Preface

Geospatial techniques in archaeology

Over the past five decades, archaeologists are increasingly using geospatial techniques such as remote sensing (RS), geographic information system (GIS) and global navigation satellite system (GNSS) to gain insights into archaeological landscapes. The application of these techniques has broadened the scope of archaeological investigations as well as the artefacts of interest to field archaeologists who have traditionally focused on tools, implements, inscriptions, monuments and other organic and inorganic material remains to also include human imprints on landscapes (soil marks, crop marks, drainage patterns, field boundaries, and a host of other man-made features).

The emergence of this field, which we call geospatial archaeology, is particularly of interest in the Indian context. The Indian subcontinent presents a diverse network of cultural landscapes ranging in time from the Paleolithic to Early Historic periods and beyond. The region has witnessed two major phases of urbanization – the Harappan Civilization in the Indus–Saraswati basin (covering northwestern India and Pakistan) and the Early Historic, covering the whole of the subcontinent. Rapid modification of cultural landscapes is of concern to archaeologists who would like to retrieve cultural data as meticulously as possible, a stupendous task made easier by the application of geospatial techniques. India has emerged as a world leader in the development of RS, GIS, GNSS and related technologies, and its use for archaeological studies. In this context, it was thought timely to bring out a special section on the applications of geospatial techniques in archaeology in *Current Science*, to provide impetus to such investigations.

This special section consists of nine articles and is organized into four parts. Part 1 comprises two articles that survey the use of geospatial techniques in archaeology. Navalgund and Rajani (**page 1859**) describe basic physical principles of RS, GIS and GNSS and illustrate the science of remote sensing in deciphering archaeological signatures from images. International and Indian satellite missions which provide different datasets suitable for archaeological applications have also been indicated. Prabhakar and Korisettar (**page 1873**) survey the integration of geospatial techniques with field methods, and examine the way in which Indian field archaeology has responded to developments outside the subcontinent.

Part 2 comprises two articles that illustrate how identifying geomorphological landscape features using geospatial techniques can be used to identify cultural sites that are archaeologically promising. Sundareshan *et al.* (**page 1891**) examine shoreline changes in Tamil Nadu, India with the help of satellite images, topographic maps and other collateral data and analyse them in the context of known remnants of human settlements. The authors also discuss how acoustic sounders can be used to locate such remnants beneath the sea. Hrishikesh and Rajawat (**page 1899**) demonstrate the potential of synthetic aperture radar data to identify palaeochannels associated with early civilization sites in parts of the Thar desert.

Part 3 comprises two articles that demonstrate how geospatial techniques can be used to gain additional insights at known sites. Malik *et al*. (**page 1906**) investigate the use of ground-penetrating radar to identify different levels of settlements in Vigukot (in the Rann of Kachchh), and to determine whether abandonment of settlements was caused by an earthquake. Shaw (**page 1918**) evaluates the usefulness of geospatial techniques for archaeological prospection and mapping relative to other techniques (systematic versus unsystematic field-walking and local knowledge frameworks) in the context of the Sanchi Survey Project.

Lastly, the three articles in Part 4 discuss the relevance of geospatial techniques to the development of inventories and site management. Udayraj *et al.* (**page 1934**) describe the SMARAC project of the Government of India to create an inventory of cultural heritage sites (including the World Heritage site at Hampi), and identify buffer zones around monuments and sites for conservation and protection. Rajangam and Rajani (**page 1948**) discuss the need to build suitable digital databases using spatial techniques to depict spatial contexts and environs of archaeological sites and develop conservation and site management plans. Using Hampi as an example, they illustrate the social and societal impact that such plans can have. Gupta *et al.* (**page 1961**) discuss the need to create a National Archaeological Database for cultural heritage sites, and develop a framework for populating this database and keeping it up-to-date and relevant in the context of rapid development.

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