A Correlation Study between the Occurence of Equatorial Spread-F and of Tropospheric Disturbances

This final report for this particular project gathers together the work done since the last semi-annual report with all the work done from the beginning. This investigation seeks to determine the effects of tropospheric disturbances on the F layer of the ionosphere, specifically on one phenomenon in that layer, equatorial spread-F. Spread-F is observed mainly in two geographic regions: at geomagnetic latitudes greater than 60° and within the equatorial belt bounded by 20°. In the equatorial belt, it is a nighttime phenomenon, while at high latitudes it is observed also during the day. Spread-F and geomagnetic activity are negatively correlated in the equatorial belt, but positively correlated at high geomagnetic latitudes. Both topside and ground based soundings are in substantial agreement on these points, so that these two types of spread-F can be regarded as different phenomena. Since it seems fairly settled that high latitude spread-F has its origin from extraterrestrial sources (Herman, 1964), Shimazaki (1959) postulates a terrestrial source for equatorial spread-F. Ionospheric effects in the F region caused by tropospheric disturbances such as hurricanes (Bauer, 1958) and earthquakes (Row, 1966) have been observed.