SHORT COMMUNICATIONS

PRECIPITATION OF MgO BY A 'BIO-METHOD'

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ALKALINE earth oxides can be obtained from their organic salts. We have described earlier[1] that MgO can be obtained from magnesium acetate by burning it in excess of air. Carbon, hydrogen and even nitrogen escape as the gases. Sometimes unburnt carbon may make separation of the oxides difficult. This communication reports an easy method of removing the carbon from the organic compounds.

Magnesium acetate was taken as the starting material. It was dissolved in distilled water and was allowed to stand for six weeks. The fungi *Monilinia* and *Fusarium oxysporum* were grown in it. The overall appearance of the fungus in the initial stages was pale yellow. Growth was then rapid and the colour became green with development of fruiting bodies. The final colour was brown-black. The fungus extracted carbon from the acetate. It was observed that the growth rate of the fungus increased (i) when it was exposed to air, and (ii) with dilution, but decreased on addition of MgO powder, Mn salts, etc.

The fungus was filtered out. The clear solution was boiled for a few minutes. On cooling fine particles of MgO settled at the bottom of the container.

The particles of MgO thus obtained had, an average size of $\sim 3\ \mu m$. Chemical analysis indicated that the method produced a very pure material as indicated below:

MgO from magnesium acetate by the burning method: lanthanide impurities, 2.6 ppm; MgO from magnesium acetate by the 'bio-method': lanthanide impurities, 1.2 ppm. Reflectivity of the sample was 11% better than that of MgO (AR) from BDH.

Another advantage of this method is that we can infer completion of the process when the third stage (see above) of the fungus is reached. As no acetate can precipitate out from the solution only those particulates (MgO) precipitate out that have lost their carbon structures.

The MgO obtained had an absorption maximum at 213 nm and had a luminescence response similar to that of fine-grained MgO described elsewhere[2]. MgO obtained by burning the acetate has a different surface state, which is responsible for 2.3 eV emission[1]; the samples obtained by the present method give 2.9–3.1 eV emission.

It may be noted that no reactants are involved in this method and hence the purity of the final product can be as good as the purity of the starting material. As purity of organic compounds can be achieved to a high degree, we may expect that the method is a powerful one for obtaining high-purity MgO and other alkaline earth oxides.

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VERTICAL DISTRIBUTION OF SPECTRA OF HEAT AND MOMENTUM FLUXES OVER EAST AND WEST COASTS OF INDIA DURING MONEX—1979

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SPECTRAL analysis has been widely used to measure dominant periodicities in meteorological parameters and to understand the causes of the oscillations.

A short-range periodicity of nearly 5 days in different meteorological parameters has been revealed by several investigators[1–4] and is related to the frequency of the monsoon 'lows' and depressions travelling from the Bay of Bengal to North India. Mishra[5] observed a westward propagating pressure wave of 4–5-day period in the tropics. Cadet[6] observed a 10–12-day periodicity in precipitable

water and meridional wind fields, and inferred that these fluctuations appeared to be associated with the westward propagating mode north of the equator.

In the present study an attempt has been made to look for possible periodicities in eddy sensible heat flux, eddy latent heat flux and eddy momentum flux at each level in the vertical from 1000 mb/surface to 300 mb surface, with intervals of 50 mb, over the east and west coasts of India during MONEX-1979 (May through August, 00 GMT). The spectral calculations have been made in the eddy sensible heat transport, eddy latent heat transport and eddy momentum transport[7]. The observed periodicities are classified into three groups, viz. short range (2–5 days), medium range (above 5–10 days) and long range (10–30 days).

Figures (1 and 2) show the vertical distribution of periodicities in eddy sensible heat, eddy latent heat

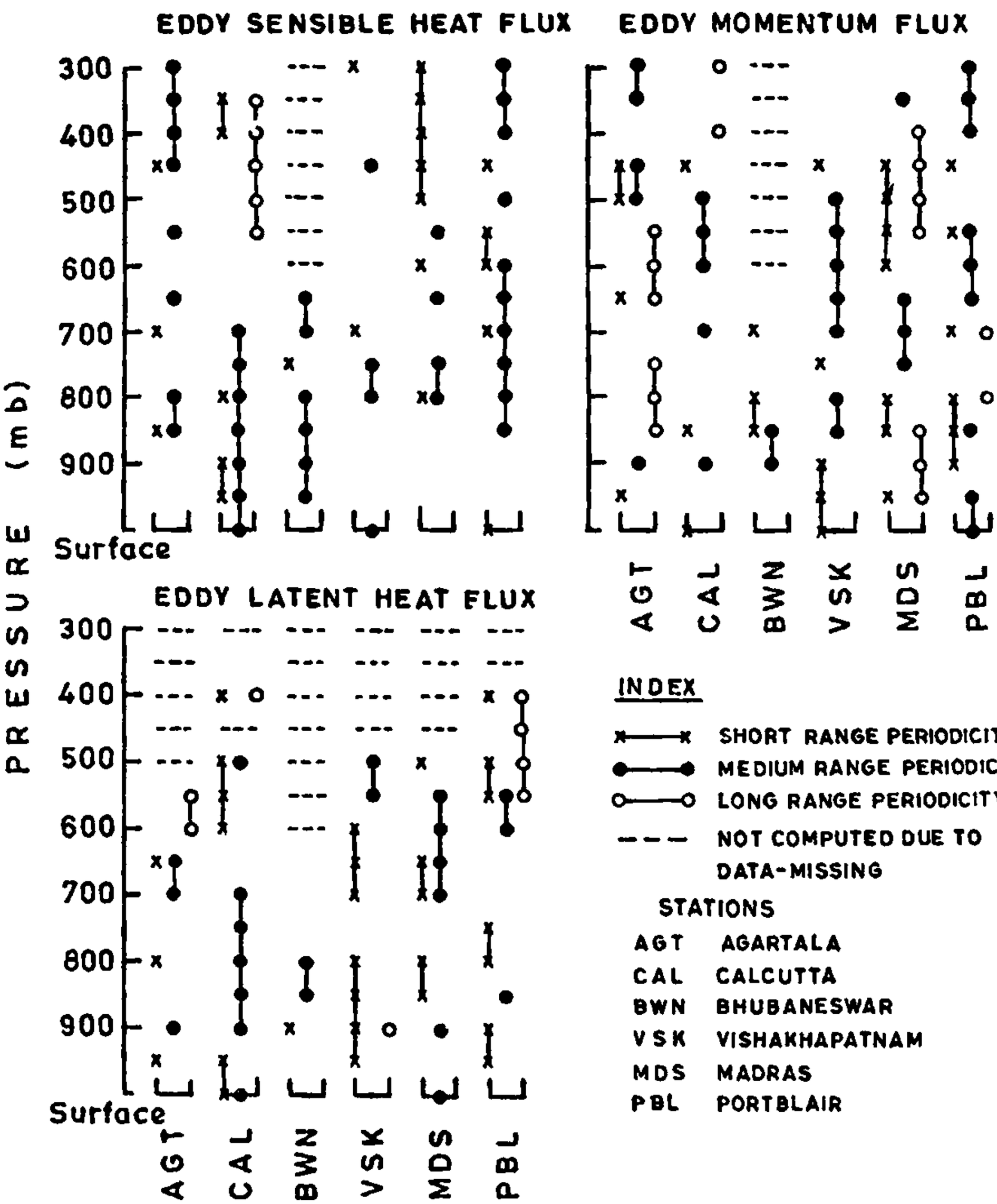

Figure 1. Vertical distribution of periodicity over east coast of India.

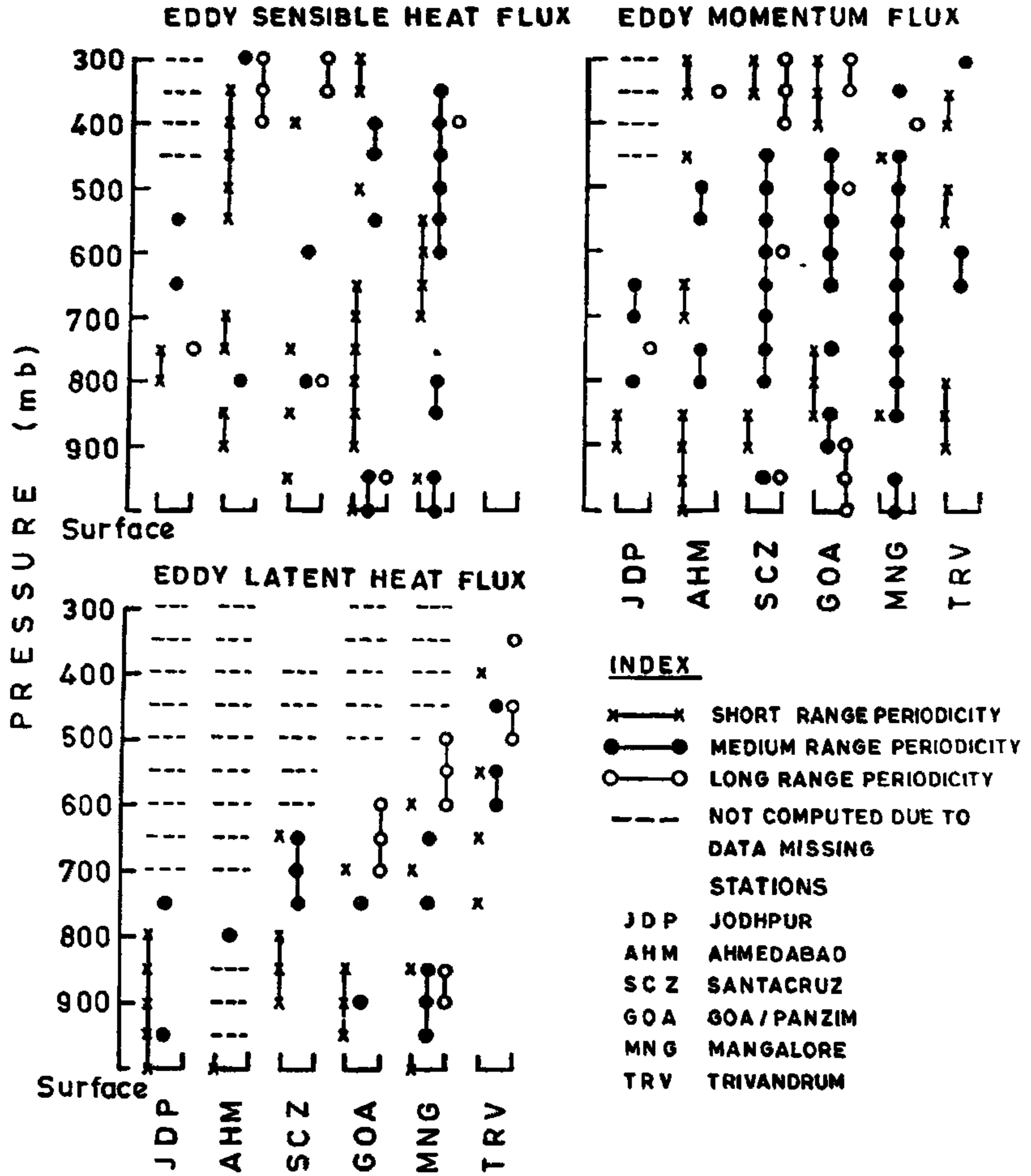

Figure 2. Vertical distribution of periodicity over west coast of India.

and eddy momentum transport, over east and west coasts of India respectively. It is seen that the long range periodicity is usually present in the eddy sensible heat and eddy momentum fluxes above 400 mb surface, between Ahmedabad and Goa. This long range periodicity is also observed below 900 mb surface over Santacruz and Goa in eddy momentum and eddy sensible heat transport. Between 900 and 400 mb surfaces, the existence of long range periodicity in eddy sensible heat and eddy momentum transport is rarely observed over west coast of India. Thus, the long range periodicity in eddy sensible heat and eddy momentum fluxes appears to be more pronounced at upper pressure levels above 400 mb surface between Ahmedabad and Goa and less pronounced below 900 mb surface. The eddy latent heat transport shows the presence of long range periodicity between Goa and Trivandrum in the middle as well as the lower troposphere.

The eddy momentum transport is dominated by

medium range periodicity between 900 and 400 mb surfaces over west coast of India. However, the eddy sensible heat transport is dominated by short range periodicity over west coast between 900 and 400 mb surface, whereas at Mangalore the medium range periodicity in eddy sensible heat transport is equally effective.

The long range periodicity has been observed in eddy sensible heat transport at Calcutta between 550 and 350 mb surface, in eddy latent heat transport at Agartala between 550 and 600 mb and at Port Blair between 400 and 550 mb surface and in eddy momentum transport between 500 and 650 mb as well as between 750 and 850 mb surface at Agartala and at 300 mb and 400 mb surfaces at Calcutta and at Madras between 400 and 550 mb surface as well as below 700 mb at Madras and Port Blair. Thus, long range periodicity is usually observed over the extreme north of the east coast of India in the middle and the upper troposphere in eddy sensible and latent heat transport and in the lower and middle troposphere in eddy momentum transport. However it is observed at Madras and Port Blair in the middle troposphere in eddy latent heat transport and in the lower and middle troposphere in the eddy momentum transport. The short and medium range periodicities are well distributed throughout the east coast in eddy transport of sensible and latent heat as well as momentum.

Finally, we conclude that short and medium range periodicities are present throughout the east and west coasts of India between 1000 and 300 mb surface with different fluxes. The long range periodicity is relatively infrequently observed in lower and upper troposphere.

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EPR SPECTROSCOPIC STUDIES OF CALCIC-PLAGIOCLASES FROM THE ARCHAEAN ANORTHOSITES OF HOLENARASIPUR, KARNATAKA CRATON, SOUTH INDIA

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THIS communication presents a study of the structural state of calcic-plagioclases from the terrestrial Archaean anorthosites of the Holenarasipur belt in Karnataka Craton, South India, by an electron paramagnetic resonance (EPR) spectroscopic study of Fe^{3+} ions substituting for Al^{3+} tetrahedral sites in the structure. The six-point Rb/Sr whole-rock isochron data provided by Kutty *et al.*[1] for the Holenarasipur anorthosites indicate that they are 3095 Ma old and are of Archaean age.

In the three representative EPR spectra of the 23 calcic-plagioclases studied from the 3095-Ma-old Archaean anorthosites, we observed the Fe^{3+} spectral component occupying the distorted tetrahedral sites, indicating the disordered structural state of plagioclases attained during the crystallization event, similar to that of lunar plagioclases. In the study of lunar plagioclase Weeks[2] not only observed the Fe^{3+} signal at $g = 4.27$ in the EPR spectrum but also recognized Ti^{3+} signal at $g = 1.98$. We have been able to ascribe the absence of Ti^{3+} spectral component in the plagioclase of Holenarasipur anorthosite to the presence of titanium in the tetravalent state based on the recognition of Ti^{3+} signal at $g = 1.998$ in the EPR spectrum of plagioclase heated to 650°C under reducing condition.

EPR spectra of Fe^{3+} ions in Ca-plagioclases

EPR first-derivative spectra were taken at 78 K on a Varian E-109 E-line X-band spectrometer at about 9.2 GHz. The phase-pure powder samples examined weighed about 30 mg. Three representative EPR spectra of the 23 plagioclase samples studied from the Archaean anorthosites of Holenarasipur are presented in figure 1 and are interpreted.