Identifying *Shan-Shui* Characteristics for National Landscape Heritage: Reconciling Western and Chinese Landscape Characterisation from a Trans-Cultural Perspective

Abstract: The recognition of landscape as cultural heritage has increasingly brought together work on landscape and heritage in recent years. In a practical sense, this has been recognized through effective landscape management strategies that have sought to encompass wider information on the historic environment and its associated values. Across Europe in recent years, effective assessment and management of the historic environment have developed through a conversation around such schemes as landscape character assessment (LCA) and historic landscape characterisation (HLC). Further work is required, however, in order to extend this conversation further in trans-cultural contexts. This paper explores the possibilities of developing such a conversation through GIS modeling that draws on both western LCA/HLC perspectives and Chinese *Shan-Shui* philosophies.

We believe that a creative conversation between western and Chinese landscape heritage philosophies might be able to allow landscape characterisation approaches that use GIS methodologies to attain a greater depth of heritage understanding within their operation. Through trans-cultural exchange, therefore, this research explores how a novel and indigenous language (of *Shan-Shui* Characterisation) might enliven western Landscape Character Assessment, thus providing a productive conversation between different disciplines, philosophies and culture cognitions.

Key words: Landscape heritage; Landscape Characterisation approach; *Shan-shui* Characterisation approach; Wudang Mountains National Park; Trans-cultural conversation

1. Introduction

The understandings of landscape and cultural heritage are inextricably intertwined. Studies of landscape and heritage have stressed the dynamic and processual nature of their subject matter, highlighting symbolic relationships between physical and representational meanings (Harvey, 2013; Harvey & Waterton, 2015; Harvey and Wilkinson 2019). UNESCO tends to define heritage landscape as having both tangible and intangible dimensions, stressing the interconnection of indigenous residents, social structures and associated ecological systems (Taylor & Lennon, 2011). The management of cultural heritage, therefore, should take the cultural landscape framework into account in order to draw on a time-deepened base of skills, experiences, information and values (UNESCO, 2013), rather than simply the physical fabric of topography, monuments and sites. However, the practical integration of heritage and landscape studies have faced some problems.

In China, for instance, national parks have lost elements of cultural heritage following natural disasters (for example, global warming and habitat loss) and various anthropogenic factors (for example, destructive human behaviour). Approximately 30 national parks in China have been awarded World Heritage Site status, but many local authorities still use outdated management systems and planning policies that have sometimes damaged heritage attributes and sometimes badly affected certain heritage values (Cai, 2004). According to the Ministry of Housing and Urban-Rural Development of the People's Republic of China, since 2015, 11 of 244 national parks in China were listed in the inventory of heritage in danger due to their heritage sites degenerating (MOHURD, 2015). In order to conserve the landscape heritage within Chinese national parks, therefore, it is crucial to recognise their heritage attributes, values and cultural identity, and to be able to put into practice policies that can connect the categorisation and day-to-day management of physical landscape features and topography, with the intangible elements of an emergent cultural heritage milieu.

There is, therefore, a strong imperative to acquire a deeper understanding of heritage values from both spatial and temporal dimensions, in order to prevent the loss of heritage landscapes in China that may be described as ‘authentic’. Unlike previous descriptions of authenticity and integrity as stable values, contemporary definitions tend to be dynamic

and performative, expressed through discourse and debate, and should take account of non-expert voices (Silverman, 2015). However, most previous practical planning implementations of interpreting heritage values have been limited to textual analyses, and lack a visual mapping process. As the link between landscape and heritage is becoming closer, Landscape Character Assessment (LCA) and Historic Landscape Characterisation (HLC) as management tools at the landscape scale have attempted to draw on both heritage values and landscape categories in maps (Turner, 2006; Fairclough, 2008; Brown & Brabyn, 2012; Butler, 2016). By analysing multiple values of heritage sites during the landscape characterisation process, we seek to develop a more critical landscape characterisation for Chinese heritage with an ability to take account of some key intangible heritage values, in a form of GIS that allows visual mapping to be undertaken.

Many scholars state that landscape characterisation should be developed within a certain cultural and historical context by recognising different natural-environmental philosophies and traditional value systems (Howard et al. 2013; Sarlöv, 2016). Exploring the HLC of Exmoor National Park, in the UK, Wilkinson and Harvey (2017) address issues of temporality and authenticity, to highlight how the materiality of landscape is represented in multiple metaphors (as palimpsest; as perception; and as a way of seeing) (Wilkinson and Harvey, 2017). In order to conserve the landscape heritage of national parks in China, Chinese scholars have tended to examine the framing of cultural landscape and heritage value, as well as searching for spatial techniques through which landscape character factors can be identified. For example, Han and Xu's (2012) analysis of the cultural landscape of national parks in China proposed a very general framework of landscape character classification, but lacked practical case studies. Peng and Yang (2018) proposed a holistic value identification model for national landscape heritage based on LCA and applied the model to Mount Tai national park, while Zhu et al. (2018) used statistical analysis to select nine landscape character factors applicable to national parks in China. In general, therefore, Chinese approaches are, thus far, quite preliminary in their exploration of how to establish a landscape character assessment system and classify landscape character types within the Chinese context. Although Chinese landscape heritage management still lacks a formal landscape characterisation approach based on Chinese criteria (Yang et al. 2016; Zhao & Gao, 2018), we argue that notions of

Shan-Shui (山水) might be used (to replace landscape) within a comparable characterisation approach. In its tangible sense, *Shan-Shui* (山水) refers to the spatial pattern of mountains and rivers (or lakes), while the intangible aspect of *Shan-shui* has a close relationship with Chinese traditional aesthetics and artistic philosophy. Chinese scholars therefore, tend to use *Shan-Shui* to analyse the components of landscape as being more than space, appealing to a sense of 'humanized nature'. In other words, seeming to invoke a language that is comparable to HLC traditions, *Shan-Shui* is appreciated as the essential concept of landscape from the perspectives of Chinese architects, landscape architects and philosophers (Zhou, 1989; Xie, 2012; Gao, 2015; Han, 2006).

The first section of this paper reviews some of the differences and similarities within western and Chinese landscape philosophies, as well as the inter-relationship between them. Comparative work on landscape and *Shan-Shui* indicates that despite different metaphors deployed, they are two parallel approaches to interpreting cultural identity. Based on traditional Chinese philosophy (for example, Taoism as a religious philosophy, theory of painting and artistic philosophy), *Shan-Shui* recognises landscape as a natural-cultural entity, imbued with symbolic imagery; with *Shan-Shui* (山水) literally meaning mountain (山) and water (水) in Mandarin. Similarly, the landscape concept within LCA not only refers to a 'real' landscape of visual or physical entities but also a perceived landscape with symbolic meanings (Council of Europe, 2000; Roe et al. 2008; Stobbelaar & Pedroli, 2011; Butler, 2014). Thus, *Shan-Shui* can help to articulate the LCA approach by squaring the tangible and intangible aspects: it derives from an authentically 'Chinese' cultural context, but is really quite allied to LCA in its basic ambition and outlook.

Through LCA surveys of British National Parks, we analysed how landscape characterisation approaches can be implemented at a national landscape scale (Zhao & Gao 2018). By comparison, our Chinese case study (Wudang Mountains National Park) explored the *Shan-Shui* Characterisation (hereafter, SSC) approach in two phases, reflecting interdisciplinary work of landscape mapping and interpretation. This approach firstly develops Landscape Description Units (LDU) during the initial (mapping) phase, and secondly, deciphers tangible and intangible values with interpretations of *Shan-Shui* paintings, historic atlases from ten local chronicles, and local religious records during the second (value description) phase. Therefore, this research integrates a variety of HLC representational formats, used in archaeology and human geography, with LCA maps

drawn in GIS, as used by disciplines such as landscape architecture and ecology. The LCA maps are drawn in the initial-phase of the SSC approach, and HLC representational formats will be analysed in the second-phase.

This paper aims to highlight (1) how a SSC approach, involving both representational and non-representational elements, is a creative cultural mapping approach with both textual and visual formats; and (2) how the SSC approach might be seen as a value-oriented categorisation approach and management tool for cultural heritage, by integrating interpretations of non-physical 'cultural' phenomena and the expert (GIS) manipulation of data. We also explore (3) some of the consequences of bringing western strategies of landscape heritage mapping (exemplified through British examples of LCA) into a productive conversation with the SSC approach from the perspective of philosophy, ontology and methodology.

2. Landscape Characterisation in Britain and China

Responding to and informing the European Landscape Convention (ELC), Landscape Character Assessment (LCA) and Historic Landscape Characterisation (HLC) practices have tended to stress the everyday landscape rather than making value judgements as to what is better or worse (Council of Europe, 2000; Swanwick, 2002). This approach makes room for complex interactions and relationships between humans and their biotic and abiotic environment (Mücher et al. 2010; Tudor, 2014; Butler, 2014). LCA/HLC is often referred to in the policy documents as providing guidelines for regional spatial planning and government policy decision-making[1], with the reduction of multiple attributes of landscape into essences through the identification of key characteristics (Van Eetveld & Antrop, 2009; Butler, 2016; Wilkinson & Harvey, 2017).

LCA and HLC were developed as British landscape assessment methods within a certain cultural and historical context (Turner 2006; Fairclough & Herring 2016). These approaches could not be directly utilised in China without recognising and engaging with issues related to the difference of natural-environmental philosophies and value systems (Howard et al. 2013). As Sarlöv (2016) notes, this situated subtext, or framing of English landscape identity must be recognised to ensure that things are not 'lost in translation' or ignored when the methods are exported to other countries. We therefore seek to clarify

how different nations may recognise 'landscape' in a manner that allows for certain culturally specific knowledges.

Research on western environmental philosophy has developed towards a more holistic definition over the last two centuries (environment as a way of seeing; as phenomena; as more than space; as heritage etc.). In the early 20th century, western geographers tended to define landscape in terms of an objective world of physical features, one that is 'out there' and that can be empirically accessed, described and modelled (For example, Sauer (1925) addressed the morphology of landscape in its physical dimension). From the 1970s, a challenge emerged to these practices that separate landscapes into objective facts and layers of subjective meaning. Critical cultural geographers in the west argued for 'landscape to be defined less as an external and physical object 'out there', and more as a mixture of 'natural' and 'cultural' elements, and as a particular, culturally-specific way of seeing or representing the world' (Wylie, 2007, see Chapter 1, p. 13).

In the 21st century, the European Landscape Convention (ELC) seeks to provide such a holistic definition of landscape. It defines landscape explicitly as broader than a merely physical thing accessed only through a visual realm, but also a perceived entity with symbolic meanings (Council of Europe, 2000; Roe, 2008; Stobbelaar & Pedroli, 2011; Rippon, 2013; Butler, 2014). In addition, when the language of landscape is used within different nations, it has multiple inherent meanings. For example, the Dutch *Landschap* has a more strongly visual and artistic connotation, whereas the Germanic version ties much more closely to the land itself (see, for instance, Jackson, 1984). In particular, the European evolution of landscape (as *Landskip*) has also developed in painterly context (e.g. in England and the Netherlands). Indeed, Peter Howard (2018) has recently summarized four developing themes emerging over the past few decades, referring to 'experiencing landscape', 'landscape, culture and heritage', 'landscape, society and justice', and 'design and planning for landscape and environment', thus illustrating more and more complexity within the landscape as it becomes integrated into different disciplines.

While the concept of landscape as representing diverse cultures and landscape characterisation approaches has followed various routes within different national traditions, as well as several different techniques in detail, they generally had very similar

purposes (Fairclough G et al. 2018). In east Asian countries, especially in China, the landscape concept is deeply entwined with interpretations of the relationship between 'natural' scenery, artistic creation, and cultural inheritance. Of particular interest, is the way in which traditional Chinese philosophy emphasises the 'oneness of nature and human beings' (天人合一), emphasising that the 'harmony of humans with nature brings beauty' (人与天调). Formulated and developed by Chinese philosophers in the 6th century BCE. (Han, 2006; Yang, 2014; Gao, 2015), these Chinese views of landscape are ethical in orientation rather than limited to objective scientific meanings (Yang, 2014). Consequently, from the past to the present, Chinese scholars have tended to use *Shan-Shui* to analyse the components of landscape as being more than space, thus invoking a sense of 'humanized nature'. *Shan-Shui* therefore, is appreciated as the essential concept of landscape from the perspectives of building and landscape architects and philosophers (e.g. see Zhou, 1989; Xie, 2012; Gao, 2015; Han, 2006).

Concepts of *Shan-Shui* landscape developed from the 5th century CE, during the Liusong dynasty. It was recognised as a genre of painting, named as *Shan-Shui* painting in Mandarin, since the Sui Dynasty in the 6th century (Fig. 1.). *Shan-Shui* paintings are usually centred on mountains, which had long been seen as sacred places in China and closely related to Chinese mythology, Buddhism and the indigenous religion of Taoism. Taoist narratives emphasise how minor the human presence is within the vastness of the cosmos and, from the 7th century (Tang Dynasty), regarded mountains as significant places connected to ideas of immortality. From the 7th to 13th century CE in China, this period saw the establishment of a system for understanding sacred mountains in *Shan-Shui* terms, promoting the development of *Shan-Shui* paintings, *Shan-Shui* poems and *Shan-Shui* gardens (with architectures). At a later date, but with many equivalences, western notions of the sublime invoked a sense of landscape in deep respect for nature, as epitomized by 'wild' mountains that could evoke feelings of awe, power and vastness (Carlson 2012).

While *Shan-Shui* paintings sought to represent the imaginative world, connecting the viewer's eye and an object in the viewer's mind (意境 in Chinese), *Shan-Shui* poems and garden-architecture ensembles were designed to be viewed as a particular work of art. They are intended to be both 'textual art' and material art that invoked an image inside a reader's mind. At the peak of *Shan-Shui* art practice from the 14th Century CE (Ming

dynasty), *Shan-Shui* became more like a vehicle of philosophy and a consciously epistemological apprehension of landscape. Consequently, within the Chinese context, landscape represents a particular way of living and provides examples of a continuous living history (Fung, 1952; Li & Woudstra, 2009). They are a vivid embodiment of landscape as a cultural process as opposed to being an objective cultural product.

The traditional Chinese environmental philosophy of *Shan-Shui* involves three representations of cultural process: (1) *Shan-Shui* painting as a cartographic representation to interpret particular spatial patterns; (2) *Shan-Shui* architecture and its associated religious meanings as both the representational and non-representational rendition are used to reflect a viewer's spiritual character and aesthetic ideal; and (3) *Shan-Shui* landscape (gardens), as material carriers to the present, both as living spaces and conveying wider ideological perspectives.

The character of *Shan-Shui* involves the connection between the 'naturalization of humanity' and the 'humanization of nature'. In absolute terms, 'nature' tends to refer to the physical dimensions of landscape (e.g. landform, soil etc.). The *Shan-Shui* perspective, however, draws on the significance of the interrelationship between the human activity and the mountainous space. *Shan-Shui* philosophy therefore, vividly deciphers the three categories of cultural landscape (painting, architecture and landscape gardening) and, in China, the *Shan-Shui* concept became closely related to sacred mountains with deep cultural, political, and religious meanings. Fowler (2003), Motonaka (2003), and Bernbaum (2005) note that mountains have an extraordinary power to evoke a sense of the sacred and, therefore, have become major resources to represent key cultural landscapes in Asia and elsewhere[2]. For example, when the *Shan-Shui* concept is referred to at mountains related to the Taoist religion, it emphasises the relationship between Taoist architectural forms and spaces, and a broader conception of *Shan-Shui* landscape. Taoist architecture therefore forms a living heritage that provides a human space for beholding notions of immortality. The *Shan-Shui* landscape is characterised by a unique combination of Taoist architecture, mountain peaks and the associated human activities that make the Taoist landscape distinctive (Zhou, 1989; Xie, 2012).

Using the indigenous landscape language of *Shan-Shui*, rendered through art and painting, poetry and literature, to reveal multiple metaphors, is useful for the sustainable

management of valued landscapes, and can be helpful in order to prevent the loss of cultural landscapes. *Shan-Shui* paintings and art were both originators and inspirers of early Chinese landscape design, revealing a deep and often mystical relationship between humans and the environment (Jellicoe, 1995). Within this paper, we propose a two-phase approach through which *Shan-Shui* character classification might be put into practice.

As a first phase of characterisation, we identify the material and tangible elements of *Shan-Shui* aesthetics and architecture. Secondly, in a further phase of characterisation, we attempt to take into account certain intangible elements of *Shan-Shui* philosophy, as represented and refracted through painting and art. Similar to the hierarchical structure of British landscape characterisation (e.g. landscape character; landscape characteristics; landscape elements; landscape features; see Swanwick, 2002), we put forward a new nomenclative structure of characterisation that refers to *Shan-Shui* character*; Shan-Shui* characteristic; *Shan-Shui* elements; and *Shan-Shui* features (Fig. 2, a further description is provided in Table 1). Rather than a simple naming difference, this structure is value-oriented by deciphering the tangible and intangible values with *Shan-Shui* iconographies.

Fig. 1. Landscape character hierarchical structures in Europe and China

3. Towards a Methodology of *Shan-Shui Characterisation*

3.1 LCA approaches to British national parks and their limitations

On the basis of comprehensive data for landscape character classification, many professional LCAs have been produced for national parks in the UK[3] (Landscape Institution, 2013). Such LDU and LANDMAP approaches used in British National Parks tend to indicate the centrality of GIS-based identification of character areas as a fundamental aspect of LCA. Although the guidance for the LCA approach suggests using a range of landscape attributes within the classification process (Swanwick, 2002; Tudor, 2014), the GIS-based format tends to focus attention on biophysical attributes, lacking detailed information on how anthropogenic aspects may be translated. Where anthropogenic factors are considered, the LCAs have tended to focus on photographic preference surveys and textual analysis or descriptions (e.g., see Habron, 1998;

Swanwick, 2002). LCAs are far-reaching documents, meant to provide a holistic approach to landscape. Sometimes, however, crucial aspects of historic depth and importance can be under-represented. Thus, the historic environment needs to be clearly and intelligently combined with LCAs, and integrating information from an HLC has proven to be the most successful way of doing this (Clark et al 2004).

In order to improve perceived limitations, many scholars have sought to develop new approaches and models. For instance, early comparative work between LCA and Historic Landscape Characterisations (HLC) approaches was undertaken in Cornwall by The Cornwall County Archaeological Unit (see Johns and Herring 1996). Meanwhile, further research has explored measures of the visibility of certain human artefacts, using digital terrain models and land cover datasets with viewshed algorithms (Carver & Wrightham, 2003; Carver et al. 2012). Viewshed models are particularly helpful for calculating the 'line-of-sight' from one surface point to another, taking into account what is actually visible and important in the landscape in relation to topography/landform (see, for instance, Ólafsdóttir & Runnström, 2011). Some other scholars have proposed cultural mapping approaches and cultural value models in LCA (Taylor 2009, Butler, 2016). These are rarely used in recent LCA implementations but could be useful for supplementing intangible heritage information.

In sum, the British approach to LCA is mostly conceived as an aid to landscape or regional planning, and is broadly divided into two stages; one of value-free characterisation, and one of judgement for planning (Swanwick, 2002). In Britain, therefore, the application of LCA for landscape heritage faces operational problems in deciphering human-orientated cultural heritage values. Consequently, it is both difficult to keep the characterisation stage 'value free', and similarly problematic to integrate dynamic heritage values as part of the judgement stage. In order to improve the LCA, an HLC approach must strive to be value-free at the characterisation stage, but does use values (evidential, historical, aesthetic and communal values, such as those mentioned in the Australian Burra Charter) at the judgement stage. The *Shan-shui Character Approach* would be another way of integrating value identification through a mutually beneficial creative conversation between western and Chinese traditions and approaches.

3.2 The development of Shan-Shui Characterisation (SSC)

In order to prevent the loss of historic information and make more room for heritage values that can otherwise be easily marginalised or ignored in the planning process, this paper develops an SSC approach involving two phases, referred to as the mapping phase and the value description phase (Fig. 3).

First, during the mapping phase, we call for an integrated method to underscore both physical features (topography, soil etc.) and human factors (viewshed). On the one hand, we use digital elevation modelling, relief amplitude, land cover and soil type as physical features. On the other hand, key elements of ancient architecture groups are recognised as key human characteristics to be integrated through viewshed analysis, reflecting the close link between heritage monuments and *Shan-Shui* patterns. The GIS mapping phase provides the baseline for identifying heritage values in the second phase.

In the second, value-description phase, we seek to interpret the dynamic heritage values that human beings attach to landscape and how they alter through time. This phase stresses stakeholder participation. The fundamental character of *Shan-Shui* emphasises the interrelation between the landscape space and human behaviour, more than the perceived entity of landscape. In other words, SSC firstly proposes a GIS map to provide the viewpoints of landscape planners. Secondly, we account for and analyse *Shan-Shui* painting and historic atlases in order to integrate geographers', historians' and local residents' viewpoints (Fig. 3). In order to provide a practical guide for national heritage landscape conservation, in the next section, we use the Wudang Mountains World Heritage Site as a case, and analyse the benefits of SSC for cultural heritage management.

Fig. 2. *Shan-Shui Characterisation* approach with two phases

4. Making *Shan-Shui Characterisation* work in a Chinese context: the Wudang Mountains National Park case study

4.1 The Wudang Mountains National Park (WMNP) in China

The Wudang Mountains are a series of mountain ranges approximately 400 km in circumference. The WMNP covers an area of approximately 312 km^2, and lies near the intersection of Danjiangkou Lake and the Yangtze River. It is located in Hubei Province and contains a wealth of scenic resources, historical monuments, animals and plant species (Fig. 4). The chosen research area, covering 2650 km^2, is much broader than the WMNP so as to allow the identification of consistent landscape character types at an appropriate scale.

Fig. 3. General information of Wudang Mountains

The Wudang Mountains is the most important of the Four Sacred Mountains of Taoism in China (Wudang Mountains, Longhu Mountain, Qiyun Mountain and Qingcheng Mountain). These sacred mountains have all been important destinations for pilgrimage journeys, made as an expression of *'paying respect to a holy mountain'.* The Wudang Mountains form a crucial sacred space at the foundational heart of Taoist ideas about immortality, and played a significant role in its organisational development and spread of belief. As a result, there is inevitably a strong and undeniable relationship between the construction of religion and the pattern of landscape space. The Wudang Mountains' ancient Taoist building complex, now a World Cultural Heritage site, was planned and constructed by the Emperor Zhu Di (Emperor Yongle of the Ming Dynasty) as a central place in the emerging national space, and as a landscape-scale vehicle through which to tell the story of how Emperor Zhenwu became immortal[4].

Throughout history, a series of ten local chronicles[5], from the Yuan Dynasty to the present, has recorded the administrative development of Wudang during every dynasty. These include historical atlases, travelogues written by geographers, and the imperial edict for planning proposals at the Wudang Mountains (Editorial Board of Wudang Mountains Books 2003). The layout of Taoist architecture, arranged along the trails from the piedmont to the peak (Fig. 5), reflects a strictly religious intention to express the key sacred characteristics of Taoist mountains through which Taoism appreciates the natural

world as a *Human-Land-Heaven* structure[6], thus recognising the mountain as the special space for cultivating immortality (Du & Yin, 2013).

4.2 Shan-Shui Characterisation of WMNP in the GIS mapping phase

The desk study step in our mapping phase involved building a GIS map (using a l km x 1km grid) to represent the basic physical dimensions of the Wudang Mountains region. In a similar way to the Level 2 of LDU at a district scale (Griffiths et al. 2004), we selected digital elevation model data (see Fig. 4a), relief amplitude (see Fig. 4b), land cover (see Fig. 4c) and soil type (see Fig. 4d) as four definitive attributes of the physical landscape (Table S1, see supporting information). These four layers were incorporated into a GIS by Map Algebra to produce a base map for HLC (LCM1; see Fig. 4e). Map Algebra is a simple and powerful algebra with which to execute all spatial analyst tools, operations and functions to perform geographic analysis. Figure 4e is the result by overlaying the four maps of Figure 4a-d through Map Algebra in ArcGIS 10.4 software.

In consideration of the human dimension of landscape heritage, we added the viewshed analysis in order to connect the layout of architecture and mountain peaks to Taoist beliefs. In the Wudang Mountains, Taoist architectural groups are located among an undulating landscape of great elevational variability. In order to integrate the Taoist architectural groups[7] as key factors in SSC, therefore, viewshed analysis (Fig. 5a) was used as a proxy quantitative method to indicate the syntagmatic relationship between the Taoist architecture and their contextual landforms. A qualitative perspective of this relationship between the Taoist architecture and the surrounding topography can also be seen in the historic atlas (S1). LCM2 (Fig. 5b) incorporates viewshed data (see in Fig. 5a) into the GIS map in order to present *Shan-Shui* units at the scale of 1km x 1km resolution grid-cells. Eight *Shan-Shui* character types (Type A-H) were grouped together in Figure 5b by using maximum-likelihood clustering classifiers at ArcGIS 10.4 software. Then we compared the boundary of Figure 5b grids and the administrative boundaries of villages in Wudang Mountains. After that, different types were classified in Figure 5c following Figure S2.

The field survey step is the evidence to delimit the boundary of *Shan-Shui* character types at the regional scale. According to the spatial character of the Wudang Mountains and our field trips from 2014 to 2017, we defined eleven *Shan-shui* character types and thirty five *Shan-shui* character areas based on the LCM2 phase. Fig.7-c indicates the final *Shan-shui* character map at the second scale level. While we attempt to consider human dimensions of heritage (architectural layout) within the qualitative GIS mapping phase, more work is still required to develop further *Shan-Shui* representational formats such as *Shan-Shui* paintings (Fig. 8) and historic atlases (Fig. 5). The materials are collected from local chronicles to indicate the different representation formats in the course of different dynasties.

Fig. 4. Physical dimension of *Shan-Shui Characterisation* mapping

Fig. 5. Human dimension of *Shan-Shui Characterisation* mapping and *Shan-Shui* character types

4.3 Shan-Shui Characterisation of the WMNP in the value description phase

When protecting and managing intangible values of cultural heritage sites with specific reference to cultural landscapes, there is an imperative to take account of the views of a range of stakeholders, such as landscape planners, visitors and users (Taylor, 2016). The SSC approach therefore attempts to integrate perspectives of landscape planners, historians and local residents (etc.) in the value description phase, thus providing a further contribution to understanding *Shan-Shui* philosophy. *Shan-Shui* paintings and the Eight-Scenes[8] atlas (Fig. 8), provide iconographic representations of landscape that can help us understand landscape heritage in an interdisciplinary context.

As Herring (2019) noted, four values (scientific, historical, aesthetic and social) mentioned in the Burra Charter should be identified in the characterization approach. When analysing the many human values attached to Wudang Mountains within SSC, we identify tangible values through the physical features in GIS map. In many ways, therefore, LCM2 classifies eight *Shan-Shui* character types and indicates the Human-Land-Heaven pattern within *Shan-Shui* philosophy (Fig. 5b). In the map shown in Figure 5b, we could objectively acknowledge the aspects of elevation, relief amplitude, land cover, soil type and viewshed data, each of which has a close relationship with physical and ecological

characteristics. This might be regarded as an expert-led technique created by landscape architects or planners (etc.), reflecting an analysis of landscape units and providing the basic evidence for spatial planning policy and landscape strategies.

The second step then seeks to provide a platform for identifying and communicating intangible values through translation of historic atlases and interpretations of non-physical 'cultural' phenomena. *Shan-Shui* paintings reflected an artistic understanding of *Shan-Shui*, and also portrayed the daily life of indigenous residents. Drawing on the supplementations of *Shan-Shui* paintings (Fig. S1), intangible values, such as landscape metaphors, spiritual character and aesthetic ideals, might be interpreted within *Shan-Shui* philosophy. For instance, Figure S1 records eight scenes of the Wudang Mountains, selecting a series of places that were felt to be key characteristics of this area. These eight scenes of *Shan-Shui* painting indicate that these paintings are revelatory of the various ways that landscape was perceived within Chinese philosophy (Li et al. 2010). The other *Shan-Shui* painting (see Fig. S3) indicates artistic and historical values from perspectives of artists and historians. This long handscroll *Shan-Shui* Painting, named DaYueTaiHeShanQuanTu (大岳太和山全图), recorded the whole scenery of 60 kilometres from Junzhou City to the Wudang Mountains[9]. Finally, in order to integrate the two phases of SSC together, we define four factors (*Shan-Shui* character; Heritage values; *Shan-Shui* characteristic; *Shan-Shui* features) of Chinese *Shan-Shui* character hierarchical structures (Table S1, see Supporting Information).

4.4 The practical result of Shan-Shui Characterisation of WMNP

Based on the above two steps (the GIS step, and value description step), the Shan-shui character map shows the different percentages of natural (N), cultural (C) and settlement (S) types. 1) The N01 type is mainly concentrated in the southern area. Covering only 10 percent of the total land area, it corresponds to the rugged mountains. 2) Notwithstanding the Wudang Mountains being recognized as a typical mountainous area, the largest proportion (N03) shows that more than 40% of the land area is classed as relatively flat terrain. 3) Land characterized as urban (S02) covers the least proportion among the three major types. These data tend to suggest that characteristics of natural ecology and heritage far outweigh land use for human settlement as key characteristics of the Wudang mountains.

The result of *Shan-shui* character classification indicates three types and eleven sub-types, by integrating physical elements (typography, land cover and soil elements) and human elements (viewshed data representing a crucial aspect of human aesthetic perception). The result also interprets the spatiality of *Shan-shui*, the interaction of human behaviour, and the integrity of dynamic value evolution. Compared with the British LCA, the SSC of the Wundang Mountains National Park case study enhances the practical work of cultural heritage management with the combination of GIS mapping and a translation of anthropogenic aspects.

5. Discussion: Conversation and consequences

5.1 Inter-relations between the SSC and LCA approaches

The epistemology of landscape and Shan-shui: Rather than stressing the differences of SSC and LCA, this research explores the inter-relations of these two approaches more deeply. The LCA approach, as used in the UK, provides an overall perspective to rethink the etymology, the extended meaning and even the associational meaning of landscape (Fig. S4-top). The evolution of landscape in the west has been through several philosophical, artistic and geographical phases. Similarly, *Shan-Shui* originated with a spatial philosophy and evolved through multiple notions and nuances (Fig. S4-bottom). Landscape characterisation approaches in the west and China are not only implemented as typological methods to integrate understandings of the landscape as a physical entity with an appreciation of the cultural phenomenology of landscape (*Shan-shui*), but also to look back at the evolution of environmental philosophy.

Cultural mapping tools for managing cultural heritage: Cultural mapping embraces a wide range of techniques and activities, from community-based participatory approaches that identify local cultural resources and activities, to the use of innovative information tools like Geographical Information Systems (GIS). Very few of these approaches, however, have managed to combine textual analysis and deeper understandings of cultural heritage with GIS visualization techniques. Rather than separating expressions of tangible and intangible values in a cultural mapping approach, the SSC approach interprets multiple

landscape attributes and values in combination. GIS maps visualize physical patterns in an ongoing conversation with symbolic meanings as deciphered through *Shan-Shui* paintings, historic atlases and local religious outlooks. Perhaps most importantly, as a cultural mapping tool, the SSC approach recognises that landscape is understandable and describable, and that it can help present visual data in digestible formats. This can enable a range of both community stakeholders and official planners and policy makers, with the capacity to capture complexity and layered phenomena, to recognize historic landscape-heritage in a more holistic fashion.

Deciphering and interpreting the past and future landscape: The SSC approach integrates aspects of heritage at the landscape scale; the physical and the cultural – the tangible and intangible. Taoist architecture involves more than just historical monuments, but represents a living landscape history cultivated by *Shan-Shui* philosophy and indigenous religion. This integration of landscape and heritage allows us to place philosophy and time-deepened indigenous knowledge at the heart of our understanding of the heritage landscape. This research attempts to respect the World Heritage of Taoist architecture as being 'universal', as well as to revive traditional *Shan-Shui* philosophy in a manner that we think can deepen the understanding of heritage integrity and enhance the integrity of sustainable heritage management at a landscape scale.

5.2 Shan-Shui characterisation in China: Reconciling Western and Chinese landscape characterisations of national heritage

What does LCA/HLC bring to China?: Thus far, landscape characterisation approaches have not been used in a Chinese national park as a means to preserve heritage sites at a landscape scale. As well as being the first attempt to apply basic landscape characterisation principles to a Chinese context, this research is also novel in its attempt to add *Shan-Shui* characteristics into the mapping process. On the one hand, it is crucial for highlighting significant monuments within a cultural landscape framework. On the other hand, the *Shan-Shui* pattern brings greater meaning to historic architecture as related through traditional philosophy. British landscape characterisation provides a holistic perspective for dynamic conservation of landscape heritage, with both qualitative

and quantitative approaches. With several decades' endeavour, LCA / HLC has been deployed effectively throughout the UK, and has informed heritage landscape management practice across Europe. Extending from this, the British approach has the potential to improve the previously outdated management system of many Chinese national landscape heritages. Our trans-cultural implementation integrates LCA and HLC in the two-phase *SSC* approach. In doing so, it provides deeper, wider and more critical dialogues of comparison from a trans-cultural perspective.

What Shan-Shui offers LCA/HLC in the west?: Turner (2006), Wylie (2007) and others have been searching for an interdisciplinary approach to landscape-heritage visualisation and management that might bring together 'representational' and 'non-representational' philosophical standpoints (see also Harvey, 2015). Our research provides a language through which *Shan-Shui Characterisation* can enliven LCA/HLC, especially through a greater recognition of intangible heritage. While this is resonant of the critiques made by scholars working with non-representational theory and phenomenology (e.g. Wylie 2007; Waterton & Watson, 2010), we feel that the *Shan-Shui* approach has the potential to do more. Rather than just providing a critique of LCA/HLC techniques, *Shan-Shui* Characterisation also tries to sketch a solution by providing a language that recognises the importance of cultural phenomenology. Methodologically, *Shan-Shui* Characterisation proposes a viability for landscape characterisation implementation within different cultural contexts. Furthermore, *Shan-Shui* characterisation allows for a productive conversation between different disciplines, philosophies and culture cognitions.

6. Conclusion: *Shan-Shui Characterisation* as an indigenous landscape language

This comparative study, which began with several ontological and epistemological issues, has sought to reconcile western landscape characterisation approaches to make them more appropriate for use in China. It is a trans-cultural conversation between different philosophies, leading to a trans-cultural understanding of landscape characterisation. Although we compare British and Chinese examples (of national parks), the philosophy behind the landscape characterisation practices is a broader European or western one. Landscape-heritage research as realised through landscape characterisation approaches,

therefore, can become an international dialogue between the west and east as part of a two-way conversation. *Shan-Shui Characterisation* can provide a methodological and ontological space – and a language – that can recognise both expert/planner voices from 'above', and indigenous/local voices from 'below' (Robertson 2012). It can make a difference in contemporary landscape management of cultural heritage spaces, as well as provide a positive toolkit for the future. Furthermore, we would also suggest that many other countries or traditions may have their equivalents of '*Shan-shui*' which could therefore be melded with the LCA/HLC approach.

Notes

1. Such as Environment Impact Assessment, Rural White Papers, and National and Regional Planning Guidance documents.
2. Indeed, the 2018 UNESCO list of newly inscribed World Heritage Sites includes many properties specifically described as being 'mountains', including all three of the newly inscribed 'natural' heritage sites. See https://whc.unesco.org/en/newproperties/, last accessed 14th November 2018.
3. These have been operationally developed through reference to Landscape Description Units (LDU) in England and Scotland or LANDMAP in Wales. LDUs are utilised as part of a GIS approach of classifying landscape character at the 1km*1km scale, while LANDMAP is a professional map to aid assessment of landscape character by geographers.
4. Emperor Zhenwu, also named Xuanwu, is a deity in Chinese religion, and one of the highest-ranking deities in Taoism. He is revered as a powerful god, able to control the elements and capable of great magic. He is identified as the god of the north Heidi (Great Deity of the Northern Peak in China) and is particularly revered by martial artists.
5. One chronicle was written in the Song Dynasty, and named Yudijisheng (舆地纪胜). One chronicle was written in the Yuan Dynasty (1291), and named Wudangfudizongzhenji (武当福地总真集). Three chronicles were written in the Ming Dynasty, which referred to Chijiandayuetaiheshanzhi (敕建太和山志) in 1493, Dayuezhilve (大岳志略) in 1536 and Dayuetaiheshanzhi(大岳太和山志) in 1556. Two chronicles were written in the Qing Dynasty, which referred to Dayuetaiheshanzhi (大岳太和山志) and Dayuetaiheshanjilve (大岳太和山纪略). There were also two chronicles written in in more recent years, named

Xuxiudayuetaiheshanzhi (续修大岳太和山志) in 1922 and Dayuetaiheshanzhi (大岳太和山志) in 1951.

6. Influenced by Chinese philosophy and Taoism, indigenous residents acknowledge the *Shan-shui* (landscape) pattern as Human-Land-Heaven. Human-space stands for the step of cultivating oneself to become on immortal in Taoism. Land-space is the second step. Heaven-space is the most significant step to become immortal in Taoism.

7. The Taoist architecture group integrated into the viewshed model refers to nine palaces, eight temples and 43 other monuments. The nine palaces include the Taihe Palace, Qingwei Palace, Chaotian Palace, Nanyan Palace, Purple Heaven Palace, Five Dragon Palace, Yuxu Palace, Yuzhen Palace and Jingle Palace. Tne eight temples are Yuanhe Temple, Huilong Temple, Taichang Temple, Fuzhen Temple, Renwei Temple, Longquan Temple, Weilie Temple and Baxian Temple.

8. Eight scenes, referred to Bajing (八景) in Mandarin, present a cultural phenomenon in which every self-respecting municipality promoted their best landscape scenes and most popular resorts as places for outdoor recreation and leisure activities.

9. The scenery of the first line of painting of Jingle Palace became submerged during the 1950s due to the 'South-to-North Water Transfer Project' (南水北调) in China. The scenery of the second line of painting of Yuzhen Palace burned down in 2003. This painting was inspired by a famous Chinese painting, Riverside Scene, exhibited at the Qingming Festival（清明上河图. It tells the story of the Wudang Mountains' Shan-Shui pattern and Taoism architectures, and so supplements missing historical information.

Acknowledgements

We would like to thank Dr Timothy J. Wilkinson (Exeter University, UK) and Dr Andrew Butler (SLU – the Swedish Agricultural University, Sweden) for their friendly and detailed advice. Material from this paper was presented at seminars in London (Annual International Conference of The Royal Geographical Society) and Torino (International Federation of Landscape Architects World Congress). We would also like to thank the British Council and China Scholarship Council for their funding (the funding number is 201603780038).

Appendix

***Shan-Shui* characterisation approach for Wudang Mountains**

	Topography/landform data is from Chinese Academy of Sciences with 30m spatial resolution(http://www.csdb.cn/) ; Land cover data is from Global Land Cover 2000 (http://forobs.jrc.ec.europa.eu/products/glc2000/products.php); Soil type data is from FAO-UNESCO (http://www.fao.org/geonetwork/srv/en/metadata.show?id=14116)		
The first Progress (Overlay four physical features)	1	DEM(m)	Acronym
	According to classification criterion from the local chronicle of Hubei, China	0-200m, low plain region	LP
		200-500m, high plain region	HP
		500-800m,low mountain region	LM
		800-1200m,middle mountain region	MM
		>1200m,high mountain region	HM
	2	Relief amplitude(m)	
	According to the classification criterion in China (Cheng et al.)	0-30m, plain	P
		30-100m,tableland	T
		100-200m,hills	H
		200-500m,mountains with gently amplitude	M
	3	Land cover	
	According to the classification criterion from GLC 2000 product.	Needle leaved evergreen forest	Nl
		Broad leaved deciduous forest	Bl
		Bush	Bu
		Slope grassland	Sg
		River and lake	Rl
		Swamp	Sw
		Farmland	Fa
	4	Soil type	
	According to classification criterion from FAO-UNESCO	Lake and river	Lr
		Alfisol	Al
		Primitive soil	Ps
		Manmade soil	Ms
The second Progress	5	Viewshed	
	Calculating 'line-of –sight' from historic monuments on the surface to another	Visible	V
		Invisible	I

References

Atha, M., Howard, P., Thompson, I., & Waterton, E. (2019). Introduction: ways of knowing and being with landscapes: a beginning. The Routledge Companion to Landscape Studies, xix-xxviii.

Bernbaum, E. (2005). Sacred Mountains of the world: an overview. In Thomas Schaaf and Cathy Lee (eds). Conserving Cultural and Biological Diversity: The role of sacred natural sites and cultural landscapes. International Symposium, Japan, 30 May-2 June, p26-p33

Brown, G., & Brabyn, L. (2012). An analysis of the relationships between multiple values and physical landscapes at a regional scale using public participation GIS and landscape character classification. *Landscape and urban planning*, 107(3), 317-331.

Butler, A. (2014). Developing theory of public involvement in landscape planning: Democratising Landscape. (Doctoral dissertation, Swedish University of Agricultural Sciences).

Butler, A. (2016). Dynamics of integrating landscape values in landscape character assessment: the hidden dominance of the objective outsider. *Landscape Research*, 41(2), 239-252.

Cai, L.L. (2004). Problems and countermeasures in the planning and administration of landscape and historic spots, *City Planning Review*. (10):74-80.

Carlson, A. “Environmental Aesthetics,” in E.N. Zalta (ed.) The Stanford Encyclopedia of Philosophy (Summer 2012 Edition),2012

Carver, S., Comber, A., McMorran, R., & Nutter, S. (2012). A GIS model for mapping spatial patterns and distribution of wild land in Scotland. *Landscape and Urban Planning*, 104(3), 395-409.

Carver, S., & Wrightham, M. (2003). Assessment of historic trends in the extent of wild land in Scotland: a pilot study. Scottish Natural Heritage.

Clark, J., Darlington, J., & Fairclough, G. J. (2004). Using Historic Landscape Characterisation: English Heritage's Review of HLC; Applications 2002-03. English Heritage and Lancashire County Council, p21-p22.

Council of Europe. European Landscape Convention [EB/OL].(2000). http://www.coe.int/t/e/Cultural_Co-operation/Environment/Landscape

Du,Y., & Yin,S.K. (2013). The Planning Concept of Wudang Mountains' Taoist Building Complex Incharged by Emperor Zhu Di in the Ming Dynasty. *Chinese Landscape Architecture*, 29(09):111-116.

Editorial Board of Wudang Mountains Books. (2003). The Variorum of Successive Dynasties Chronicles of Wudang Mountains. [M].

Fairclough, G. (2008). A new landscape for cultural heritage management: Characterisation as a management tool. In L. R. Lozny (Ed.), Landscapes under Pressure theory and practice of cultural heritage research and preservation (pp. 55–74). Cham, Switzerland: Springer Science & Business Media.

Fairclough, G., & Herring, P. (2016). Lens, mirror, window: Interactions between historic landscape characterisation and landscape character assessment. *Landscape Research*, 41(2), 186-198.

Fairclough G, Herlin I S, & Swanwick C (2018). Landscape character approaches in global, disciplinary and policy context: an introduction [M]/Routledge Handbook of Landscape Character Assessment. Routledge, p3-p20.

Fowler, P. J. (2003). World Heritage Papers 6: World Heritage Cultural Landscapes 1992-2002[M]. Paris: UNESCO World Heritage Centre, 2003.

Fung, Y.L. (1952). A Short History of Chinese Philosophy [M]. A history of Chinese philosophy /. Princeton University Press, p17-p53.

Gao, C. (2015). Landscape character creates landscape diversity. A report from Landscape Architect Forum-Landscape Diversity, Beijing.

Griffiths, G., Porter, J., Simmons, E., & Warnock, S. (2004). The living landscapes project: landscape character and biodiversity. Final report.

Habron, D. (1998). Visual perception of wild land in Scotland. *Landscape & Urban Planning*, 42(1), 45-56.

Han, F. (2006). The Chinese view of nature: tourism in China's scenic and historic interest areas (Doctoral dissertation, Queensland University of Technology).

Han, F., Xu, Q. (2012). A preliminary study about theoretical framework of cultural landscape value research in China's scenic and historic interest area. Proceeding of Chinese Landscape Architecture Society conference[C].China Architecture and Building Press,p42-p42

Harvey, D. C. (2013). Emerging landscapes of heritage. The Routledge companion to landscape studies. Routledge. Taylor and Francis group. London and New York, p152-p165.

Harvey, D. C. (2015). Landscape and heritage: trajectories and consequences. *Landscape Research*, 40(8), 911-924.

Harvey, D. C., & Waterton, E. (2015). Landscapes of heritage and heritage landscapes. [J]. *Landscape Research*, 2015, 40(8): 905-910.

Harvey, D.C and Wilkinson, T.J. (2019). Landscape and heritage: emerging landscapes of heritage, in P. Howard, I. Thompson, E. Waterton, and M. Atha (eds) *The Routledge Companion to Landscape Studies* (2nd Edition), London: Routledge, pp. 176-191.

Herring, P. (2019). Valuing the whole historic landscape, in P. Howard, I. Thompson, E. Waterton, and M. Atha (eds) *The Routledge Companion to Landscape Studies* (2nd Edition), London: Routledge, p192-p205.

Howard, P., Thompson, I., Waterton, E., & Atha, M. (Eds.). (2019). The Routledge companion to landscape studies,(2nd Edition) London: Routledge.

Jackson, J.B. (1984). Discovering the Vernacular Landscape [M], New Haven, CT: Yale University Press.

Jellicoe, S. G. (1995). The Landscape of Man [M].

Johns, C. and Herring, P. (1996). *St Keverne Historic Landscape Assessment: an Archaeological and Historical Survey*, (Report to English Heritage and the Ministry of Agriculture, Fisheries and Food, Cornwall County Council: Truro)

Li, K.R., & Woudstra, J. (2009). Phenomenological Landscape Study: The Modernity of Chinese Traditional Perception of Landscape Reflected in Serial Scenes. *Chinese Landscape Architecture*, 25(05):29-33.

Li, K.R., Woudstra, J. & Wei Feng (2010) 'Eight Views' versus 'Eight Scenes': The History of the Bajing Tradition in China, *Landscape Research*, 35(1), 83-110

Ministry of housing and urban rural development (2015). http://www.mohurd.gov.cn/wjfb/201610/t20161013_229161.html

Motonaka, M. (2003). Conservation of Cultural Landscapes in Asia and the Pacific Region: Terraced Rice Fields and Sacred Mountains. [C]// Cultural landscapes: the challenges of conservation. Paper 7 [M]. p127-p131.

Mücher, C. A., Klijn, J. A., Wascher, D. M., & Schaminée, J. H. (2010). A new European Landscape Classification (LANMAP): A transparent, flexible and user-oriented methodology to distinguish landscapes. *Ecological indicators*, 10(1), 87-103.

Olafsdottir, R., & Runnström, M. C. (2011). How wild is Iceland? Wilderness quality with respect to nature-based tourism. *Tourism Geographies*, 13(2), 280-298.

Peng, L. & Yang, R. (2018). On the Holistic Value of Scenic Areas and Its Identification. [J].*Chinese Landscape Architecture*, 34(07):42-47.

Rippon, S. (2013). Historic landscape character and sense of place. *Landscape research*, 38(2), 179-202

Robertson, I.J.M. (2012). Introduction: heritage from below, in I.J.M. Robertson (ed.) *Heritage from Below*, (Ashgate: Farnham), pp. 1-28.

Roe, M., Jones, C., & Mell, I. C. (2008). Research to support the implementation of the European Landscape Convention in England. Natural England (Contract No. PYT01/10/1.16).

Rössler, M. (2006). World heritage cultural landscapes: a UNESCO flagship programme 1992–2006. *Landscape Research*, 31(4), 333-353.

Sarlöv, H. I. (2016). Exploring the national contexts and cultural ideas that preceded the Landscape Character Assessment method in England. *Landscape Research*, 41(2), 175-185.

Silverman, H. (2015). Heritage and Authenticity. In The Palgrave Handbook of Contemporary Heritage Research (p69-p88). Palgrave Macmillan UK.

Stobbelaar, D. J., & Pedroli, B. (2011). Perspectives on landscape identity: A conceptual challenge. *Landscape Research*, 36(3), 321-339.

Swanwick, C. (2002). Landscape character assessment: guidance for England and Scotland. [M]. Cheltenham: Countryside Agency.

Taylor, K. (2009). Cultural landscapes and Asia: reconciling international and Southeast Asian regional values. *Landscape research*, 34(1), 7-31.

Taylor, K., & Lennon, J. (2011). Cultural landscapes: a bridge between culture and nature? *International Journal of Heritage Studies*, 17(6), 537-554.

Taylor, K. (2016). Cultural landscape meanings and values. Research in Landscape Architecture: Methods and Methodology. Routledge. Taylor and Francis group, p211-p233

Tudor, C. (2014). An approach to landscape character assessment. Natural England.

Turner, S. (2006). Historic Landscape Characterisation: A landscape archaeology for research, management and planning. *Landscape Research*, 31(4), 385-398.

UNESCO. Operational Guidelines for the Implementation of the World Heritage Convention, 2013

Van Eetvelde, V., & Antrop, M. (2009). Indicators for assessing changing landscape character of cultural landscapes in Flanders (Belgium). *Land Use Policy*, 26(4), 901-910.

Waterton, E., & Watson, S. (Eds.). (2010). Culture, heritage and representation: Perspectives on visuality and the past. Aldershot: Ashgate Publishing.p10-p22.

Wilkinson, T. J., & Harvey, D. C. (2017). Managing the future of the past: images of Exmoor landscape heritage. *Landscape research*, 42(8), 862-879.

Wylie, J. (2007). Landscape (key ideas in Geography). Abingdon: Routledge.

Xie, N.G. (2011). Famous Mountains, Landscape and Heritage [M]

Yang, C., Sim, J., & Lawson, G. (2016). Deciphering historic landscapes: A case study of slender West Lake in Yangzhou, China. *Landscape Research*, 41(1), 95-112.

Yang, R. (2014). Views of Nature" in China and the West, in Historical and Personal Context. [J]. *World Architecture*, 02:19-21.

Zhao, Y., & Gao, C. (2018). Review and enlightenment of the British National Park landscape character assessment system. [J].*Chinese Landscape Architecture*, 34(07):29-35.

Zhou, W.Q. (1996). Chinese famous mountains scenic spot. [M]. Tsinghua University Press.p1-p10.

Zhu, L.Y., Xu, S., & Lan, S.R. (2018). Selection of National Park's Landscape Character Factors in China Based on Grey Statistical Analysis. *Chinese Landscape Architecture*, 34(10):98-102.