

THE MEAN THICKNESS OF NIGHT-TIME E_s CLOUDS AT BRISBANE*

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It has been stated that the sporadic E region of the ionosphere at Brisbane is very thin, with a maximum thickness of the order of a few hundred metres (McNicol and Gipps 1951). The measurements reported below indicate that at Brisbane E_{sc} clouds (patches of enhanced ionization in the sporadic E region which maintain an almost constant height) at night are, on the average, almost certainly less than 1 km thick.

The thickness of E_{sc} clouds was obtained from measurements of :

- (a) the equivalent paths of echoes from the under-surfaces of these clouds, and also from the F region ; and
- (b) simultaneously observed equivalent paths of echoes which had experienced one internal reflection between the F region and the top surface of the E_{sc} cloud before returning to the ground (so-called " M reflections").

The assumption is made that both the E region cloud being measured and the base of the F region are horizontal, at the times when the M echoes which were used for measurement appeared.

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Spurious results can be caused if any of the reflecting surfaces are not horizontal. This phenomenon is sufficiently rare, however, to cause little trouble (Thomas 1956), and, in any case, was eliminated from the measurements by utilizing only those records for which the range of the M echo was constant with time.

Measurements have been taken from Brisbane 2.28 Mc/s $P't$ records covering the range 0–500 km. The receiver was calibrated for errors in apparent height due to variations in the amplitude of the received echo, using the method described by Lyon and Moorat (1956). The error Δ was found to obey the relation

$$\Delta = 8 - 0.2w,$$

where w is the width of the trace. This error was subtracted from the apparent height read directly. Since the error in each individual height measurement is 1 km, each estimated value of the thickness may be in error up to 4 km.

Records obtained during 1952, 1953, and 1954 were examined. The mean of 98 measurements was 0.33 km thickness and the standard error of the mean was 0.23 km.

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