
Discussion on the Papers on Atmospheric Sciences

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Discussion on the papers on atmospheric sciences

W. R. PIGGOTT

Although Dr Dudeney's paper presents some preliminary results from the h.f. Doppler experiment in the Antarctic Peninsula which are interesting in themselves, the main objective of deploying the experiment in this part of the world was to take advantage of the special geographical situation in the sector for a broader investigation. Our objectives included:

- (a) to study the relations between gravity waves and travelling ionospheric disturbances.
- (b) to see whether gravity waves could be associated with major weather systems, or with particular types of auroral particle precipitation.
- (c) to investigate whether F-region winds are modified during periods of auroral activity.
- (d) to search for possible F-region movements associated with magnetic field changes, e.g. sudden commencements.
- (e) if electric fields exist in the F-region in this zone, vertical movements due to them should be particularly easy to detect.

The experiment thus forms part of the general British Antarctic Survey's attack on the dynamics of the F-region.

D. ORR

Has Dr Dudeney looked on magnetic records to see whether the rapid oscillations observed in the ionosphere are correlated with active periods, or periods when micropulsations are occurring?

J. R. DUDENEY

The events do not appear to be associated with widespread magnetic storminess or with the occurrence of storm sudden commencements. On the question of geomagnetic pulsations however, new data received and analysed [after the Royal Society meeting] do indeed appear to reveal a one-to-one correlation between the occurrence of geomagnetic pulsations visible on normal La Cour magnetograms and the rapid oscillations observed on the Doppler traces. This is a new result and we wish to thank Dr Orr for provoking us to search for it. It clearly throws doubt on our original speculations as to causes, but more work is needed to clarify the situation.

SIR GEORGE DEACON, F.R.S.

Do the records of short-period magnetic fluctuations contain evidence of the effect of varying earth currents concentrated in neighbouring water channels, particularly the Drake Passage? I am thinking of effects like those described by N. F. Barber in *Mon. Nat. R. astr. Soc., Geophys. Suppl.* **5**, 258–269 (1948).

J. R. DUDENEY

The data from the B.A.S. magnetic observatories are almost certainly perturbed to some extent both by the effects of electric currents induced by the movement of the sea and currents locally induced in the sea from external short period magnetic perturbations. There are, however, no nearby magnetic observatories from which intercomparisons could be made to evaluate the probable magnitudes of these phenomena, which are relatively small compared with the perturbations which the experiments are designed to study. The relatively high cost of making measurements in the far south imposes a discipline in which one only studies phenomena

for which the theatre has special advantages or where the data are needed for an immediate practical or scientific purpose. Argentine Islands, the only magnetic observatory in the peninsula, is not well placed to detect the effects of currents in the Drake Passage, the centre of which is some 400 km away.

W. R. PIGGOTT

I should like to comment on Dr Mayaud's figure showing the time variation of magnetic activity from selected stations and the time variation of the angle between the Earth's magnetic field and the direction of the Sun. I think we must all compliment Dr Mayaud on obtaining such clear evidence of the importance of the angle between the Earth's magnetic axis and the direction of the Sun. It is astonishing that so simple an analysis gives results which agree in such detail. The regularity of the residuals suggests that it would be worth while to try the next approximation, replacing the central dipole by a model more representative of the actual Earth's field. This figure clearly suggests that the diurnal and seasonal variations of the average magnetic activity over the world are mainly determined by this geometric factor.