Introduction

The occurrence of human and animal figures displaying various kinds of day to day activities like hunting, gathering, pastoral life style etc., are pictograph or petroglyph or geoglyph on the rock surface. Such rock art can provide visual of a particular place, particular time authored by contemporary people. Rock art plays a vital role in the study of human beliefs and practices, especially of prehistoric people. In fact, it is a global phenomenon throughout the ages. The art continued even during historic times and the practice is continued even today. It is wildly known that rock art was one of the mediums to communicate and represent their understanding of their surroundings and it also reflects their ritualistic beliefs and ideas. Therefore, rock art is an indispensable source of information for our understanding of some aspects of prehistoric life of people that generally can’t be known from the other kinds of prehistoric material evidences.

Among the regions like South-western Europe, Russia, North Africa and Australia; India is one of the major region of rock art in the global context and the country is placed as the biggest centre for rock art in Asia. Indian rock art sites are known for their uniqueness and for its comprehensive communication (Chakravarty and Bednarik 1997; Wakankar and Brooks 1976). In magnitude, vividness and richness this art form offers substantial source material for our study and perhaps 'the only consistent record left of the developing human mind' (Bednarik 2002). Dense rock art concentration is found in the Vindhyan range, eastern part and peninsular India illustrating art in the form of pictographs and petroglyphs. In the global context, India as a whole and Karnataka as a part are known for a large number of discoveries and appreciation of prehistoric and protohistoric rock art.

Archaeology is used as an effective tool in the study of prehistoric rock art. From the recent past the rock art is begun to be considered as one of the prime sources for study. So, it enables us to understand about not only about their culture, religion, beliefs or origins of human cognition but also human ability to experience reality. Apparently, it is a reflection of human mind to changing environment and relatively cultural development.
1.1 Types in Rock Art

On the basis of the picture depiction technique, pictures are divided into the two types (Fig. A01) as follows,

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>Pictograph</td>
<td>(the application of colour on rock surfaces e.g. red-ochre, green, yellow-ochre, black, white etc.)</td>
</tr>
<tr>
<td>Petroglyph</td>
<td>divided into three categories such as</td>
</tr>
<tr>
<td></td>
<td>a. Bruising (the application of hammering or rubbing on rock surface)</td>
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<td></td>
<td>b. Engraving (the application of carving on rock surface)</td>
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<td></td>
<td>c. Cupule (the application of hammering in form of hollow)</td>
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</tbody>
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Fig. A01 Types in rock art

1. Pictograph
2. Petroglyph, divided into three categories such as
   a. Bruising (the application of hammering or rubbing on rock surface)
   b. Engraving (the application of carving on rock surface)
   c. Cupule (the application of hammering in form of hollow)

1.2 History of Rock Art

a. Rock Art Research in India

The evidence of petroglyphs was first reported from Almora in India by Henwood (1856). The year 1867 CE would remain as a milestone in the history of Indian rock research mainly because Archibald C. Carllyle, the first assistant in the Archaeological Survey of India who under Alexander Cunningham discovered rock paintings near Sohangighaṭ in the Kaimur range, Mirzapur district, Uttar Pradesh. This happened a decade before the discovery of rock art and initiation of research in Western Europe in the year 1879 CE. He also collected Microlithic tools of agate, jasper and chert (displayed in National Museum, Dublin). Carllyle has not published any account of his discoveries apart from his field notes left with his friend Rev. Reginald Gatty. Those notes were later published by Vincent A. Smith (1906) and he was the one who made first attempt to unveil the chronology of the paintings.
Cockburn enumerates that he made discoveries of interest with the help of V.A. Smith in district Mirzapur. Then he gives a general account of his discoveries in Berghelkhand, Bundelkhand and other places during the last nine years (Proceedings of Asiatic Society of Bengal, 1883, pp.49). Unfortunately, the paper was unable to publish.

The first scientific paper on Indian rock art was published by J. Cockburn (1883), an officer in the Opium Department of the British Government. In 1883, when he was reported his discovery of a few painted rock shelters in the Kaimur ranges. Further, he published his second article on rock art of India in 1899, in which he made an attempt at establishing the antiquity of these rock paintings and does a comparative study of the paintings found in South Africa, North America, South America and Australia. He was the pioneer to give information about the discovery of rock paintings using clear words and reasoning and he says, ‘These drawings were first brought to notice by the late Mr. Archibald Carleyle and myself, and were discovered by us independently of each other in 1880’s, he working in Rewah and Mirzapur and I in Banda’ (Cockburn 1899). Cockburn seems to have been the first antiquarian to have contributed to scientific periodicals on the subject of rock art in India. After Carleyle and Cockburn, a couple of scholars and explorers reported their discoveries on various occasions from different parts of the Indian subcontinent. In 1901, F. Fawcett (1901) reported the carvings of the Edakkal cave in Kozhikode district of Kerala. The works of Cockburn and Carlleyle were the only source material for decades, which was used by archaeologists and art historians. None of them achieved much in terms of facilitating an understanding or analysis of this art, in general or trying to explore more rock art material, to reach answers for numerous questions that had arisen on the subject.

A.H. Francke (1902, 1903) published a paper on his discovery of rock carvings in lower Ladakh region. C.A. Silberrad (1907), an officer of Indian Civil Service discovered a series of rock art sites in Banda district. Robert Bruce Foote described the rock bruising of Kappagallu, Ballari district in Karnataka which were found by Hubert Knox in the 1880s. But the photographs were earlier taken by F. Fawcett, Deputy inspector-general of Madras police (Foote 1916: 87-89). Percy Brown (1917: 16), an art historian, principal of Arts College in Kolkata, mentioned about rock paintings in his work on Indian Paintings. C. W. Anderson (1918) reported
rock paintings in Raigarh district of Chhattisgarh. P. Mitra (1923) described some rock art pictures in his book entitled: *prehistoric India: Its place in the World's culture*. First mention of rock engravings in Odhisa was made by K.P. Jayaswal (1933). The Benakal forest lies on the North bank of the Tungabadra in Gangavati, Koppāḷa district. It consists of large group of gneissic hill. Leonard Munn (1934) was the first to discover rock art in this region. Further study was carried out by Sundara (1974).

British officer, Colonel D.H. Gordon (1951) tried to tackle the chronological problems of rock art by analyzing the succession of overlapping paintings as their style and the technological contents are shown. In this way he tried to derive at a reliable scientific base for the rock pictures chronologically. He also brought to light Kappagallu (which was pronounced as Kupgal by the westerners) rock petroglyphs in a systematic way. He was probably one of the earliest to identify the erotic aspects in rock art. Rock paintings of the Panchmarhi region were re-examined by D.H. Gordon (1958). ‘Gordon’s work was mainly based on the rock pictures from the Mahadeo hills in the surroundings of the cantonment of Panchmarhi where he spent several years as commander of the Small Arms School’ (Neumayer 1985). He describes the concept of sexual intercourse portrayed in rock art.

Gordon’s expansive study, *'Prehistoric Background of Indian Culture'* (1958) offered a good introduction to rock art and gained much popularity among archaeologists and researchers. Attempts to find chronological indicators for rock art from archaeological excavations were also made by R.G. Hunter (1936), Professor of History at the Jabalpur University. He dug several trenches in the Dorothy Deep shelter near Panchmarhi and other places in the Mahadeo hills where Gordon had explored approximately fifty painted shelters. These were initial research works on rock art carried out before the achievement of India's independence. Unfortunately, much of such early work was hampered by Euro centric preconceptions of the Western archaeologists.

The discovery of Bhimbetka group of painted rock shelters by V.S. Wakankar, who is hailed as the Father of Indian Rock art in 1957, gave a new lease of life to rock art research in India (IAR 1956-57: 79; IAR 1960-61: 61). Interest among archaeologists, anthropologists and art specialists on rock art grew and a comprehensive study of hitherto known sites along with a deliberate intensive search for new sites began in right earnestness.
In Karnataka, most of the newly discovered rock art sites were reported by A. Sundara (1994), who found during his field work for Megalithic cultures in the Krishna-Tungabhadra region. Elsewhere, it was only after the discovery of the huge rock painting galleries in Madhya Pradesh that rock pictures were recognized as archaeological remains and caught the interest of scientists and laymen alike.

First three decades of post-independence experienced a gradual change in concepts on rock art studies. During this period the excavations of prehistoric sites like Piklihal by Allchin (1960: 11-21) in 1960, Tekklakōṭa by Nagaraja Rao and Malhotra in 1965 led the study rock art sites also in the localities (Nagaraja Rao et al. 1965: 97-99). In course of site more than 5000 rock art shelters have been reported from Indian subcontinent.

The existence of the rock art of Pleistocene contexts was hardly known until the discovery of Bhimbetka in 1957. and later excavations in the 1970’s at the Bhimbetka site complex by some prehistorians including V.S. Wakankar 1973, 1975, 1984, 2005; S.K. Pandey 1970, 1993; and Y. Mathpal 1984. This ushered in an era of intense rock art research in India (IAR 1955-56: 69; IAR 1956-57: 11-14, IAR 1959-60: 74; IAR 1962-63: 32; H.V. Trivedi et al. 1959; IAR 1960-61: 59, C.B. Trivedi 1961, 1997; IAR1961-62: 99; Jacobson 1970; Kathuria 1975; Mathpal 1978, 1984, 1993, 1998; Pandey 1993; Sonawane 1982, 1987, 2008; Neumayer 1983, 1985, 1991, 1992a&b, 1993, 1995; Allchin and Allchin 1994-95; Kumar 1983, 2000-01; Kumar et al. 2002; Behera 1991-92; Chandramouli 2002 (the study of rock art in Karnataka is dealt with below in detail). Of course, there were brief reports, efforts made by the pioneering investigators to give the maximum possible information that can be seen with regard to the rock paintings. But, the subsequent work in the field was noteworthy development. The informal field school at Bhimbetka not only trained many a young archaeologist and artist in the study of rock art but also attracted rock art specialists from abroad who have carried forward research on rock art with considerable zeal and commitment. Wakankar’s sustained research work on rock art and his scholarly lectures, research publications in reputed journals both in India and abroad won a respectable position for Indian rock art. As a result, he was instrumental in shaping indigenous school of rock art that also saw the coming of age of a new phase of international collaboration. Rock art research of post Wakankar phase had made rapid strides and the desired international impact. Within a couple of years of
Wakankar’s death, his devout students established an organisation named RASI to carry forward the much avowed aspirations of the Late Wakankar. The organisation is affiliated to IFRAO. It organises Annual National and International conferences, exhibitions as part of outreach activity. Institutional patronage to rock art research is provided by IGRMS, Bhopal and IGNCA, New Delhi.


Of late, in North and Central India, numerous sites with cupules were discovered and studied under the aegis of EIP project. It is a multidisciplinary project (a joint venture by RASI and AURA, sponsored by the ASI, ICHR, and the Australia-India Council Canberra under the aegis of the IFRAO and the UNESCO in collaboration with scientific organizations and institutions in India and Australia). The EIP commission under the IFRAO and various other Academic bodies is to investigate systematically all problems relating to the Early Rock Art of India, by the application of scientific methods such as Carbon Isotope Analysis, Optically Stimulated luminescence (OSL) dating, Micro Erosion Analysis, Uranium-Thorium Analysis and conducting archaeological exploration and excavation (Bednarik 2000-01; Bednarik et al. 2005; Ganjoo et al. 2002).

b. Rock Art Research in Karnataka

In the global context, India, including Karnataka, has to its credit the discovery and appreciation of prehistoric rock art. The rock art sites are located in archaeologically rich areas noted for significant Palaeolithic deposits as well as varied

Initial investigation began around 1842 by Capt. New Bold, in and around Kappagallu but he was silent about those pictures (Foote 1916). However, the first report on the petroglyphs at Kappagallu seems to have been made known by F. Fawcett in 1892, in the Asiatic Quarterly Review. Foote (1916) also briefly addressed the Kappagallu rock art in his book on The Foote Collection of Indian Prehistoric and Photohistoric Antiquities, Notes on their Ages and Distributions. As result So far as many as 150 (some sites not mentioned which are recently noticed) rock art sites (Map 1.1) of two categories i.e. pictograph (Map 1.2) and petroglyph i.e. engraving (Map 1.3) bruising (Map 1.4) and cupules (Map 1.5) are reported in Karnataka from different scholars (Table 1.1) (Mohana and Hemant 2015).

Leonard Munn discovered rock art sites at Hire Benakal in 1934 (Munn 1934, 1935). Later his illustrations were re-photographed and described in detail from those enlargements, together with Munn's manuscript notes by Gordon. ‘On Munn's death the results of his archeological researches passed on to Sir Theodore Tasker, so that this material record would not be lost’ (Gordon and Allchin 1955). The discovery made by the Geological Survey of India drew the attention of archaeologists to look for further exploration in this region. After Munn, around 1940’s some sites like Maski and Athanur (Rāichῡr taluk), Balachakra (Yadgiri taluk) were discovered and reported by Archaeological Survey of Hyderabad former state and the Geological Survey (GSI 1941). Sundara and Allchin threw light on rock art sites like Sivapura, Bilebhavi, Ānegundi, Emi Guḍḍa and at Piklihāḷ (with the kind assistance of the Director of Archaeology for Hyderabad, Dr. P. Sreenivasachar, he did a small excavation). Here numbers of paintings and bruisings were found in association with Neolithic evidence (Gordon and Allchin 1955). Excavations began at Piklihāḷ in 1960 by Allechin (1960: 11-21). Raymond and Bridget Allchin (1994-95) conducted a detail study of Maski and Piklihāḷ rock art sites. A Sundara (IAR-1961-62: 102, 1974, 1975, 1978, 1981, 1984, 1985, 1987, 1994, 2002, 2006, 2009) has also discovered many rock paintings at Indurgi, Koppala, Bilebhavi, Sivapura, Nārāyāṇapura, Anjanahalli (Gangāvati taluk), Aihole (Hungunda taluk) and Hosa Mahakuṭa (Bādāmi taluk). The studies of these
sites in this region led Sundara to classify rock art into three sub-categories; namely as bruising, engravings and paintings. He noticed a boulder with cupules in Bilgi, a taluk headquarters in Bāgalakōṭe district, near the Siddheshvara temple in 1964-65 (Sundara 2006). In 1968 L.S. Rao and Sundara have discovered some more rock paintings at Indurgi in Koppa taluk.

Explorations since the last five decades up-to the present, in and around of Kuṭakankeri-Bādāmi-Aihole series exposed quite a few sites with prehistoric and historical paintings. V.S Wakankar explored Bādāmi region (Wakankar and Brooks 1976). Wakankar, Neumayer, Mathpal and Sundara have solely studied rock art. Erwin Neumayer (1983, 1991, 1992a, 1993) exclusively carried out field survey of rock art sites such as Bādāmi, Hire Guḍḍa, Thimmappa Guḍḍa (he mentions this site as Timapa Guḍḍa), around Bādāmi, Aihole, Piklihal, Maski, Mallapura, Benakal forest rock paintings. He has described these paintings with line drawings. In his book entitled “Lines on Stone” published in 1993. Based on stylistic features and archaeological evidences he ascribes the period of the rock art of this region to Mesolithic - Early Historic (Neumayer 2010). He also identifies wheeled vehicles and mounted animals at Hire Guḍḍa, Kappgallu, Maski, Edkal (Kerala) and Central India (Neumayer 1991). Two monographs are published in Kannada on rock art of Karnataka i.e. Karnataka: Pragitthaasa Kalada kale (Prehistoric Art in Karnataka) in 1994 by Sundara (1994) and Sharanabasappa Kolkar Shilayugada Gavichthragaḷu (Prehistoric Cave Paintings) in 2010, after working on the rock art sites of Hampi-Gangavati region for his doctoral thesis. Chandrashekar discovered Chalcolithic bruising at Maladkal, Devadurga taluk, Rāichōr in 2010. He also noticed some of the rock engraving at Watgallu (Chandrashekar 2012).

In the Central Karnataka more than 30 sites are concentrated. As for example at In Chitradurga district 12 petroglyph sites reported by me (see Mohana and Sundara) are made known including cupule sites in Chitradurga-Davangere mentioned above. Some of the other sites are of early and late historical.

In southern and eastern part of Karnataka, about 10 sites are reported, especially as for example at Doḍḍa Baḷḷapura - Devanahalli (Vishvanath 1999), Vedik Nagara (Jayaramayya et al. 2000); Doḍḍabati (Manjappa 2009); Cheluvanahalli, Gavimaṭhā, Bhairagondanahalli and Benḍekere (HanumaNayaka 2009) and Perjenahalli (Vemagal Murthy 2013), are made known.
c. **Rock Art Research in the Study Area**

Early research on rock art in the Malaprabha basin began in the last quarter of the 20th century. V.S. Wakankar explored Bādāmi, Tatakoti, Sidla Phaḍi and Ramgudiwar in 1976 (Wakankar and Brooks 1976) (perhaps, he miss spells the Ramgudiwar site, because researcher could not find such site or name not only during my field survey but also from any other source). This was followed by Sundara (1978, 1994). Yashodhar Mathpal and Neumayer located painted shelters in Are Guḍḍa and Hire Guḍḍa by 1978. They are found in the area between the famous Chalukyan art centres of Bādāmi and Paṭṭadakallu (IAR 1978-79: 96) and little later by Erwin Numeyer (1983, 1994). Fortunate now there is a contintuity of field research, though the chain of research was interrupted in the near past. There are very few papers on petroglyph and pictographs found especially in Bādāmi area. Tamminaḷ discovered by M.N. Kadapatti (Kadapatti and Padigar 2014) and Pillugunḍu site, noticed by Baravali (see Mohana 2013).

1.3 **Environment**

A brief account of the present environmental setting in the Malaprabha basin viz. river system (drainage), geology, climate, soils, fauna and vegetation is outlined. This information forms the basis to understand the nature of the terrain and favoured landforms preferred for habitation, the availability and distribution of mineral, rock, plant and animal resources and the probable climatic conditions prevailing during the Quaternary to present day.

a. **River System**

The Malaprabha representative basin lies in the extreme western part of the Krishna basin. It extends in between 74° 20' and 74°30' E longitudes, and 15° 20' and 15°40' N latitudes and encompasses an area of 540 Sq. km of the Belagavi district in the Karnataka state. Geographically the area under study forms part of the northern maidan, which is a plateau of about 600 m elevation (AMSL). The Malaprabha river originates in Chorla Ghats, a section of Western Ghats, at an elevation of 792.4 m at Jamboti village, Khanapur taluk, Belagavi District. It is a right bank tributary of the Krishna River and flows through Belagavi and Bāgalakōṭe districts of Karnataka.
The river flows east and the northeast and joins at an altitude of 488 m Krishna river at kudaalasangama in Bāgalakōṭe district. The Benni Halla, Hire Halla and Tupari Halla are the major tributaries to the Malaprabha. The river flows a distance of 304 km from Jamboti-Khanapur-Soundatti-Nargunda-Kuḍalasangama. To harness the water of the Malaprabha River, a dam is constructed at Naviluteerth, Beḷagavi district to impound 1377 MCM water (NIH 2000-01).

b. Geological Context of the Study Area

Geologically, the Malaprabha representative basin comprises of two main geological formations: Tertiary basalts and Sedimentary Rocks of Pre-Cambrian age. The study area mainly appears in ‘Bādāmi Group’ of the latter formations. Viswanathiah (1983) made the first attempt to classify Kaladgi sediments into two groups namely the ‘Bādāmi Group’ and the ‘Kaladgi Group’.

c. Temperature

The maximum temperature in the Malaprabha representative basin varies between 35.0 °C in the month of April and 26.0 °C in the month of January. The average annual temperature stands at 24.4 °C, which varies in between 35°C and 14.6°C. April is the hottest month and January is the coldest month in the year.

d. Climate and Rainfall

The climate of the area is characterized by dry weather for 8 months of the calendar and hot summer for the remaining four months. The geological pattern conforms to those generally in the Deccan. The area is the driest some of the peninsular India and is characteristically rain shadow area, liable to drought which has determined the economy of the people. The hot summer season begins by about the middle of February and extends to the end of May. The southeast monsoon season is from June to September. October and November months are post monsoon season or retreating monsoon months. The period from December to the middle of February is the cold season.

e. Wind

There is a gradual increase in the wind velocity from March to May. The minimum and maximum wind velocities for the months of March, April and May are
43.2 and 120; 49.6 and 352.4; and 81.6 and 48km per day, respectively.

**f. Vegetation**

Vegetation is dependent on soils and climatic condition. The area under study presents a mosaic of grass lands, with tree-scrub at places. A few species of deciduous trees are commonly observed. There are no historical records mentioning the original or climax vegetation of the area. But the few relic sites represent the following species (Table 1.2), which are typical of semi arid climate (Pappu & Deo 1994).

**g. Soil and Minerals**

The soils of the area are divided into five groups.

i. Lateritic Soil- It is extensively seen in the track of heavy rainfall in the source region of the Ghaṭaprabha and the Malaprabha basin.

ii. Reddish sandy soil- It is restricted to the gneissic zones and has been noted along both banks of the Krishna Jolihaḷḷi and Devadurga.

iii. Light grey loamy soil- It is mainly derived from granitoid series of gneisses. The finer and sandy accumulations are spread out by the activity of incipient streams that frequently out across the plains. Ferruginous arenaceous deposits occupy low valleys or the bottom layers in river banks thinly alternating with brown or black clay, where they often become calcareous.

iv. Reddish brown soil- It occurs in the zone of dibasic schist’s and basic dykes and forms a transition stage to the formation of black cotton soil (vertical).

v. Black cotton soil- It covers the greater portion of the area under sandy, it is essentially a transported soil mantling the underlying rocks. This soil is a product of disintegration and decomposition of Deccan Trap which occurs in the north-western border of the area under study. The average depth of the soils in this area does not exceed 3m. This soil is found capping almost all rock types. About 80 percentages of the black soils contain gypsum indicating a zone of salt concentration. The soils are predominant in nontmorillonite, predominantly saturated with calcium and low in organic content. These soils are moderately rich in potash and low in phosphorous and are highly erodible.

In the study area, black cotton soil is the most dominant soil type in the area.
Red sandy soil is found mainly around the sandstone hills of Bādāmi, Bāgalakōṭe and Hungunda taluk. Southern parts of the district have some forest cover.

### 1.4 Aims and Objective

Following are the aims and objectives of the research:

i. To understand the geological background of the study area

ii. To understand man-land relationship from late Pleistocene to Medieval period

iii. Site formation process and landscape archaeology

iv. To prepare detailed documentation of sites

v. Detailed description of the rock art sites: such as location of rock shelters, caves or isolated boulders within the site and the relationship of rock art sites within the landscape and other characteristic features.

vi. Study of the explored rock art i.e. styles, themes, patina, superimposition, colour and other important features

vii. Study of the fauna and flora of the area of rock shelters and overall ecological background

viii. To understand the techniques and chronological development of the rock art

ix. To understand the motives behind the depictions of rock art

x. Comparative study of rock art of the Malaprabha basin, with that of the neighbouring regions and in global context wherever possible and necessary

### 1.5 Methodology

i) A detailed foot survey in and around the Lower Malaprabha basin.

ii) Catchment analysis of water management in association with rock art locality i.e. river, seasonal spring, perennial spring, lake, ponds, etc.
iii) Geographical distribution of rock art for each category: pictographs and petroglyphs (engraving, bruising and cupule) sites.

iv) Advance tracing method of line drawings by using computerising applications

The present research attempts to present a systematic and a holistic approach in the study of the rock art of the Lower Malaprabha basin for understanding the environment and relatively human cultural significance.