Palaeoindian artefact distributions: evidence and implications

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The distribution of projectile points over broad geographic areas yields important insights about Palaeoindian settlement pattern and history. While traditionally viewed as a Great Plains adaptation, the data show that fluted points are far more common in Eastern North America. These artefacts are not evenly spread across the landscape, furthermore, but occur in distinct concentrations. Within some of these areas distinct cultural traditions quickly emerged, something that appears tied to the sudden onset of the Younger Dryas.

Key-words: Palaeoindian, fluted points, Eastern North America, Younger Dryas, archaeological databases

Introduction

The timing of initial human entry into the New World remains the subject of appreciable debate. Some investigators argue that there is no conclusive evidence for human presence anywhere prior to *c.* 12,500 BP, while others suggest that human entry may date to 20,000 BP or earlier (*cf.* Fiedel 2000; Meltzer 1997). While considerable ink has been spilled on the matter, there simply is not sufficient hard evidence at present to examine cultural trends in much detail prior to 11,500 BP. Immediately after this time, however, archaeological assemblages are widespread, unambiguously of human origin, and in many cases superbly documented. These data are amenable to large-scale distributional analyses.

By 10,800 BP, groups of people had settled much of North America (TABLE 1). Since the Folsom discovery, sites of these terminal Pleistocene peoples have been commonly identified by fluted projectile points, which have been dated to between *c.* 11,600 and 10,000 BP. While the antiquity of fluting technology is currently unknown, the Clovis type, most consistently dated to between *c.* 11,200 and 10,800 BP, remains the best candidate for the ancestral form from which many later fluted variants arose. It must be cautioned, however, that what is meant by 'Clovis' is far from clear, and in need of more systematic and consistent definition.

Theoretical models used to characterize the radiation of fluted point assemblages emphasize either wave of advance or leap frog patterns. Paul Martin's (1973) wave of advance model assumed the widespread distribution of fluted points was due to the rapid dispersal of a specialized big game hunting adaptation across virtually all landforms. Information compiled in recent years and summarized here, however, shows that fluted points are unevenly distributed across North America, suggesting the technology more probably spread in a leap frog pattern (see also Anderson & Gillam 2000: 58–9).

Palaeoindian artefact distributions

For the past 10 years we have been compiling information on the occurrence of Palaeoindian projectile points, and have published maps covering progressively larger portions of the lower 48 United States (e.g. Anderson 1990: 170; Faught *et al.* 1994: 32–3; Faught 1996; Anderson & Faught 1998: 169). We are now able to present maps spanning the entire lower 48 states and encompassing several point types. The primary dataset consists of point counts by type and county. The primary artefact and x–y grid data used to generate these maps, based on data from 3075 counties, are available on the Internet at http://www.anthro.fsu.edu/special/paleo/paleoind.html or may be obtained

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calendar age (cal BP) intercepts	radiocarbon years BP	stage	culture complex	European climatic periods
11,250 11,230	9900			
11,540 11,510 11,400 11,390 11340	10,000	Late Palaeoindian	Hell Gap	
11,690 11,680 11,640	10,100		Early Side Notched	Younger Dryas ends/Preboreal
11,930 11,800 11,770	10,200			
12,273 12,246 12,110	10,300			
12,337	10,400			
12,620 12,470 12,390	10,500		Agate Basin Dalton Suwannee	
12,800 12,731 12,652	10,600			
			Denali	
12,840	10,700			
12,890	10,800	Middle Palaeoindian	Magellan/El Inga Fishtails Cumberland	
12,940	10,900		Goshen-Plainview/Folsom	Younger Dryas begins
13,000	11,000		Clovis widespread	
13,130	11,100			Inter-Allerød Cold Period ends
13,150	11,200			
13,180	11,300			
13,410	11,400			Inter-Allerød Cold Period begins
13,450	11,500	Early Palaeoindian	Clovis tradition begins?	
13,492	11,600			
13,799 13,672 13,555 13,810 13,822	11,700 11,750 11,800		Nenana in Alaska?	Allerød
14,007 13,962 13,843 14,040 13,920 13,860 14,060	11,900 11,950 12,000			Older Dryas ends
14,100	12,100			Older Dryas begins
141,135	12,200			
14,289	12,300		Monte Verde	
14,336	12,400			
15,080 14,730 14,380	12,500			
15,230 14606 14,450	12,600		Initial human colonization??	Bølling begins

TABLE 1. *A combined radiocarbon/calendrical timescale for Palaeoindian assemblages (calibrations taken from Stuiver* et al. *1998).*

by e-mail from the authors. The information comes from a wide array of sources, including publications, state site file managers and researchers coordinating artefact surveys, for whose help we are profoundly grateful. Scholarly references for the artefact counts for each county are included in the data file. We are also compiling point data from Alaska, Canada, and Latin America with the assistance of researchers in these areas, and intend to incorporate that data into future analyses.

As of January 2000, the database encompasses 12,791 Palaeoindian projectile points, including 1971 Folsom, 348 Cumberland, 490 Suwannee and 51 Simpson projectile points. The remainder (n=9931) are fluted points exhibiting appreciable morphological variation, and include Clovis and several other named and unnamed types or forms. Due to difficulties in separating these forms, we have treated them as a single category. The database as presently constituted encompasses much of the published literature and most of the data in state-level artefact recording projects. As such, the current sample can be considered a reasonably complete accounting of readily accessible material. New artefacts will, of course, continue to be documented. Nonetheless, we doubt that the total number of fluted points will grow appreciably in the years to come. The sample may double or even treble, but it is unlikely it will ever come close to the millions advanced by some scholars (Haynes 1966: 112; Steele *et al.* 1998: 297), or implied by the wave-advance model. While there are obvious biases to this data, such as differences in visibility or recording effort from state to state, we believe that it provides useful and reliable information about the occurrence of these artefacts. As such, these data require consideration of new models of migration, adaptation and culture history.

The database was used to create contour maps showing the incidence of all fluted points (FIGURE 1) as well as the Folsom, Cumberland and Suwannee/Simpson types or variants (FIGURE 2). Inspecting the maps, major concentrations and voids are immediately evident. Because counties in the western states are far larger than in the east, artefact concentrations in the West appear to be larger than concentrations based on similar numbers of points in the East. Standardizing by area — using points per 1000 square miles — reduces the size and visual impact of projectile point concentrations in the West somewhat, but the uneven spacing of the data points remains a problem for future resolution. The maps offer far better precision and detail, however, than earlier, intuitively based efforts (e.g. Mason 1962: 233, 242; Williams & Stoltman 1965: 677; Dincauze 1993: 282).

Concentrations of fluted points tend to occur in resource-rich areas, such as near pluvial lakes, along major drainages or near major chert sources (FIGURE 1). Some concentrations reflect single large sites, while others encompass appreciable numbers of sites and artefacts. Comparatively few points occur in the Appalachian Mountains, on the Gulf Coastal Plain and over large portions of the central and western United States. While sampling bias due to differences in surface visibility, amount of prior collection or research or differential erosion conditions may influence these patterns (and are subjects that warrant additional research), it still appears fluted-point making peoples keyed in on some areas and minimally utilized or avoided others.

The total sample conflates appreciable morphological and chronological variation within fluted points, which is why we have begun delimiting the occurrence of readily identifiable typological variants (FIGURE 2). Dense concentrations of Folsom points, equated with a grassland bison-hunting adaptation, for example, occur as expected throughout the Great Plains. Smaller numbers of these artefacts occur east of the Mississippi River, primarily in Illinois, a distribution attributed to the existence of prairie conditions in this area during Folsom times (Munson 1990). The reason for the low numbers of Folsom points in the central Plains, between two marked concentrations, is currently unknown. If not due to sampling bias, territorial boundaries or traditional use ranges may be indicated.

The Cumberland type, a well-known fluted point variant in the East, has a highly restricted distribution, essentially to within and near the Cumberland and Tennessee River drainages of northern Alabama, Tennessee and Kentucky. Flutes on these points typically extend along the entire face, similar to the fluting observed on Folsom points, and suggesting they might be contemporaneous. The size of the Cumberland point concentration, *c.* 400 km in extent, appears to delimit the range or habitual use area of the people making this artefact category.

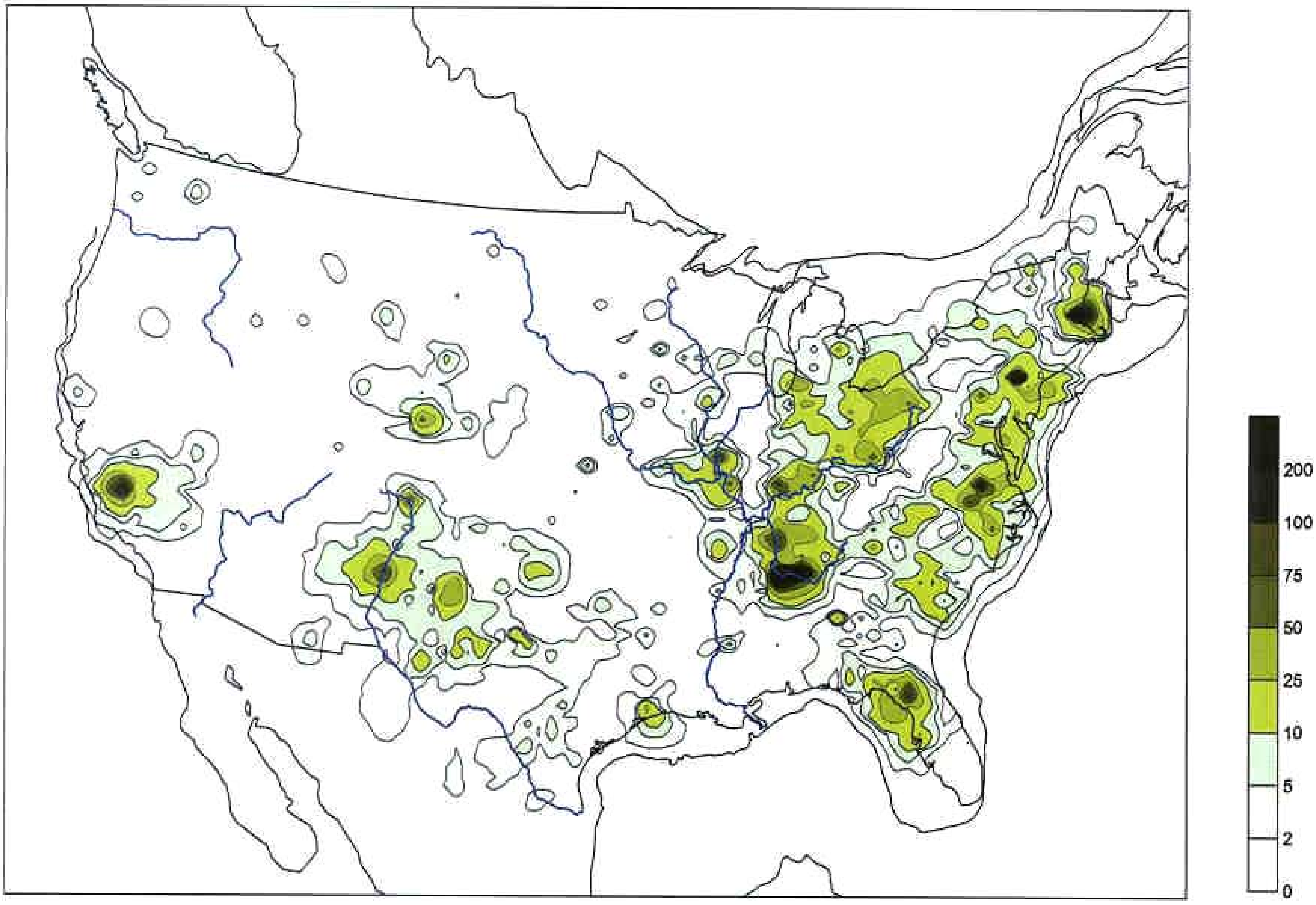


FIGURE 1. *All Palaeoindian projectile points in the lower 48 United States (N=12,791), illustrated using county level data, and presented as number of points per 1000 square miles.*

The distribution of Suwannee/Simpson points also appears to indicate the geographic extent of another Palaeoindian group or cultural tradition (FIGURE 2). The Suwannee/Simpson cluster is centred on north Florida, where these types have been well documented over the previous half-century. Somewhat unexpectedly, these 'Florida types' are also fairly common across south Georgia and into southwestern South Carolina, a distribution that may be due to the presence of high quality chert sources in these areas.

Fluting technology is thought by many archaeologists to have originated on the Plains, perhaps near the Ice Free Corridor. Clovis points, in fact, are sometimes perceived as having primarily a western or southwestern tradition, or else are thought to be more or less evenly distributed over the landscape. None of these views is supported by the distributional evidence. Over 70% of the total fluted point sample occurs in states east of the Mississippi River. Standardizing for differences in area, there are over five times as many fluted points per thousand square miles in the East than in the West. Fluted points that have been recorded in the northern Great Plains, furthermore, are mostly Folsom points and not Clovis or other varieties. When Folsom, Cumberland and Suwannee/Simpson points are removed from the total, an interesting pattern begins to emerge (FIGURE 3). Except for spatially limited concentrations in the Southwest and Far West, the vast majority of the remaining points are in the East, and are densely spread over that region. When variation in fluted points is better understood, however, it is likely that far fewer will be considered Clovis. Northeastern variants such as the Vail/Debert/Bull Brook types, for example, date to 10,600 BP or later (Levine 1990). It will be interesting to see what the distributions of the various fluted point types will look like following another decade or so of research. We predict that Clovis points may be most prevalent in the Southeast, reflecting our opinion (currently

FIGURE 3. *All Paleoindian fluted points minus the Folsom, Cumberland, Suwannee and Simpson types (N=9931) in the lower 48 United States, presented as points per 1000 square miles.*

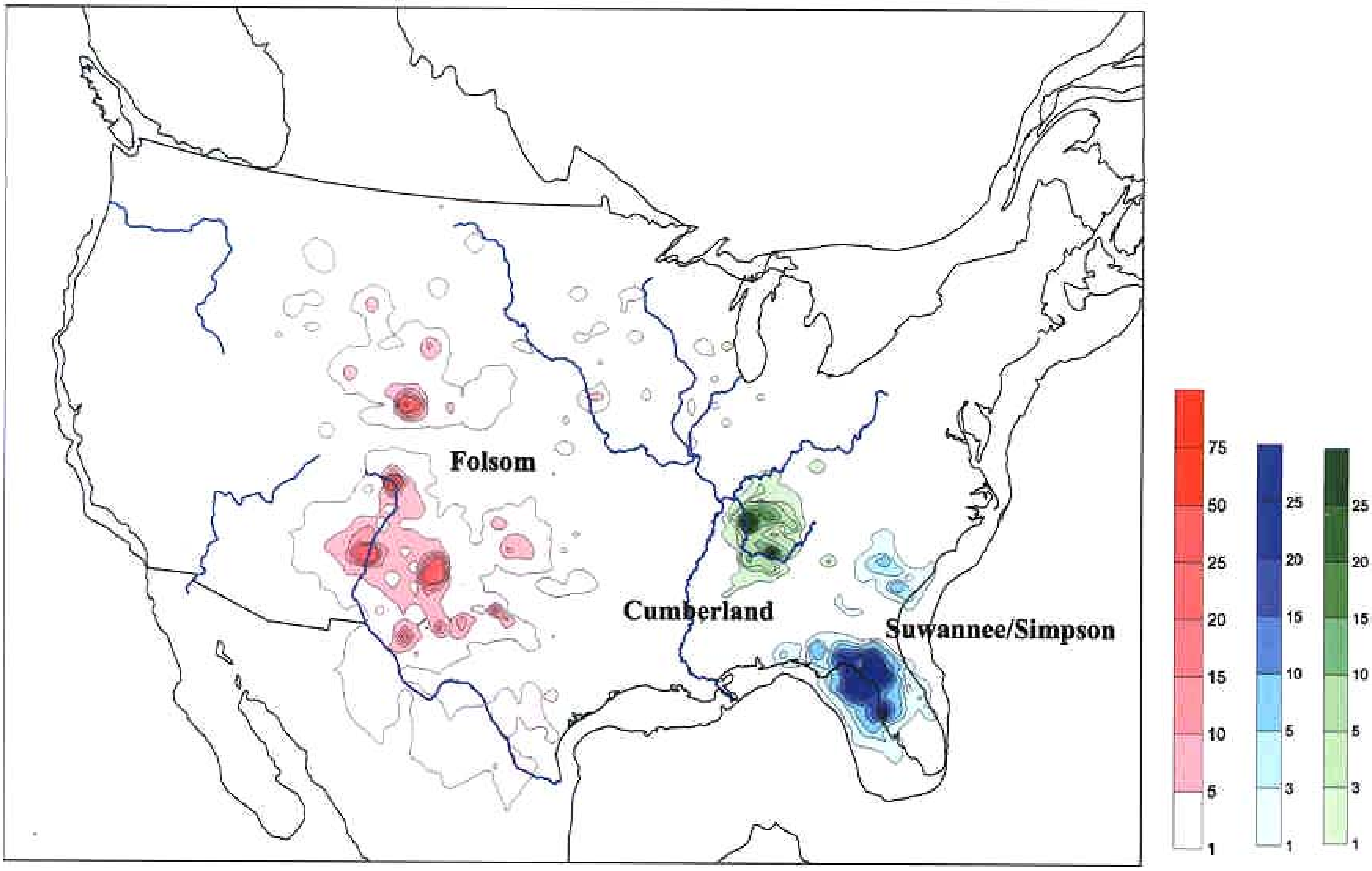
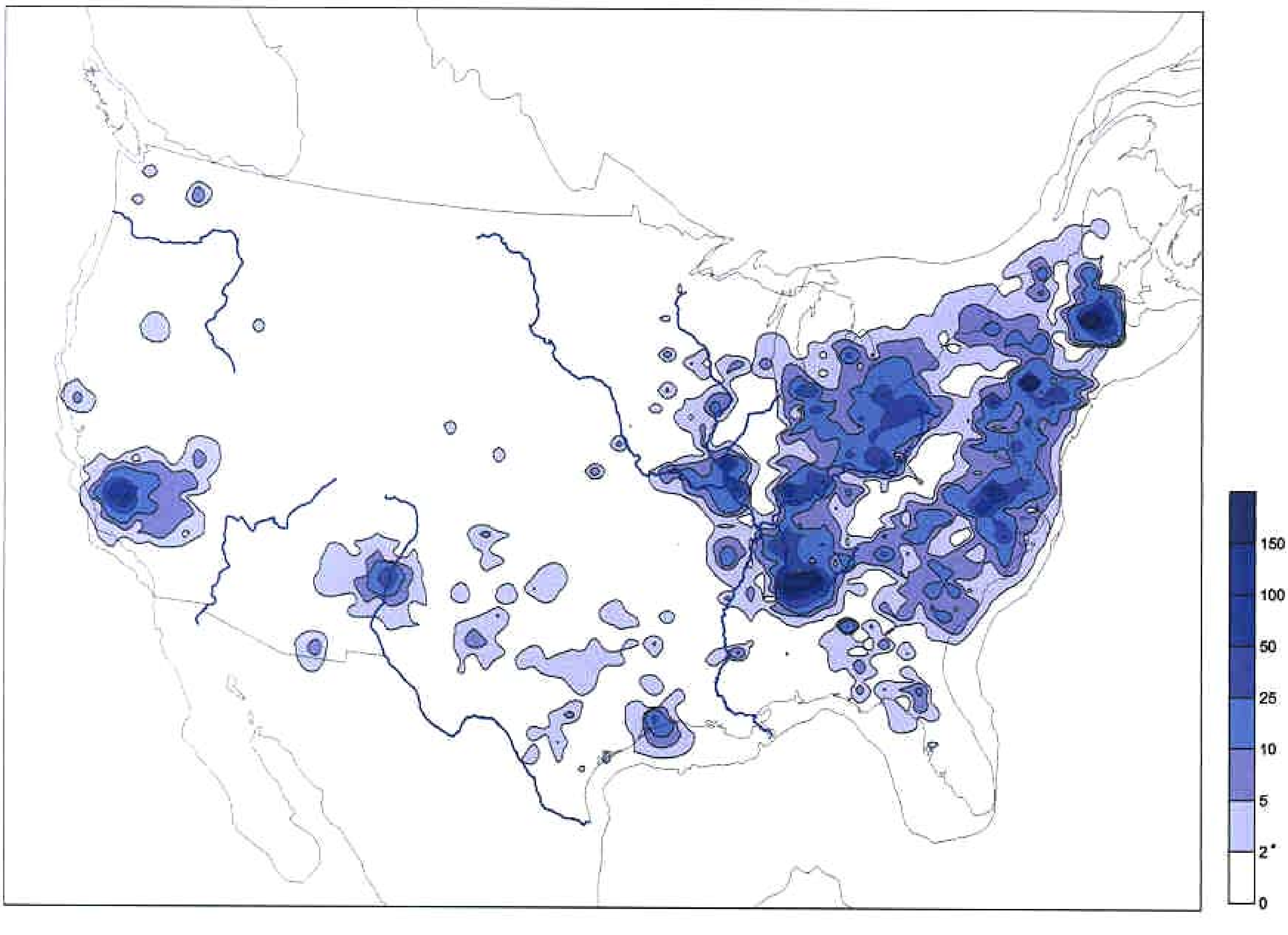


FIGURE 2. *Folsom (N=1971), Cumberland (N=348), Suwannee (N=490) and Simpson (N=51) projectile points in the lower 48 United States, presented as number of points per 1000 square miles.*



real hard evidence) that the technology may have originated there.

Effect of climate change on Palaeoindian settlement distributions

Climate change may provide an explanation for some of the patterns observed in the Palaeoindian distributional record. During the period of presumed initial human settlement, some time after the glacial maximum *c.* 18,000 BP, the Coastal Plain in many areas was almost twice its present size due to lowered sea levels. Rapid glacial retreat began during the Bølling, after *c.* 12,600 BP, and continued with comparatively minor fluctuations until the sudden onset of the Younger Dryas glacial readvance. Assuming initial human entry sometime during the Bølling or before, these groups would have been faced with a vast but slowly shrinking Coastal Plain, whose shoreline would be trending inland, save for comparatively minor movements in the other direction, during events like the Older Dryas and the Inter-Allerød Cold Period.

Clovis technology apparently appeared and spread widely during and immediately following the Inter-Allerød Cold Period (*c.* 11,400–11,100 BP; *c.* 13,410–13,130 cal BP), and had diversified into a number of subregional variants by or shortly after the start of the Younger Dryas (Fiedel 1999: 106; Taylor *et al.* 1996). There appears to be a strong relationship between the demise of the Clovis way of life, the emergence of subregional cultural traditions, the extinction of megafauna, and the sudden onset of the Younger Dryas cold period.

The Younger Dryas, from *c.* 10,800–10,100 BP (*c.* 12,890–11,680 cal BP), was a sudden and major glacial readvance, that led to pronounced colder conditions, changes in the distribution of floral and faunal communities, and possibly a significant lowering of sea level. Onset occurred rapidly, with cold conditions appearing within 10 to 40 years, well within the span of a human lifetime; the period was also apparently characterized by dramatic short-term temperature fluctuations (Grafenstein *et al.* 1999). If sea-level dropped very much at the onset of the Younger Dryas, this would have exposed large areas of the previously submerged continental shelf, an area that may have taken some time to rebound ecologically. These changes may have rendered immediate coastal settings unattractive, prompting movement into the interior (Faught 1996).

The sudden disruptions in climate and biota brought about by the onset of the Younger Dryas, when coupled with the extinction of megafauna about the same time, may have forced Palaeoindian populations to diversify their subsistence, and change settlement patterns. The procurement of food resources in smaller package sizes may have reduced the need for long-distance movement, and led to the increasing isolation and differentiation in assemblages observed at this time. That is, movement over long distances to exploit large and widely dispersed game animals may have been replaced by more localized movements directed toward a wider range of smaller animals, and an increased use of plant foods (Anderson 1990; Kelly & Todd 1988; Piperno & Pearsall 1998). The distribution of Cumberland and Suwannee/Simpson points within fairly circumscribed ranges may reflect the beginning of this trend. While the use of a wide range of plant and animal foods is assumed to have developed gradually over the course of the Archaic period (e.g. Caldwell 1958), subsistence diversification was probably under way well back in the Palaeoindian era (Meltzer & Smith 1986).

Conclusions

By 11,000 BP or shortly thereafter, fluted-point using populations were present over wide areas of North America, and a number of variants had appeared. Once assumed to have been the only technological tradition occurring at this time level, a number of distinct traditions are now known to have been contemporaneous (Bonnichsen & Turnmire 1999; Dillehay 2000). These include Nenana in Alaska, the Western Stemmed Point tradition in California and the Great Basin, Goshen on the High Plains and various assemblages in South America. Mapping these traditions is another research challenge that needs to be taken up.

The compilation and analysis of Palaeoindian artefacts over broad geographic and temporal scales can yield important insight about these early occupations. Untangling the origins of the fluted-point technological tradition and its relationship to other early New World cultures will unquestionably occupy many subsequent generations of archaeologists. Crucial to such analyses, however, will be having reliable data. We urge our colleagues to redouble their efforts to compile and report this information.

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An Aurignacian point from Uphill Quarry (Somerset) and the earliest settlement of Britain by *Homo sapiens sapiens*

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A rare and important AMS sample provides an Aurignacian date for Britain. The artefact and its implications are discussed.

Key-words: Somerset, Uphill, Aurignacian, AMS dating

The Early Upper Palaeolithic of Britain, unlike the Late Upper Palaeolithic, has remained poorly understood chronologically, largely due to the lack of cutmarked or otherwise culturally modified organic items which may be said clearly to represent human activity (Jacobi 1999). A cul-

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