

## I. PHYSICS

### Astrophysics (Ionosphere)

#### DETECTION OF IONOSPHERIC POLARISATION SCINTILLATIONS

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THE purpose of the study is to detect the ionospheric polarisation scintillations during the solar eclipse of February 1980.

**Keywords:** Polarisation; Polarisation Scintillation; Magnetic Storm; Sunspot Years.

#### EXPERIMENT

A chain of polarisation measuring equipment were set up at Rangapur (17° 6'N, 78° 43'E), Pune (18° 31'N, 73° 53'E), Rajkot (22° 19'N, 70° 44'E) and Ahmedabad (23° 02' N, 72° 36'E) to investigate the effect of the solar eclipse of February 16, 1980 on the ionosphere and to detect eclipse induced gravity waves. Rangapur experienced total solar eclipse (duration 2 min. and 9 secs.), Pune experienced 90 per cent eclipse, Rajkot and Ahmedabad 75 per cent each. The observations were made for two weeks beginning a week before the eclipse. The observations of Faraday rotation angle (polarisation) were carried out continuously round the clock using a Japanese geostationary satellite ETS-2. During the two week observation period polarisation scintillations were observed on all the nights except the eclipse night at all stations. Duration of polarisation scintillation at different stations varies. As one progresses towards higher latitudes the duration drops down (Fig. 1). This indicates that the irregularities causing PS are observed for a longer duration near the equator. Similar observations were carried out at a chain of five stations during 1975-76 and no such PS were observed except on 10-11 January 1976 which was found to be a magnetic storm day. But during current eclipse observations, the PS were seen on every night except the eclipse night. A moderate magnetic storm with sudden commencement began at 0810 75° EMT on February 14, 1980, with magnetic field recovery near 0000 hr on February 15, 1980. A major magnetic storm on February 16, 1980, began after 0000 hr with field recovery near 2100 hr on the same day. So the absence of scintillations on the eclipse night (February 16, 1980) could be either due to total eclipse or due to magnetic storm. Since there are two causes and one effect, it is difficult to pinpoint the cause of PS. It is also worthwhile to note that eclipse observations were made during high solar activity period whereas 1975-76 observations were essentially made during a low solar activity period. Current observations give a clear indication that PS are observed during high sunspot years.

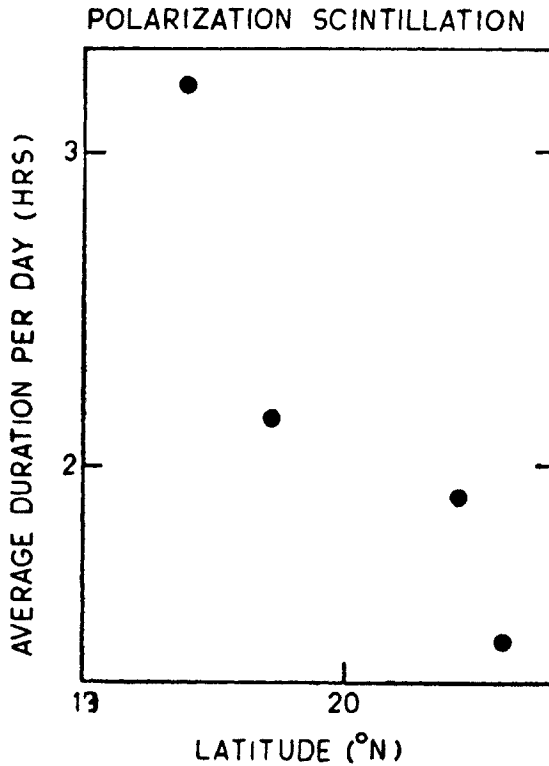


FIG. 1

## PARTICIPANTS

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