

## Archaeogeomorphology as an application in physical geography

Mary J. Thornbush\*

*School of Geography, Earth and Environmental Sciences, University of Birmingham, Edgbaston, Birmingham B15 2TT, UK*

### A B S T R A C T

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This paper presents a geographical subfield that was first introduced by an American archaeologist in 1992 and deserted. It is reexamined here by a geomorphologist and placed in a proper perspective, where it is compared with the similar field of geoarchaeology. The purpose is to explore and further develop the concept “archaeogeomorphology” and to present examples from published studies. Both geoarchaeology and archaeogeomorphology are considered separately and then compared before they are critically scrutinized as an application within a subfield of physical geography in geomorphology. It is argued that archaeogeomorphology should be treated as a geomorphology in some studies that were previously considered within the geoarchaeology domain. Moreover, many examples of archaeogeomorphological studies already exist, including within heritage conservation science. These need to be considered as part of a new subfield within geomorphology, as part of physical geography.

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### Introduction

There is much discussion at present concerning the traditional disciplines and subdisciplines (subfields) and how they should intermingle. Terms like interdisciplinary, cross-disciplinary and multidisciplinary are being used to address modern research that is not constrained within a single discipline. While the latter term (“multidisciplinary”) is the most intuitive, involving multiple researchers and representing different disciplinary perspectives in research, the first two terms have been used interchangeably. The first, “interdisciplinary,” concept is used with reference to research that borrows from at least a couple of disciplines. Often, these are subdisciplines and can involve more than two disciplinary perspectives, for example paleoethnobotany in archaeology. Most often, these interdisciplinary approaches comprise a couple of traditional disciplines, for example geoarchaeology, which is also in archaeology. The term “geoarchaeology” made one of its first appearances in a publication by [Shackley \(1979\)](#), who outlined its potential future development. Soon after, [Gladfelter \(1981\)](#) defined the discipline and considered its development and future directions, arguing that the environment of archaeological sites should provide more than just a matrix for holding artifacts. [Stein and Farrand \(1985\)](#) soon followed, in an edited volume, with a portrayal of geoarchaeology as providing archaeological context. Most recently, [Butzer \(2008\)](#) referred to “cross-disciplinary geoarchaeology,” as representing a growing subfield that crosses several disciplines,

including environmental history and geomorphology in addition to archaeology (the human past). He dated the adoption of the term geoarchaeology since 1973; and it has since developed to the point of having its own journal.

From a disciplinary perspective, these subfields occupy specific areas within a discipline. For instance, geography is composed of various subdisciplinary areas, including human and physical geography, which are further broken down to include various subfields, such as, in physical geography, geomorphology, climatology, soil science, geographic information science and biogeography. Ownership can be contested for any of these subfields, as for example biogeography has appeared as part of biology university departments, and most of these can actually stand alone as independent fields of study, for example geomorphology and climatology. There are also subdisciplines in human geography, including economic, political, cultural, social and historical components. North American anthropology has similarly been subdivided into subdisciplines, comprising physical, social and cultural, plus linguistics and archaeology. Under this system of classification, geoarchaeology is by definition an application of geology, or its derivative geomorphology (now in physical geography), to archaeology. So, it currently belongs in archaeology ([Fig. 1](#)), even though it could be contested that it is an independent discipline developing in its own right. This is supported by its typical appearance in university programs within anthropology or archaeology departments. A comparison can be drawn with geomorphology, which was originally part of geology and then broke from this discipline to become independent, but now sits firmly as a subfield of physical geography in geography departments at universities around the world.

\* Tel.: +44 (0) 121 414 8143; fax: +44 (0) 121 414 5528.

E-mail address: [m.thornbush@bham.ac.uk](mailto:m.thornbush@bham.ac.uk).

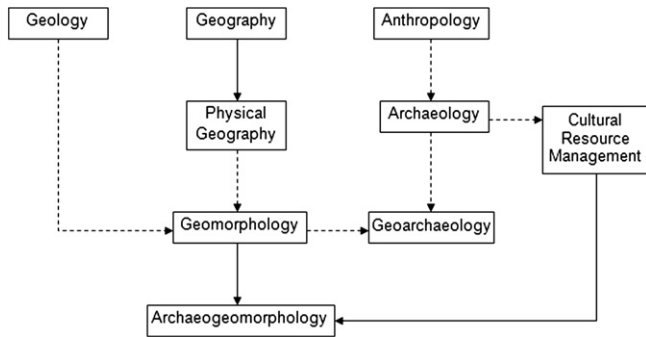


Fig. 1. Placement of archaeogeomorphology in the context of the traditional disciplines and some other subdisciplines.

This paper considers geoarchaeology as an archaeological science, but nevertheless still pertaining to archaeology. This makes sense when one examines publications in the journal *Geoarchaeology*, for instance, which comprises archaeological excavations, where the environment, including the sediment matrix, is considered for context (Butzer, 1982; Stein, 1987). Geoarchaeology employs environmental information in order to interpret archaeological remains (Rapp & Hill, 1998). This approach has gained popularity since the 1970s linked to ecological and environmental archaeology as well as cultural resource management projects from surface surveys (Linse, 1993). For example, Walker, Desloges, Crawford, and Smith (1997) published on formation processes of the floodplain at the lower Grand River and the implications for the Grand Banks site. Geoarchaeology also consists of more specific studies, such as that of alluvial geoarchaeology of which Brown (1997) was chiefly responsible for developing for river floodplains. This landscape-specific type of geoarchaeology was adopted by others, such as for the Mississippi Valley (Haag, 1996; Kidder, 1996) and further afield by Hassan (1997) for the Nile River in Egypt and Jing, Rapp, and Gao (1997) for the Yellow River in China. Others, such as Ferring (1992) and Gladfelter (1985, 1992), contributed to a soils or alluvial paedology approach to geoarchaeological research. Research studies by Crozier (1984) and McDowell (1984) are likewise suited for a geoarchaeological approach, even though they were not published in the journal *Geoarchaeology*.

The purpose of this paper is to clarify the application of geomorphology to archaeological work, but not from a geoarchaeological perspective. Rather, the approach taken here is to call for and promote the development of an archaeogeomorphological subfield within geomorphology itself that is set apart from geoarchaeology. Exemplary studies are considered that could be a part of this applied geomorphology. It is noteworthy that this approach differs from an archaeological geology (as published by Rapp & Gifford, 1985), since it is securely embedded within geomorphology, which is concerned with surficial processes and landforms. Geologists, like Karrow (1994), have examined archaeology from a glacial history perspective within the Quaternary. Waters and Kuehn (1996) similarly approached a geoarchaeological study from what they called a “geological” perspective of process. Others have likewise engaged in geological investigations, such as the Bow River in Alberta, Canada (Wilson, 1983). These geological approaches do not specifically allude to geomorphology, which separated from geology towards the middle of the 20th century (cf. Burt, Chorley, Brunsdon, Cox, & Goudie, 2008).

### Positioning archaeogeomorphology

The word “archaeogeomorphology” was first used by an American archaeologist, namely Wandsnider (1992). In an edited

volume chapter on landscape studies in archaeology, she called for “the continued emphasis on archaeogeomorphology” as critical even though it captures much larger temporal scales than of normally interest to archaeologists (p. 290). She posited that “[w]hen such studies are tailored to archaeological problems, however, critical information on formation history and hence on system condition emerges.” This is based on what she described as “an evolving tradition of collaboration between quaternary scientists, that is archaeologists and geomorphologists, that we see intensifying to mutual benefit of all in the future.” She introduced the concept around the time that another American anthropologist, Stein (1993), advocated a human scale, where it is possible to address social processes, over the traditional landscape scale that is employed in geomorphological studies. Landscapes are in the domain of geomorphological investigations and tend to be regional to global in scale. However, closer-up studies are possible, as in the auspice of weathering geomorphology (Nordberg & Turkington, 2004; Turkington, Phillips, & Campbell, 2005). For instance, Viles (2001) published on issues of scale within geomorphology, specifically in weathering studies, which can range from  $\mu\text{m}$  to km (outlined in her Table 1, p. 66). Landforms operate at spatial scales between m to km, with corresponding temporal scales of years to millennia (in her Table 3, p. 68). There is much in weathering studies or weathering geomorphology applied to cultural heritage through heritage conservation science, such as historical buildings and structures, that overlaps with cultural resources within the subdiscipline of (historical) archaeology and cultural resource management (also included as a cultural geography within human geography) that can be considered as part of a cultural geomorphology encompassed by archaeogeomorphology (Fig. 2). Similar studies within geomorphology have incorporated conceptualizations like biogeomorphology, which took off since the publication of the edited volume by British geomorphologists (Stine & Butler, 2011), including Viles in 1988 (cf. Haussmann, 2011), and was recently revisited (Naylor, Viles, & Carter, 2002). Sherman (1989) first introduced the concept of anthropogeomorphology in the published literature as addressing human impacts on the physical landscape, which was later applied by Goudie (1993) in a deliberation of global warming. Other subdivisions of geomorphology exist, including paleogeomorphology, which was one of the first and introduced by Martin (1960). A summary of these subdivisions within applied geomorphology is provided in Table 1, which contains a selected list (that is by no means complete, e.g. excluding environmental geomorphology) of these subdivisions and their

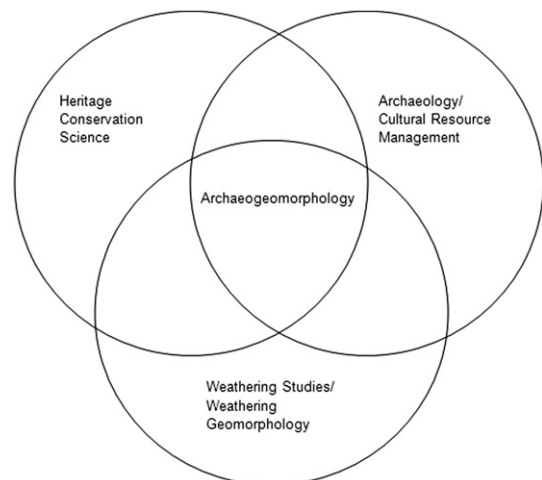


Fig. 2. The cross-over of disciplines and relevant contributors to the making of archaeogeomorphology.

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