ECOLOGICAL CRISIS IN THE NORTHWESTERN BLACK SEA REGION AT THE PLEISTOCENE-HOLOCENE BOUNDARY: MAIN COMPONENTS AND DYNAMICS THROUGH TIME

Smyntyna O.

Department of Archaeology and Ethnology of Ukraine, Odessa I.I. Mechnikov National University, 2, Dvoryanskaya str., Odessa, Ukraine, 65082, smyntyna_olena@onu.edu.ua

Keywords: LGM, Altered, Dryas III, Preboreal, climate change, Black Sea level rise, flint knapping traditions, food procurement strategies, social behavior

Introduction

The theory of ecological crises as important driving forces in the paleohistorical process was put forward by Sergey Bibikov in the late 1960s in connection with his complex studies of hunter-gatherer economy and modes of life on the eve of the transition to a productive economy. He viewed prehistoric ecological crises as being integral with paleoeconomic crises, interpreting both as an objective and natural result of prehistoric production activity taking place in a permanently changing environment. For the period 9000-6000 B.C., he distinguished several stages of crisis development that correlate with phases of paleoenvironmental evolution as well as with changes in the livelihood of hunter-gatherers (Bibikov 1969).

His speculations stimulated intensive field investigations of fauna and flora, climate, and geomorphology in the Late Pleistocene and Early Holocene, which were followed by modeling of the paleogeographic conditions in territories mainly centered upon archaeological sites at periods of time when the sites were occupied. Such investigations in the northwestern Black Sea region (NWBSR) have resulted in the formation of a comprehensive paleogeographic database, which includes palynological, paleontological, paleoclimatic, and geological data. Results of interdisciplinary investigations of archaeological sites of the same period offer the possibility of (1) reconstructing human responses to the variety of challenges put forward by nature, (2) delineating the main components of the ecological crisis in the NWBSR at the Pleistocene-Holocene boundary, and (3) detecting stages in the crisis development through time.

Ecological Crisis Components: Environmental and Social Implications

Up to the very end of the 20th century, two phenomena were usually mentioned as basic components of the ecological crisis in the NWBSR at the Pleistocene-Holocene boundary. One of them is the transformation of the faunal complex resulting from non-sustainable human behavior in the previous period, such as Late Paleolithic bison overkills complicated by over-crowding of the NWBSR during the LGM, which brought about a general exhaustion of its demographic potential (Bibikova 1978). Replacement of bison and horse herds by aurochs and smaller horses implies a transition from collective procurement of large, gregarious game toward the hunting of small non-gregarious species mainly by small groups or individually. In its turn, this stimulated a re-shaping of traditional tool kits by NWBSR inhabitants (first of all, in their hunting weapons, game butchering tools, and other processing inventory) and a re-structuring of economic units.

The other 'traditional' feature of the ecological crisis is change in the floral complexes and species composition, which usually is regarded as being caused by climatic oscillations during the Last Glacial retreat (Artyushenko 1970). This phenomenon, in spite of the obvious importance of vegetation in the diet of prehistoric hunter-gatherers, is one that had a minor impact on human livelihood strategy at the Pleistocene-Holocene boundary.

Recent studies of Black Sea basin history at the Pleistocene-Holocene boundary provide fundamental background for viewing the rise in the level of the Black Sea and the attendant

coastline migration as one more important component of the ecological crisis of the region under study. This agency takes on special importance in light of the animated ongoing discussion between proponents and opponents of the Great Flood theory, in both its Mediterranean and Caspian versions as proposed by W. Ryan et al. (2003) and A. Chepalyga (2002). It needs to be stressed that, in the case of the dry Pontic steppes, the history of formation and early activity of the estuaries (lakes and limans) and watercourses (e.g., rivers, springs) is equally, if not more, important than transgressive Black Sea shoreline migration.

Re-shaping of the hydrological network together with the emergence of a new Black Sea coastline and adjacent drylands created new living spaces that needed to be explored by the local population. Occupation system, choice of settlement location, the possibility of contacts among groups inhabiting different niches, and other aspects of human spatial behavior on a macro-level (living space exploitation system) were, in many respects, determined by these features.

Ecological Crisis Dynamics through the Time: Perspectives of Further Studies

The first evidence of ecological crisis in the region under study is usually correlated with the LGM, and its development through time is traditionally correlated with stages of the Last Glacial retreat. The rapidity of the latter process makes it impossible, in most cases, to detect their display simultaneously in paleogeographic records and in remnants of human activity.

The contemporary database offers the possibility to speak about the Allerod and Dryas III- Preboreal boundary as the only phase of the ecological crisis displayed in the NWBSR archaeological and paleogeographical sources. It correlates well with Black Sea level changes and coastline migrations in the course of the Final Pleistocene-Early Holocene Neoeuxinian transgression, phases of which correspond with the main climatic stages of this period.

The most interesting information about the peculiarities of ecological crisis development through time has resulted from the correlation between stages of environmental change with phases in the appearance of new traits in human social behavior, procurement and flint- knapping activity, and the living space exploitation system. In most of the known cases, cultural development related to changes in lifeways shows a direct connection with climatic stages of the Late Pleistocene.

Conclusions

A state-of-the art database containing archaeological, paleogeographic, and geological information concerning the particularities of human occupation in the permanently changing environment of the NWBSR at the Pleistocene-Holocene boundary has led to the detection of two basic components at the core of the coeval ecological crisis. These components can be traced through time and reveal details of their effect at every stage of cultural development. One component reflects the main parameters of the resource base, including principally the main hunted species, their abundance, behavioral characteristics, and accessibility. The other component reflects the spatial behavior of the population, of which the social and ethnic implications need further examination.

Correlation between environmental dynamics and culture change at the Pleistocene- Holocene boundary opens wide perspectives for calibrating human adaptability in its elemental detail and as an integral whole.

References

Artyushenko A.T. 1970. Rastitelnost' Lesostepi i Stepi Ukrainy v Chetvertichnom Periode [Vegetation of Forest-Steppes and Steppes of Ukraine in Quaternary Period]. Kiev: Naukova dumka. (In Russian).

Bibikov S.N. 1969. Nekotorye aspekty paleoeconomicheskogo modelirovaniya paleolita [Some aspects of paleoeconomic modeling of Paleolithic], Sovetskaya Arkheologia [Soviet Archaeology] 4:5-22. (In Russian).

Bibikova V.I. 1978. Fauna iz mesoliticheskih poseleniy Belolesie i Girzhevo (Nizhneye Podnestrivie) [Fauna from the Mesolithic settlements of Belolesie and Girzhevo (Lower Dniester region)]. In Arkheologicheskiye issledovaniya Severo-Zapadnogo Prichernomoriya [Archaeological investigations of Northwestern Pontic region], P.O. Karyshkovskiy, ed., pp. 17-29. Kiev, Naukova dumka. (In Russian)

Chepalyga A.L. 2002. Morskie basseiny [Marine basins]. In Dinamika landshaftnykh komponentov i vnutrennikh morskikh basseinov Severnoi Evrazii za poslednie 130 000 let [Dynamics of Terrestrial Landscape Components and Inner marine Basins of Northern Eurasia During the Last 130,000 Years], A.A. Velichko, ed., pp. 165-213. GEOS, Moscow. (In Russian).

Ryan W.B.F., Major C.O., Lericolais G„ Goldstein S.L. 2003. Catastrophic flooding of the Black Sea. *Annual Review of Earth and Planetary Sciences* 31:525-554.