

Global Positions Of The Archaeological Sites In And Around The Gwalior Fort, Madhya Pradesh In India

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Abstract: Almost N-S strike the famous Gwalior fort is situated in the North - West direction from the Gwalior railway station and falls in Survey of India toposheet No. 54 J/4. Many archaeological monuments / sites are located in and around the fort, few of them are namely- Man Mandir Palace, Vikram Mandir, Karan Mahal, Johar Kund, Bhim Kund, Sas-Bahu Ka Mandir, Suraj Kund, Teli Ka Mandir, Urwahi Group, Trishala Giri, Ek Pathar Ki Bawari, Gujari Mahal, Girnar and Siddhanchal.

Global positions of the said sites are recorded by using the modern technology of the recent high-tech world. GPS (Global Positioning System) is a satellite based navigation system, which provides exact location of any archaeological site present on the earth, in the form of geographic coordinates (latitude and longitude) with elevation (height) from MSL (Mean Sea Level). On the basis of geographic coordinate data, the global position of the archaeological site can be shown on the globe. More over the said data can be used in GIS (Geographic Information System) for making a site map of our choice.

In the remote sensing community, The GPS has been recognized as an accurate, fast and cost effecting method for collecting the geographic coordinate, which can be used in surveying and GIS applications, normally it take months by using conventional methods, by using GPS techniques work can be done in a few days.

Keywords: GPS, Archaeological, GIS, SOI and Remote Sensing.

I. INTRODUCTION

The Gwalior fort is equally world famous like the ancient Gwalior city in the Indian history. Almost N-S strikes fort is situated in middle of the city, resting over the 325 feet thick hill [1] known as fort hill from ground level and covering approximate 5 sq. km. area, falls in SOI toposheet no. 54 J/4. Many archaeological monuments / sites are well located in and around the fort; few famous of them are namely- **Man Mandir Palace, Vikram Mandir, Karan Mahal, Johar Kund, Bhim Kund, Sas-Bahu Ka Mandir, Suraj Kund, Teli Ka Mandir, Urwahi Group, Trishala Giri, Ek Pathar Ki Bawari, Gujari Mahal, Girnar and Siddhanchal.** Archaeological study deals with ancient history from the surviving traces of former societies [2] The global positions of the said sites are recorded first time by the “GPS receiver”.

II. MATERIALS AND METHODOLOGY

(A) Remotely sensed data (RSD)

Remote sensing is a tool or technique by which we can get the information about any object present over the earth surface, without going and touching the object through the analysis of the RSD, which is acquired by a device from a space or air-born platform. RSD is used here to identify and locate the sites under investigations. Satellite image of IRS 1D, L 3, Geo-coded, Map ID 54 J/4, scale 1:50,000 are used.

(B) Global Positioning System (GPS)

GPS is a satellite based navigation system. It is based on the principle of trilateration. Trilateration is the basic geometric principle that allows to find a location of the objects under investigation. When we make a ground observation, we would like to its exact location on the earth, GPS provides us the exact location in the form of X, Y and Z, i.e. latitude, longitude and altitude (height) of any ground object. “Garmin” make, etrex vista HCx model GPS receiver is used (Fig.1) to get the geographic location with altitude of the investigated site to locate them globally.

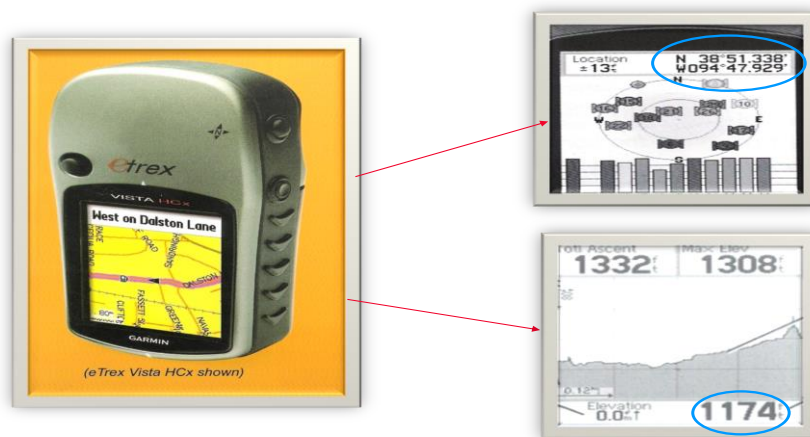


Fig. 1

(C) Survey of India (SOI) topographic map

SOI topsheet no. 54 J/4 is used to correlate the investigated site locations with satellite image of same area.

(D) Geographic Information System (GIS)

It is a Computer based system, consists by hardware and software, which provides us the location details to solve the problem “what is it”? [3] on the globe. Arc GIS software is used to prepare a map of the Gwalior fort.

III. GLOBAL POSITION OF THE GWALIOR FORT

Global position of the famous Gwalior fort (encircled) are shown in satellite image and SOI map of same scale in Fig. 2, lies in between the Cartesian coordinates $26^{\circ}12'35''$ to $26^{\circ}14'06''$ N and $78^{\circ}09'45''$ to $78^{\circ}10'32''$ E [4].

Satellite Image and SOI Map of Gwalior Fort



Fig. 2

IV. GLOBAL LOCATIONS OF THE ARCHAEOLOGICAL SITES

Recorded global locations of the investigated sites in and around the Gwalior fort with their elevation (altitude) are given in the following table –

LOCATION NO.	LOCATION NAME	GEOGRAPHIC COORDINATE	ALTITUDE (IN FEET)
1	Man Mandir Palace	26 ⁰ 13' 50" N and 78 ⁰ 10' 08" E	969
2	Vikram Mandir	26 ⁰ 13' 53" N and 78 ⁰ 10' 10" E	986
3	Karan Mahal	26 ⁰ 13' 50" N and 78 ⁰ 10' 08" E	999
4	Johar Kund	26 ⁰ 13' 56" N and 78 ⁰ 10' 11" E	987
5	Bhim Kund	26 ⁰ 13' 59" N and 78 ⁰ 10' 11" E	967
6	Sas-Bahu Ka Mandir	26 ⁰ 13' 26" N and 78 ⁰ 10' 13" E	977
7	Suraj Kund	26 ⁰ 13' 23" N and 78 ⁰ 09' 59" E	964
8	Teli Ka Mandir	26 ⁰ 13' 13" N and 78 ⁰ 09' 58" E	966
9	Urwahi Group	26 ⁰ 13' 26" N and 78 ⁰ 09' 53" E	803
10	Trishala Giri	26 ⁰ 13' 16" N and 78 ⁰ 09' 44" E	801
11	Ek Pathar Ki Bawari	26 ⁰ 12' 55" N and 78 ⁰ 10' 03" E	782
12	Gujari Mahal	26 ⁰ 14' 02" N and 78 ⁰ 10' 15" E	770
13	Girnar	26 ⁰ 13' 55" N and 78 ⁰ 10' 14" E	900
14	Siddhanchal	26 ⁰ 14' 00" N and 78 ⁰ 10' 04" E	890

V. IMPORTANT GLOBAL POSITION OF THE ARCHAEOLOGICAL SITES IN AND AROUND THE GWALIOR FORT ARE SHOWN IN MAP FIG. 3

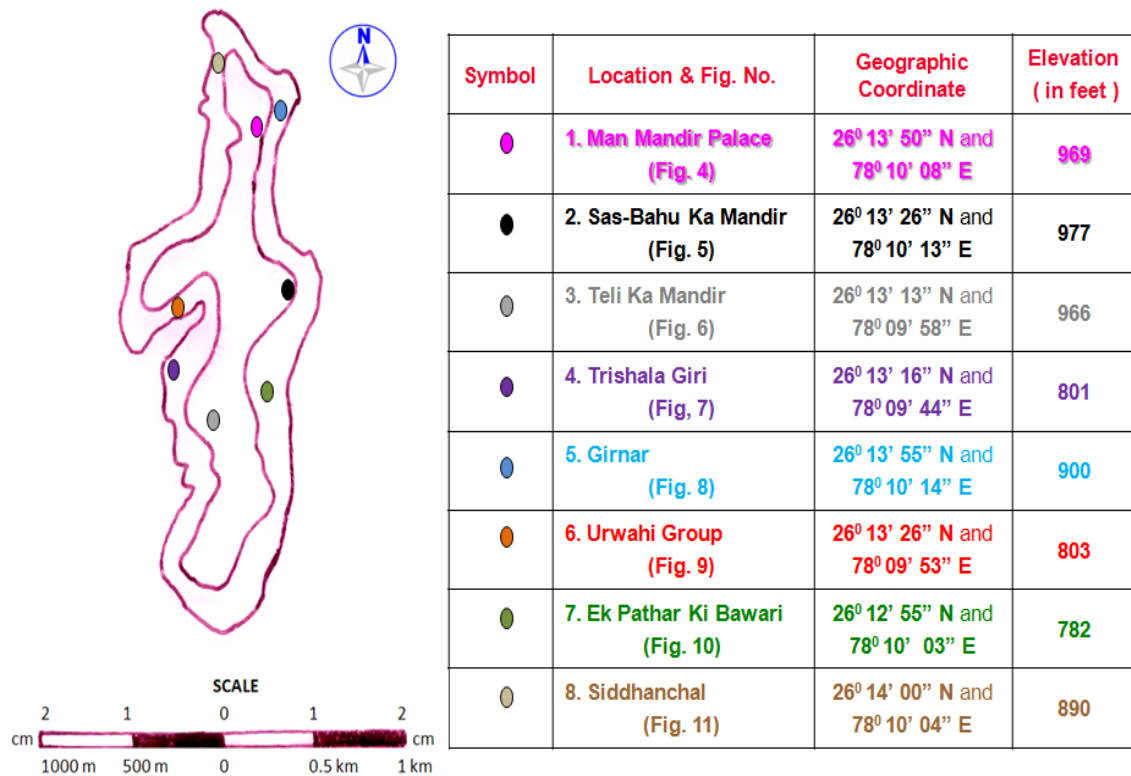


Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8



Fig. 9

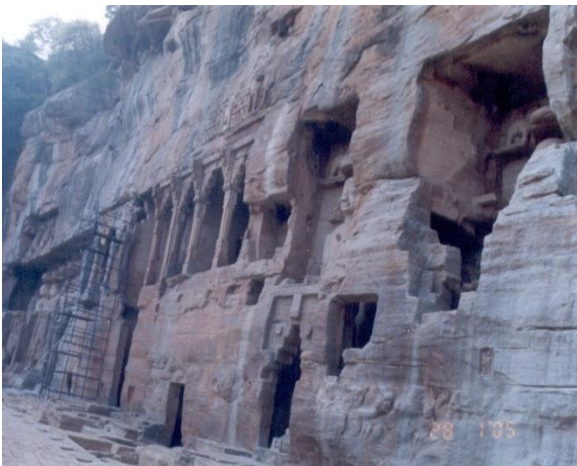


Fig. 10



Fig. 11

VI. GLOBAL POSITIONS OF THE ARCHAEOLOGICAL SITES:

In and around the Gwalior fort are shown in Satellite image of IRS 1D, L 3, Geo-coded, Map ID 54 J/4, scale 1:50,000 (Fig.12) and in the world globe (Fig. 13).

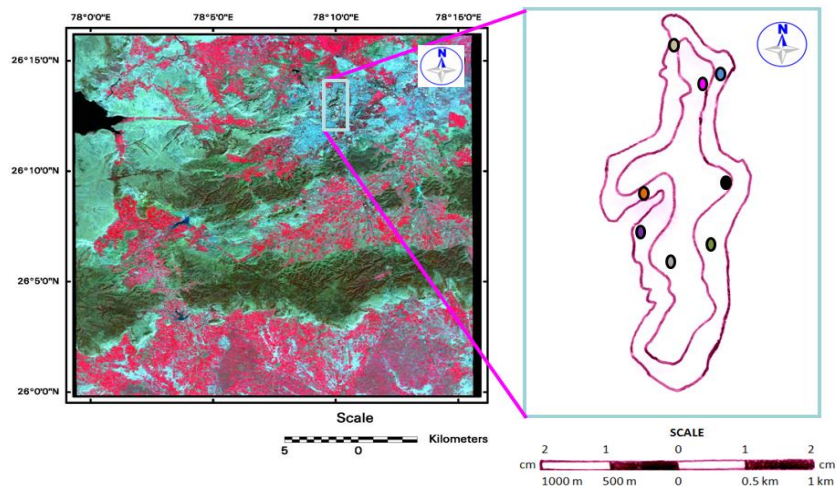


Fig. 12

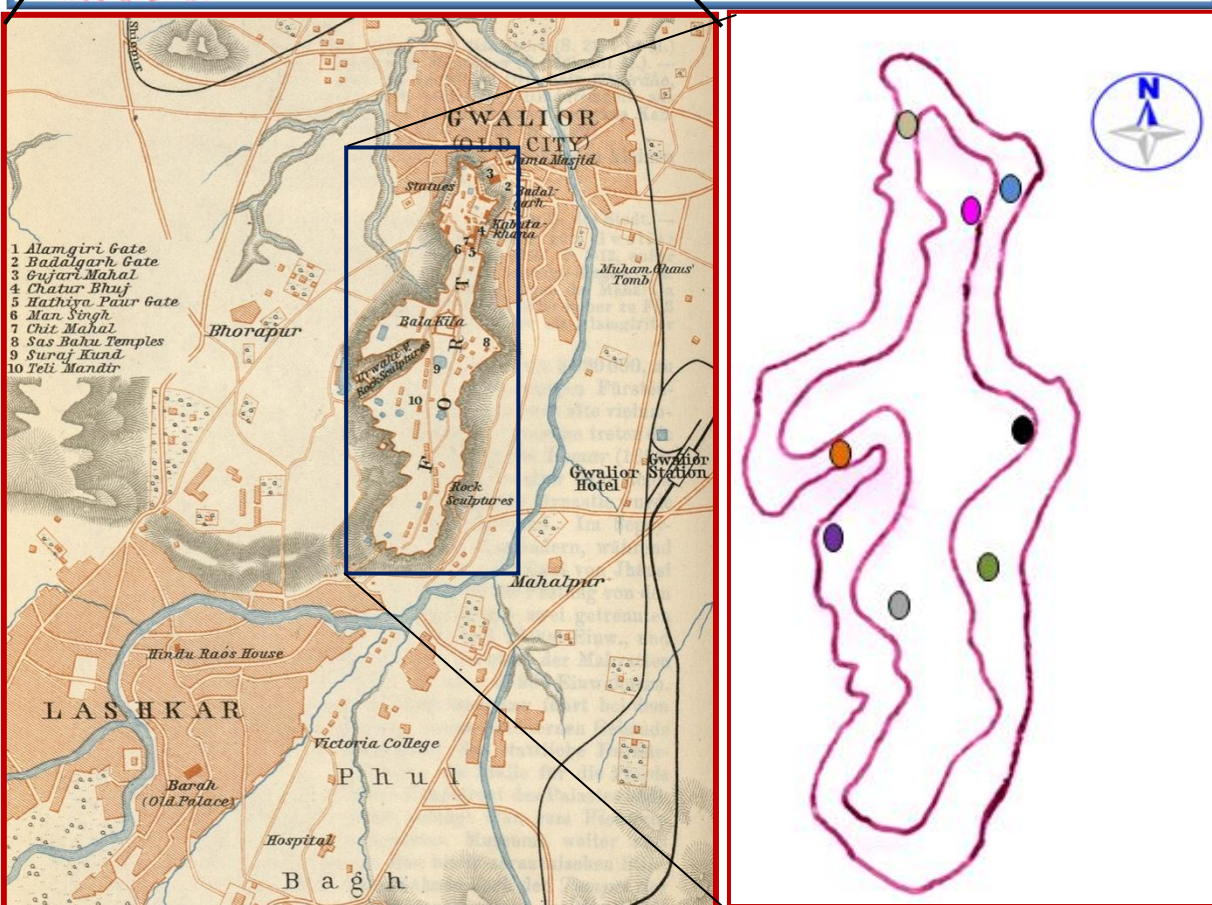
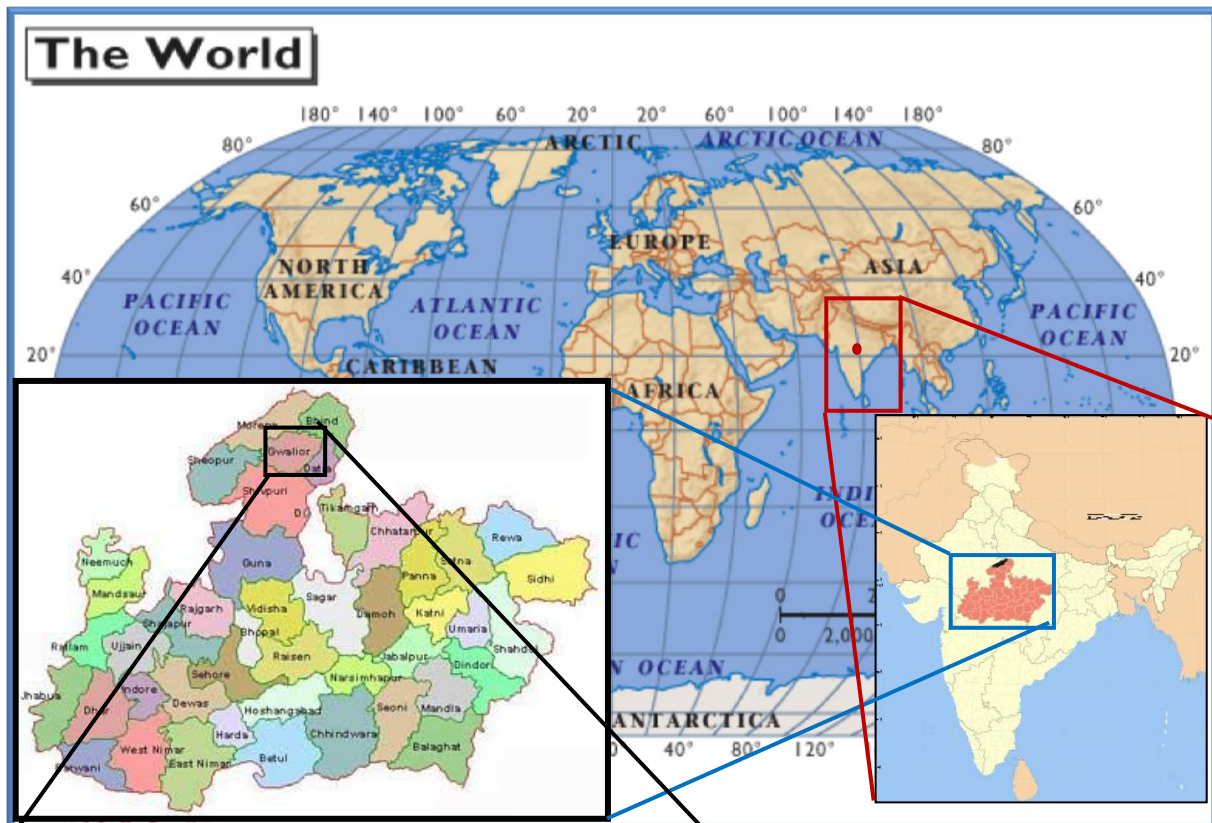


Fig. 13

VII. CONCLUSIONS

- 1) The GPS technology has been recognized as an accurate, fast and cost effecting method for collecting the geographic coordinates in terms of X, Y and Z i.e. Latitude, Longitude and Altitude.
- 2) The records / data (X, Y and Z) can be used well in surveying to generate the map of the area under investigation.
- 3) Geographic coordinates are well known parameter to solve the problem related to the location of the objects in the “glove”, subjected to where is it? And what is it?
- 4) By use of GPS, the work can be done within few hours or a day instead of month or more.
- 5) It is a time and money saving technique.
- 6) Remote sensing provides us the data (RSD) for analysis and identifying the objects in the field, GPS confirms their locations. Moreover, the data can be manipulated and integrate as per our choice by use of GIS.

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