin, Baumert and Hurford, 1991). Both spectra agree within a few percents in the wavelength region from 2 to 30 cm. This data were interpreted correspondingly by Bogod and Grebinsky (1997) and by Zirin et al.(1991). In both works it was concluded that there is no significant contribution from chromosphere to corona transition region to observed brigtness temperature of quiet sun. In this work we have adopted the transition region model with constant thermal flux from corona to chromosphere. In this assumption the radiation transfer equation were solved analiticaly. The result looks like the same as for the solar atmosphere model without transition region used in above mentioned interpretations. The only difference is that the optical thikness term consist of sum of two parts: optical thikness of the corona themself and the effective optical thikness of the transition region. It is shown that in the short wavelength region basic contributors to the observed brigtness temperature are chromosphere and transition region and in the longer wavelengths the main contribution to the brigtness is from the solar corona. Model differential emission measure were compared with available data, based on observations of UV lines, and it is concluded, that radio and UV data still depart from each other. Using available microwave brigtness temperature spectra for coronal holes and weak plage regions we have modelled also the transition regions for this objects.

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References

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