Potential Human Population Decline/Reorganization during the Younger Dryas in North America

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Introduction

We use three proxy methods to test whether climate change associated with the Younger Dryas (YD) from ca. 12,900 to 11,600 cal BP affected human populations in North America: (1) frequency analyses of Paleoindian projectile points from across the continent, (2) assemblage data from 11 Paleoindian quarry sites in the southeastern United States, and (3) summed probability analyses (SPA) of radiocarbon dates from across North America and a number of regions in the northern hemisphere of the Old World. The results of each analysis suggest that a significant decline or reorganization of human population occurred during the initial centuries of the Younger Dryas, albeit playing out somewhat differently in different regions. Settings formerly heavily utilized, such as stone quarries in the southeast, were apparently no longer heavily utilized, while over larger areas a substantial decline in the numbers of diagnostic projectile points and radiocarbon estimations occurs. In the latter half of the YD a rebound in population or settlement is indicated by the projectile point and SPA datasets in a number of areas.

Climate and Culture Change: Basic Assumptions

A combination of monsoons from the Sahara after these changes and human inertia (i.e., a dramatic change in settlement patterns) occurred with the onset of the YD cooling 12,000 years ago in some or all portions of North America. SPA analyses suggest similar declines occurred across much of the Northern Hemisphere, with the possible exception of the Middle East. In addition, SPA analyses indicate that such changes also occurred during the Abbevillian beginning around 20,000 years ago and lasting for nearly 5000 years. This is the first time that a continental pattern has been reported for the Abbevillian or that a hemispheric demographic pattern has been proposed for the YD. We suggest these changes in climate and biota are related, that they occurred quickly and lasted for centuries, and may have resulted in human population declines of up to 30% to 50%. If a comparable event occurred today, the results would be catastrophic.

Analysis Results (1): Clovis and Post-Clovis Projectile Point Frequencies in North America

We use three proxy methods to test whether climate change associated with the Younger Dryas (YD) from ca. 12,900 to 11,600 cal BP affected human populations in North America: (1) frequency analyses of Paleoindian projectile points from across the continent, (2) assemblage data from 11 Paleoindian quarry sites in the southeastern United States, and (3) summed probability analyses (SPA) of radiocarbon dates from across North America and a number of regions in the northern hemisphere of the Old World. The results of each analysis suggest that a significant decline or reorganization of human population occurred during the initial centuries of the Younger Dryas, albeit playing out somewhat differently in different regions. Settings formerly heavily utilized, such as stone quarries in the southeast, were apparently no longer heavily utilized, while over larger areas a substantial decline in the numbers of diagnostic projectile points and radiocarbon estimations occurs. In the latter half of the YD a rebound in population or settlement is indicated by the projectile point and SPA datasets in a number of areas.

Analysis Results (2): Southeastern Quarry Assemblages

We use three proxy methods to test whether climate change associated with the Younger Dryas (YD) from ca. 12,900 to 11,600 cal BP affected human populations in North America: (1) frequency analyses of Paleoindian projectile points from across the continent, (2) assemblage data from 11 Paleoindian quarry sites in the southeastern United States, and (3) summed probability analyses (SPA) of radiocarbon dates from across North America and a number of regions in the northern hemisphere of the Old World. The results of each analysis suggest that a significant decline or reorganization of human population occurred during the initial centuries of the Younger Dryas, albeit playing out somewhat differently in different regions. Settings formerly heavily utilized, such as stone quarries in the southeast, were apparently no longer heavily utilized, while over larger areas a substantial decline in the numbers of diagnostic projectile points and radiocarbon estimations occurs. In the latter half of the YD a rebound in population or settlement is indicated by the projectile point and SPA datasets in a number of areas.

Analysis Results (3): Summed Probability Analyses

We use three proxy methods to test whether climate change associated with the Younger Dryas (YD) from ca. 12,900 to 11,600 cal BP affected human populations in North America: (1) frequency analyses of Paleoindian projectile points from across the continent, (2) assemblage data from 11 Paleoindian quarry sites in the southeastern United States, and (3) summed probability analyses (SPA) of radiocarbon dates from across North America and a number of regions in the northern hemisphere of the Old World. The results of each analysis suggest that a significant decline or reorganization of human population occurred during the initial centuries of the Younger Dryas, albeit playing out somewhat differently in different regions. Settings formerly heavily utilized, such as stone quarries in the southeast, were apparently no longer heavily utilized, while over larger areas a substantial decline in the numbers of diagnostic projectile points and radiocarbon estimations occurs. In the latter half of the YD a rebound in population or settlement is indicated by the projectile point and SPA datasets in a number of areas.

CONCLUSIONS

Our analyses indicate that various human and animal population declines or bottlenecks, or alternatively population reorganizations (i.e., dramatic changes in settlement patterns) occurred with the onset of the YD cooling 12,000 years ago in some or all portions of North America. SPA analyses suggest similar declines occurred across much of the Northern Hemisphere, with the possible exception of the Middle East. In addition, SPA analyses indicate that such changes also occurred during the Abbevillian beginning around 20,000 years ago and lasting for nearly 5000 years. This is the first time that a continental pattern has been reported for the Abbevillian or that a hemispheric demographic pattern has been proposed for the YD. We suggest these changes in climate and biota are related, that they occurred quickly and lasted for centuries, and may have resulted in human population declines of up to 30% to 50%. If a comparable event occurred today, the results would be catastrophic.

REFERENCES


