induced fission of heavy elements as possible source of fossil tracks in Dhajala meteorite. The spontaneous fission contribution of fossil tracks from ^{238}U and ^{244}Pu is estimated by Bhandari *et al.*[9] to be less than $3 \times 10^2\ cm^{-2}$.

On the basis of numerical calculations[8] the recordable range of iron group ions in olivine and pyroxene is predicted to be 10 μm on the average. Price *et al.*[14] determined the most probable track lengths of Fe ions in olivine from accelerator irradiations and from fossil tints (track in track) to be 13·0 μm and 9–11 μm respectively. We have neither taken recourse to tints, tincles or tots,[15] (methods to obtain total track lengths) nor applied any annealing correction but counted and measured lengths of only the normal surface tracks which are revealed by etching on the cleavage plane of the crystal. The most probable value of fossil surface track length observed in our analysis is 7·5 μm for olivine under normal etching conditions[12] which is consistent with the tracks belonging to the VH group of cosmic ray nuclei. Hence we conclude that the most predominant source of fossil tracks in Dhajala meteorite shower is the Fe group of cosmic rays.

The author is thankful to Dr. S. L. Koul for his invauable help in the preparation of samples. This study has been made possible by a generous supply of Dhajala meteorite fragment by Dr. N. Bhandari and helpful discussions with PRL group of Professor D. Lal at Ahmedabad.

Department of Physics, H. S. VIRK.
Guru Nanak Dev University,
Amritsar, *April* 27, 1979.

1. Fleischer, R. L., Price, P. B., Walker, R. M., Maurette, M. and Morgan, G., *Geophys. Res.*, 1967, **72**, 355.
2. —, Haines, E. L., Hanneman, R. E., Hart, H. R. Jr., Kasper, J. S., Lifshin, E., Woods, R. T. and Price, P. B., *Science*, 1970, **167**, 568.
3. Price, P. B., Rajan, R. S. and Tamhane, A. S., *Astrophys. J. Lett.*, 1968, **151**, 109.
4. Lal, D., Rajan, R. S. and Tamhane, A. S., *Nature*, 1969, **221**, 33.
5. —, Macdougall, D., Wilkening, L. and Arrhenius, G., *Proc. Apollo Sci. Conf.*, 1970, **3**, 2351.
6. Fleischer, R. L., Price, P. B. and Walker, R. M., *J. Geophys. Res.*, 1965, **70**, 2703.
7. Bhandari, N., Bhat, S. G., Lal, D., Rajgopalan, G., Tamhane, A. S. and Venkatavardan, V. S., *Nature*, 1971, **230**, 219.
8. Fleischer, R. L., Price, P. B., Walker, R. M. and Maurette, M., *J. Geophys. Res.*, 1967, **72**, 331.
9. Bhandari, N., Lal, D. and Trivedi, J. R., *Meteoritics*, 1976, **11**, 137.
10. —, N. and Ballabh, G. M., *Astron. Soc. India*, 1977, **5**, 69.
11. Bagolia, C., Doshi, N., Gupta, S. K., Kumar, S., Lal, D. and Trivedi, J. R., *Nucl. Track Det.*, 1977, **1**, 83.
12. Krishnaswami, S., Lal, D., Prabhu, N. and Tamhane, A. S., *Science*, 1971, **194**, 287.
13. Gupta, S. K. and Lal, D., *Nucl. Track Det.*, 1978, **2**, 37.
14. Price, P. B., Lal, D., Tamhane, A. S. and Perelygin, V. P., *Earth Planet. Sci. Lett.*, 1973, **19**, 377.
15. Lal, D., *Space Sci. Rev.*, 1969, **9**, 623.

SIMULTANEOUS DRIFT MEASUREMENTS BY SPACED RECEIVER TECHNIQUE AND BY BARIUM CLOUD RELEASE NEAR MAGNETIC EQUATOR

A SERIES of rocket borne barium cloud drift measurements were made over Thumba (dip. 0·6° S) during March 1968[1]. Horizontal E–W drift measurements in equatorial F-region by various techniques have been compared by Balsley[2] in his review on equatorial electric fields. In addition to these *in situ* measurements other techniques included in comparison are (1) drift measurements by spaced receiver technique at Thumba averaged over the period 1968–69[3] and at Ibadan during IGY[4], (2) drift measurements by incoherent scatter experiment at Jicamarca, (3) drift velocities derived from the sequential appearance of spread-F at a chain of ionosondes in Peru[5] and (4) from the spread-F ionogram synthesis work based on Huancayo ionosonde records[6].

Drift velocities by barium release experiment conducted at Thumba matched very well with the average spaced receiver drift velocities at Thumba and in close agreement with the velocities at Ibadan also be similar experiment even though the latter data belonged to different years and to different longitudes. The velocities by incoherent scatter method at Jicamarca showed however disagreement.

During the barium release experiments conducted at Thumba, the spaced receiver drift experiment was operated simultaneously and here we wish to compare the E–W drifts by this technique and by barium release technique. The spaced fading records have been analysed by similar fade method[7] and no N–S component was noticed on any of the barium release times. The drift was purely westward during the evening flights of 28th and 30th March (launch time 18·55 hr IST) and purely eastward on the morning flight of 31st March (launch time 05·37 hr IST). The E–W drift speeds are shown in Fig. 1. The drift speeds by the barium release experiment on two evening flights were around 90–100 m/s towards west and this is shown by the big filled circle in the figure with arrow in time axis showing the launch time. Similarly the drift speed in the morning flight was about 80 m/s towards east and this is again denoted by big filled circle. It is clear that the E–W drift speeds determined by the two different techniques match very well within the limits of experimental errors.

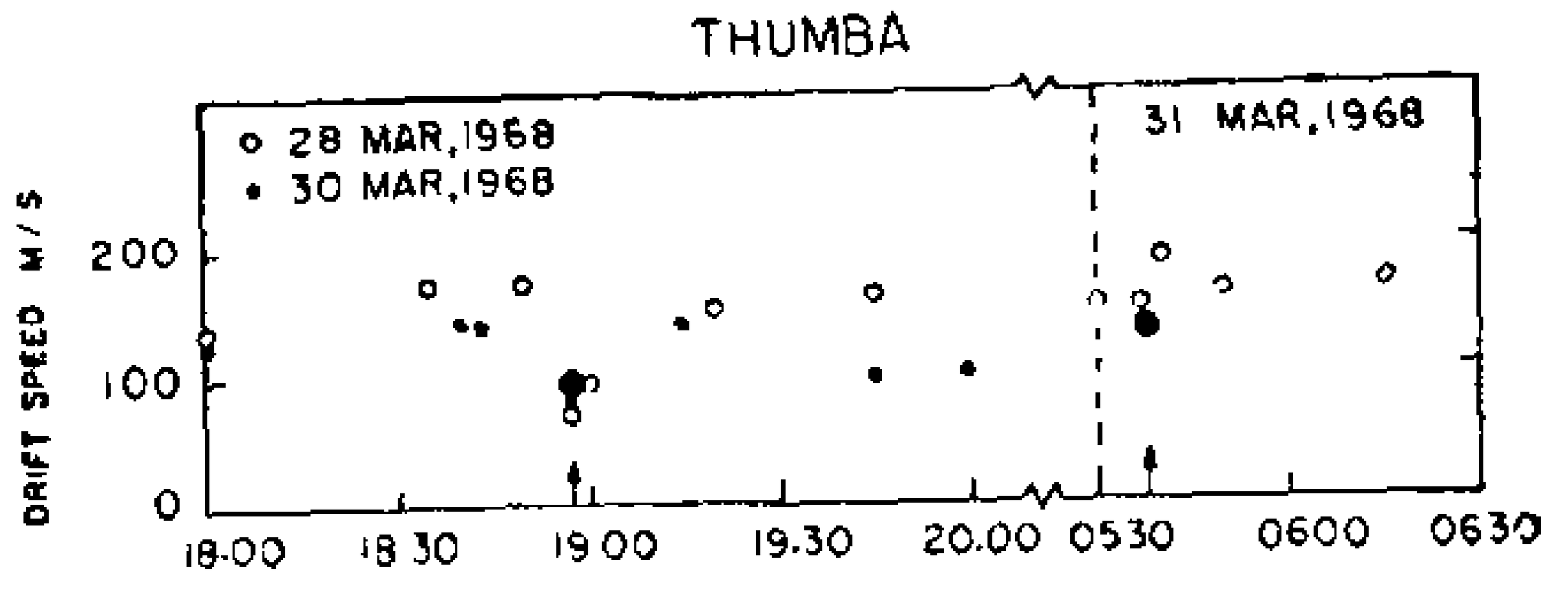

FIG. 1. F-region drift speed by spaced receiver experiment compared with the drift speed by barium release experiment, both experiments conducted at Thumba.

Drift measurements by spaced receiver technique have been compared with various other independent months in the last decade following the doubts expressed on the interpretation of spaced receiver experiments. These include winds by meteor radar in D-region[8,9] and in E-region[10–12], winds by rockets in E-region by falling sphere method[13] and in E-region by lithium trail method[14], drift in F-region by incoherent scatter method[15], in E-region at electrojet latitudes by VHF backscatter doppler shift method[16], winds in troposphere by radiosonde[17] and with space craft measurements of solar wind (being compared with spaced IPS method)[18]. All these comparisons have established spaced receiver technique as a simple and potential radio remote probing method of studying dynamics in turbulent media (neutral as well as ionized).

Sincere thanks are due to Prof. K. R. Ramanathan and late Prof. V. A. Sarabhai for encouragement and facilities towards establishing ionospheric drift station at Thumba, to Prof. R. G. Rastogi for his guidance and supervision of the activities of the ionospheric drift group at PRL and to Dr. R. K. Misra for help in making these drift observations.

Physical Research Laboratory, H. CHANDRA.
Ahmedabad 380 009,
August 6, 1979.

1. Haerendel, G., *Solar Terrestrial Phys.*, Leningrad, 1970.
2. Balsley, B. B., *J. Atoms. Terr. Phys.*, 1973, **35**, 1035.
3. Misra, R. K. and Rastogi, R. G., *J. Inst. Telecom. Engrs.*, 1971, **17**, 400.
4. Skinner, N. J., Hope, J. and Wright, R. W., *Nature*, 1958, **182**, 1363.
5. Knecht, R. W., *Ibid.*, 1960, **187**, 927.
6. Calvert, W. and Cohen, R., *J. Geophys. Res.*, 1961, **66**, 3125.
7. Mitra, S. N., *Proc. I E.E.E.*, 1949, *P–III*, **96**, 441.
8. Stubbs, T. J., *J. Atmos. Terr. Phys.*, 1973, **38**, 979.
9. Stubbs, T. J. and Vincent, R. A., *Aust. J. Phys.*, 1973, **26**, 645.
10. Lysenko, I. A., Portnyagin yu, I., Sprenger, K., Greisiger, K. M. and Schminder, R., *J. Atmos. Terr. Phys.*, 1972, **34**, 1435.
11. Felgate, D. G., Hunter, A. N., Kingsley, S. P. and Muller, H. G., *Planet. Space Sci.*, 1975, **23**, 389.
12. Wright, J. W., Glass, M. and Spizzichini, A., *J. Atmos. Terr. Phys.*, 1976, **38**, 713.
13. Vincent, R. A., Stubbs, T. J., Pearson, P. H. O., Lloyd, K. H. and Low, C. H., *Ibid.*, 1977, **39**, 813.
14. Ohyama, H., Nakashima, S., Nakajima, M. and Kamishikiry, O., *Rev. Radio Res. Labs.*, 1974, **20**, 419.
15. Wright, J. W., Amayenc, P. and Vasseur, G., *J. Atmos. Terr. Phys.*, 1970, **38**, 731.
16. Crochet, M., Tabbagh, J. and Masiosse, N., *Ibid.*, 1977, **39**, 463.
17. Rottger, J. and Vincent, R. A., *Geophys. Res. Letts.*, 1978, **5**, 917.
18. Coles, W. A., *Space Science Reviews*, 1978, **21**, 411.

DEVIATIONS FROM KOHLER'S RULE IN FERROMAGNETIC IRON

Introduction

THE study of magnetoresistance (MR) of metals is one of the important methods used to explore their electronic structure and the scattering processes of their current carriers. It is customary to plot the Kohler diagram in order to compare the field dependence of MR of different purity samples of the same metal or of different metals. The Kohler's plot is based on Kohler's rule,

$$\frac{\Delta \rho}{\rho_0} = F(B/\rho_0) = [\rho(B) - \rho_0]/\rho_0$$

i.e., the fractional increase in resistance $\Delta\rho/\rho_0$ in the magnetic induction B of a specimen of resistivity ρ_0 at zero induction is a function only of the parameter B/ρ_0. The function F depends on the relative orientation of B and the measuring current J, and if the