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NATURE OF PALAEOCURRENTS AND ENVIRONMENTAL SIGNIFICANCE OF VINDHYANS (KAIMUR QUARTZITE) AROUND CHITTAURGARH, RAJASTHAN

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To work out the process and direction of transport of sediments, orientation of the basin of deposition and palaeo-geographical history of the rock units, palaeocurrent analysis is the most important method. The present note is confined to the study of palaeocurrent systems and environmental significance which are determined from cross-stratification and ripple mark

measurements respectively. These structures are well observed in the Kaimur Quartzite of Kaimur series at the Chittaurgarh Fort.

Compass diagrams have been found to be more useful than the conventional rose diagrams. The compass is divided into 12 sectors, each comprising an arc of 30°. The mean of the number of measurements per sector and the standard deviation of the number of measurements per sector are calculated (figure 1). The compass diagram has been prepared for 36 cross-bedding directions, measured in the Kaimur Quartzite. The compass diagram shows only one mode towards East. Thus it can be easily deduced that the direction of palaeocurrents was from west to east.

Only two structures, viz. ripple markings and cross-stratification were used as tools to study the Environmental significance. Cross-stratification may originate from (i) migration of ripples (ii) scour and channel fill features (iii) deposition on point bars of small meandering channels and (iv) inclined surface of beaches and bars. Ripple marks are symmetrical oscillation ripple marks; 31 measurements were carried out. These reveal that the ripples are symmetrical, their amplitude ranging from 0.27 to 0.5 cm and their wavelength from 2.1 to 2.45 cm thus giving a ripple index from 5 to 7.5; trends of the ripples are parallel to sub-parallel and occasionally joined.

Ripple marks are produced due to action of air or water. An index 5 to 7.5 suggests that the ripples have been produced under aqueous conditions, symmetrical ripple marks are developed when shallow sandy bottoms of standing water bodies are agitated by to-and-fro motion of waves. The ripple marks indicate deposition under aqueous conditions. Symmetrical ripple marks suggest that water laid down in a quiet water environment².

Sedimentary structure	Probable environmental significance
Planar cross-stratification	Aqueous, Fluvial
Symmetrical ripple marks	Aqueous, quiet water beach.

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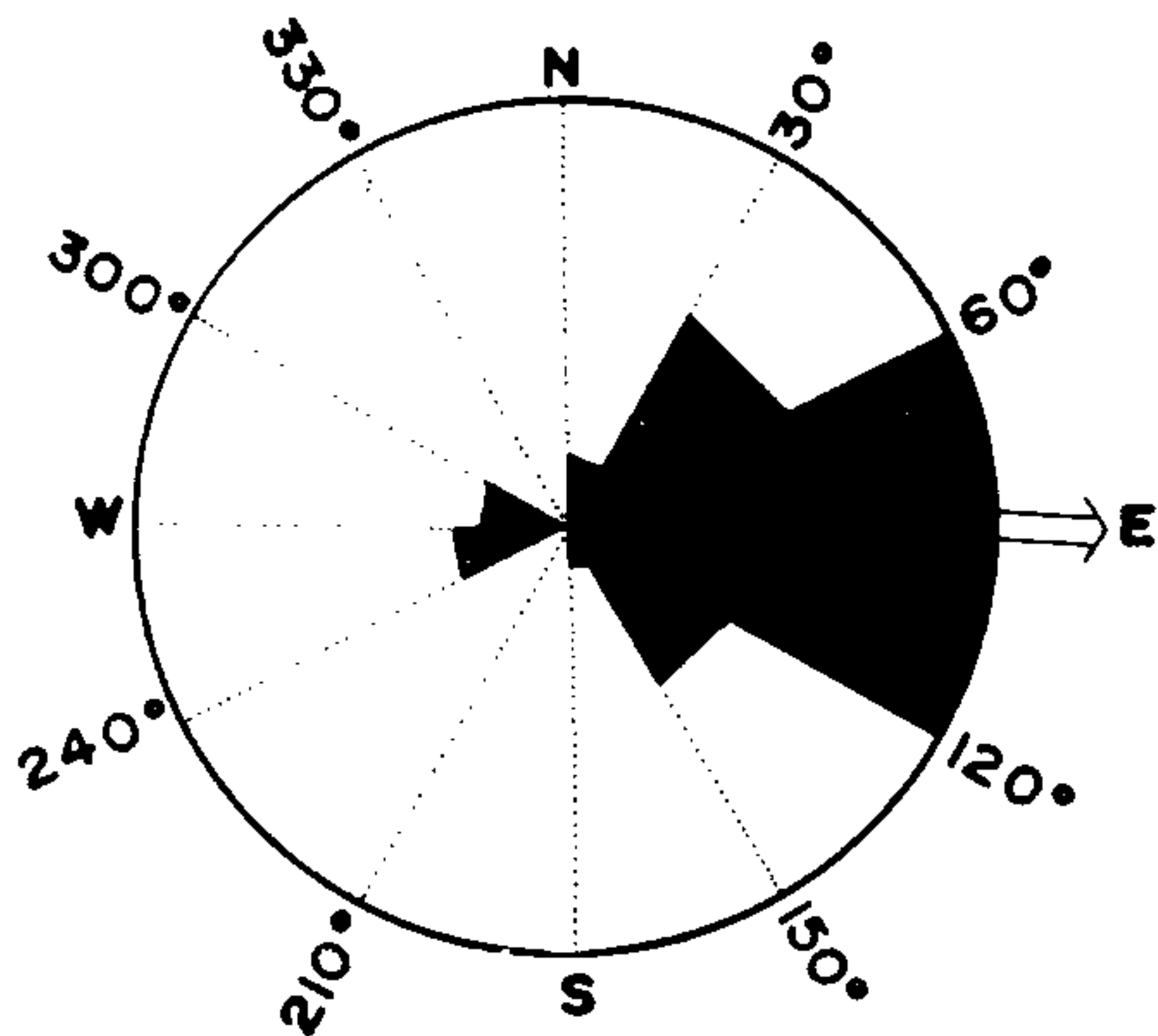


Figure 1. Compass diagram of 36 palaeocurrent measurements. The arrow refers to palaeocurrent direction.