IONOSPHERIC E REGION DRIFT PATTERN AT LOW-LATITUDES

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ABSTRACT

Ionospheric E region drift measurements at Ahmedabad during the period 1970–75 show a consistent pattern. Drift direction is different during winter and summer with change over in equinoxes. This agrees with the atmospheric circulation pattern obtained for the IGY period when large number of drift stations existed.

INTRODUCTION

DRIFT motion of ionospheric irregularities by spaced receiver method has been studied at Ahmedabad for different periods since 1954. The results for the period 1956–66, summarised by Rastogi[5] indicate significant seasonal and solar cycle variations. When similar measurements were made at Thumba near the magnetic equator, a very consistent picture emerged independent of season or solar cycle with drift direction always towards west by the day and towards east by the night (Rastogi *et al.*[6]). The observations at Ahmedabad were restarted in October, 1970 as part of a programme to establish a chain of drift stations in India and continued till June, 1975 This is the longest continuous spell of observations conducted at Ahmedabad and various investigations on the features of drift are being done. In this short note we present the consistent pattern of the drift observed at Ahmedabad derived from over five thousand observations during daytime (0800–1600 hr 75° E.M.T.).

RESULTS

The annual mean histogram of the percentage occurrence of drift direction for the period 0800–1600 hr local time (75° E.M.T.) for the year 1974 is shown in Fig. 1. There is no single drift

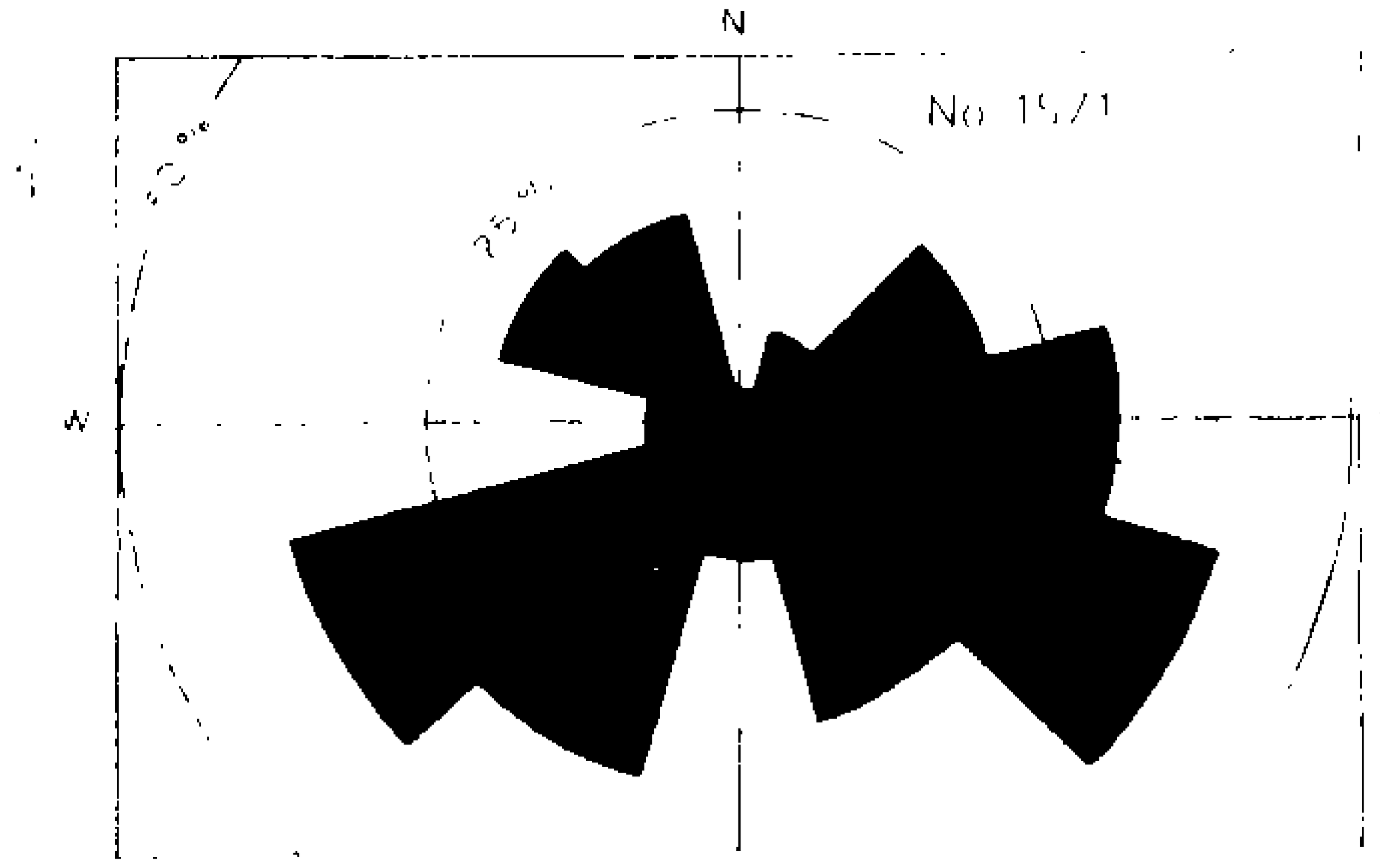

FIG. 1. Annual mean histogram of percentage occurrence of the E region drift direction at Ahmedabad during the year 1974.

direction at this latitude when the mean of such a long period is taken, although broad peaks are evident at SE and SW directions. This could be due to large seasonal variation in the pattern and so separate monthly histograms were studied. In Fig. 2, are shown the histograms of drift direction for every month averaged over the five-year period.

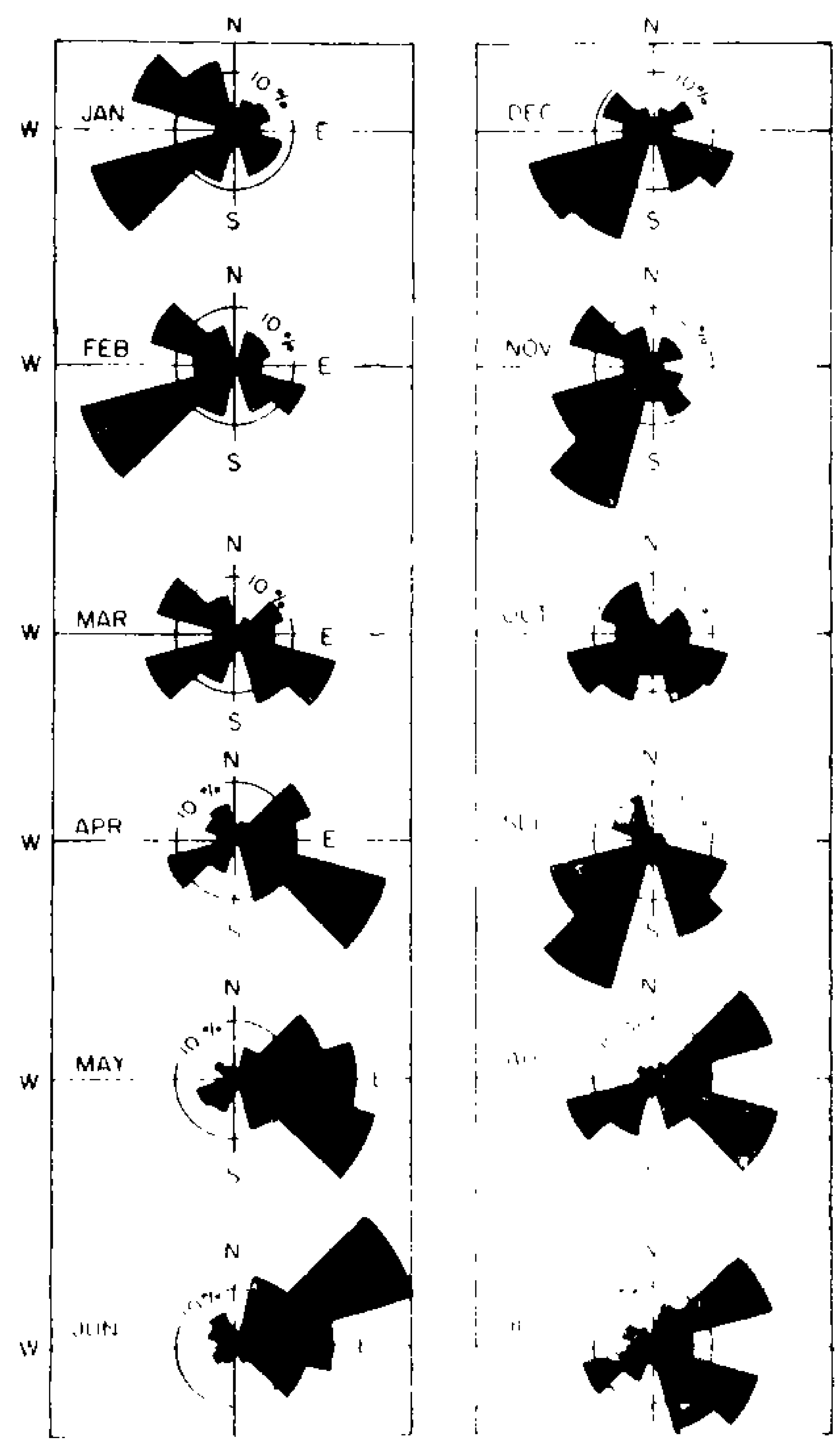

FIG. 2. Monthly mean histograms of percentage occurrence of the E region drift direction at Ahmedabad for each of the months averaged over the years 1970 to 1975.

The drift direction is mainly towards west during January with nearly equal peaks along N–W and S–W directions. The occurrence of eastward direction is very small. The eastward component increases progressively as seen from the histograms for subsequent months February, March, etc., until June when almost all occurrences are towards east. From July onwards the percentage occurrence towards east shows a decrease and westward directions increase in the subsequent months till November when again westward direction is the dominant one. The transition of the zonal component is seen during March–April and then during September and October. Rastogi[5] had earlier reported change in the drift pattern from high sunspot epoch to low sunspot epoch also. This period from October 1970 to June 1975 is primarily a low sunspot epoch and no such change has been noticed.

Discussion

Fairly lagre number of drift stations had operated during IGY–IGC and Kazimiroskiy[3,4] presented world maps of the drift vector during winter and summer. From this he could give a circulation pattern in the ionosphere. For the E region altitudes the circulation patterns were different for winter and summer. During equinoxes there was instability in the drift direction. Even though there were quite a few stations at high latitudes (with large longitude differences) the stations at low latitudes were very few.

Based on meteor winds and rocket measurements Groves[1] has computed wind model giving mean wind as a function of height and latitude for the region between 60 and 130 km. This model predicts mean wind of about 12 m/sec towards west during January and about 25 m/sec towards east during summer for a latitude of Ahmedabad considering mean E region altitude of 100 km. The data presented here are only for the daytime (0800–1600 hr) and it is not possible to compute mean winds but from earlier results for Ahmedabad (Rastogi[5]) one can find the reversal of mean zonal wind flow from westward during winter to eastward towards summer. Mean zonal flow at Udaipur, 200 km from Ahmedabad, also shows similar reversals with mean flow of about 10 m/sec towards west during winter and about 20 m/sec towards east during summer (Janve *et al.*[2]).

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SYNTHESIS AND STRUCTURAL STUDIES OF MALONYL DIACETONE HYDRAZONE COMPLEXES OF Mn(II), Fe(II), Co(II), Ni(II), Cu(II) AND Zn(II)

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Abstract

Adducts and deprotonated complexes of the empirical compositions $M(MDAH)Cl_2$ and $M(MDAH–2H)(H_2O)_2$ where M = Mn(II), Fe(II), Co(II), Ni(II), Cu(II) and Zn(II) and MDAH = malonyl diacetone hydrozone, have been prepared and characterized by analytical data, molar conductance, magnetic susceptibility, infrared and electronic spectral measurements.

Introduction

In continuation of our earlier work[1] on oxovanadium(IV) complexes of diacetone hydrazones, we report here the results of our studies on Mn(II), Fe(II), Co(II), Ni(II), Cu(II) and Zn(II) complexes of MDAH.

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Experimental

The adducts of the type $M(MDAH)Cl_2$ were prepared by mixing together cold/hot ethanolic solutions of the metal chloride and MDAH in Ca 1 : 1 molar ratio. The deprotonated complexes $M(MDAH–2H)(H_2O)_2$ were prepared by mixing the aqueous solutions of the metal chloride and MDAH in Ca 1 : 2 molar ratio and raising the