The Interpretation Of The Plant Macrofossil Data

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Introduction

Reconstruction of leteticheskih Holocene foundations based on pollen sediment records from the Nordic countries shows the beginning of the summer heat about 9000 years ago. However, the reconstruction of the pollen-based temperature is due to changes in the scale of taxa ratio trees, and thus, the early signs of the Holocene can be delayed due to the imbalance between humans and climatic, geographical trees. Here, summer temperature estimates based on aquatic plant macrofossils in North Europe, compared to a polygon-based refurbishment of the Holocene, are warmer under 2 ° C (11 700-7 500 years ago). When the delay in the formation of the potential of the trees was identified in the Holocene (7,500 years ago), the temperature decreased in each area of research. We have demonstrated that the macro-aquatic plant recording makrofossilnye can be further informed and the evolution of the Holocene temperatures available at the beginning of Europe to the north and further provide it to support the development of post-hectic climate on a multi-data fusion basis.

Climate Irregularly warmed during the last ice article (late glaciers around 14 700-11 700 kB (up BP = 1950)) and then heated rapidly until the temperature after the start of the Polar Holocene. During the first Holocene millennia, summer temperatures came up to 2 ° C (Maximum Holocaust Thermal). This was noted on the highest northern latitudes due to litter supports that had high summer months. After the ice core layer melts and the circulation stabilizes in the North Atlantic, summer temperatures are more than the current value. 9,000 and 7,500 years of KB1.

Most golotcenovyh first temperature refiners are derived from the exclusion of terrestrial fossil pollen complexes to local components, such as aquatic plants, and indicate that the pollen record shows local vegetation and, thus, climate change. The long-term population did not consider the delays in the expansion tree in response to early Holocene healing caused by time and derevev4 propagation to moderately slow duplication.

The classic Danish work of late ice Iversen5 flora indicates that aquatic plants can provide a more accurate climate change record from the lateral and at the beginning of ice compared to the trees due to the higher dissolved rates. However, studies have been scarce on the post-glacial decay of decaying aquatic plants. Bulletin reports show that aquatic plants continue firmly with melting the glacial fraction and achieving the current levels in North America on the Holocaust. Since quantitative climate reconstruction using insufficient water-makrofilnyh data, the value of the spread of climate index and large-scale dynamics of aquatic plants in holocoen is still weak. Modern research shows

that the behaviour and distribution of birds through water systems11 are the most significant and fastest ways to spread. Luath Holocene makrofossilnye records or lake sediment are typically characterized by communities of relatively different aquatic plants, which means rapid early Holocene colonization when the population of terrestrial pollen shows the balance of climate and uneven vegetation with low volatility and low productivity.

Holocene pollen-based refurbishment of summer temperatures obtained from Northern Europe extracts the most common pollen in kaynaklanmaktadır2, and temperature of changes in Tucson is usually the eastern part of the European spice (Picea Abies) as it will be without harmonization with an increase in some tree pollen Tassone. Northern Fennoscandia in Russia, Pine (Pinus sylvestris) and southern Fennoscandia and herbage herbs in the Baltic States (feather, Alnus Glutinosa, Ulmus glabra, common collision, Tilia cordata and Quercus robur). Regarding the temperature reconstruction of the pollen direction of the temperature, as a result of climate imbalance and tree species distribution and population dynamics, we accept that Hoboken can postpone climate warming to the early stages. Pollen from climate reconstruction of the possible shortcomings, especially the intergenic ice change of study using independent data as paleo-climate modelling data pollen is the most widely used data in data proxy application common source comparison. To test the hypothesis, the corresponding individual data records can be provided with sizeable aquatic fossil plants. With a faster response time, aquatic plants can show a real change in temperature faster than the pollen-based temperature reconstruction.

Modern pollen refurbishment is usually based on the temperature (the remnants of the parental seed of a parent) and associated climate variables (measurable climate standards) based on pollen-climate calibrations obtained using large datasets. Massive fossil transformations, without data, which are proportional to the core and surface of calibration sequel sets as shown in Vagrant and Al single lights on large community fossil taxa and their use of the distribution range contained therein current and environmental. South Fin – early-vaychelyanskogo interstadial series of Lapland.

In this study, compilation and comparison of water and telematic (helophytes) large fossil plants (in this section referred to as tjulm) and a terrestrial pail (hereafter tjulp) based on the temperature in July (Tjul). Seasonal restoration results are based on large aquatic fossil tacos and multilateral trees that can propagate faster than hypotheses, and that can react to the rapid Holocene temperature rebuild by the pollen in the hypothesis workspace, we recognize. Secondly, it is still spread towards the border, and thus, the climate, summer temperature, and tree pollen taxa inequality inevitably greatly increase the pollen increase.

Description And Interpretation Of The Pollen Data

Finland is relatively low, with few mountains in the northwest. The Okyanusluk continental gradient of today is notably noteworthy: as a rule, kıtasallık in the southwest (semi-oceanic) in the northeast (subcontinent) increases. Similarly, gradient precipitation is gradual, with a difference. 200 mm in the

south and north of Finland – 1. A country with 10 ° latitude imposed and causing rise to a significant increase in the northwest temperatures. Ca. Tjul Southwestern Lappish mountain south-east at 17 ° C 7.5 ° C As a result, Finland covers a different bioclimatic zone: Boreon-nemoral (mixed and deciduous suburban mixed and characterized by the southern region of bioclimatic), boreal (needle dominant deciduous forests) and Fo vegetation (boreal region between the wood line between Finland) mountain birch).

For this reason, the northern border of Finland has many plants. Except in most of the north, there is a limited distribution of rising climate (orohimicheskimi). Unlike many European countries, where the distribution of plants is strongly influenced by human activity, Finland can be considered to be in a relatively natural state. The geographical facts provide an excellent environment for the use of modern relationships between species and temperature, watching the temperature for paleoecological refurbishments. (see Figure 1) Regional clusters: boreonemoral boreal (Lielais, Nakra na Kankaanjärv, and Laihalamp lakes), sea boreal (Kråkenes Lake), Taiga (Loits Valve and Kipojärv Lakes) and sub-articulations (Njargajavr lake from Korsajavr na and Yansvatnet). Northeast data, where the Tsumeb and Toskala lakes are derived from literary records and lakes in Finland are located in various European Biochemistry to maintain a Russian record: northern boreal (LLET lake), the Arctic tree line (Tumbulovaty lake) and the pole Tundra (Loch harina). For comparison, the resilience based on pollen and large fossils from 11,700 to 7,500 kb timeslot is divided into four-time windows: 11700 to 10500, 10500 to 9,500, 9,500 to 8,500 and 8,500 to 7,500 KB.

Discussion

Recent estimates of migration rates following the amendment of the ice tree taking into account the protection of data makrofossilnyh pop tree populations in Europe, Central and Northern Europe, the Baltic region and later in the Mediterranean region of the Mediterranean (14 500). -11,700 cal. AD) 28,29,30,31,32,33. Ratings related to rapid progress (100-1000 m per year) on tree populations, extending from refusing from southern Europe to 34, reduced to 60-260 m of god35. Trees were reached at different times during the early Holocene (Appendix 1b). 30 Pollen and Russian macrofossils in the northeast of Europe show that the reaction of small populations of trees in northern climate change can have been over the centuries. However, the Baltic region has faster response times reported in the last intergenic glacier and cold weather events in the 8.2 ka.

Fennoscandia, the Baltic region and Ice dates in Russia are very different. Northern Europe Russia was frozen for the ca. 90 000 years 37. In the Baltic region, the western Baltic collapsed, and the later stages of the forced land appeared almost since then. 15,000 calories BP38. Here, macrofossils suggest that birch populations (Betula pendula), pine (P. sylvestris) and poplar (Populus tremula) are associated with the boundary of the Fennoskandii 1400-13 500 HEC melting plate linen, white spruce. P. abies) ca. 12 500 cals. BP28.29.39. Also, when Fennoskandiansky ice cream was lowering into a small area in the north of Fennoscandia, expansion trees extended to the Baltic region in the early Holocene. Therefore, the impact of the development and migration of trees for pollen-based

rebuilding can be less pronounced in the Baltic region than in the north.

In Russia and Southeast Europe, Tjulp and TjulM show closer thermal evolution. Makrofosfaty TjulM must have regional significance, which is higher than the BPLP (<15 ° C) to 7,500 tonnes for the earliest Holocene. Thin refurbishment that does not depend on one of our regions> 14 ° C, support of Chironomidae tundra donors of Lake Harineya 41, rebuilding TjulM at about 15 ° C. Also, macrofossil data in the southwest areas of Karlinsky and Yaroslavl soon Holocaust with tile 15 ° C (see 13, 42). In Russia, we see that our Tulul, found by 15.7 ° C macrofossils, is only held on the spot of Typha seeds. At present, latifolia Typha angustifolia and Typha must very clearly distribute the interval of the regional climate parameters (Annex 4, Den Virtuella floran, https://linnaeus.nrm.se/flora/welcome.html).

The northern boundary is T. latifolia ca. European Department based on plant types in Finland at 17 ° C (Den Virtuella floran) and restructuring of our temperatures in Russia. You are usually one of the first tacsones that should be identified in the makrofossilya13 recorded (Appendix 5). Very productive, scoop, fast taxa. New areas of colonization can be fast in the environment, suitable for the area of 58 m2 from semeni43 for two years. Also, if the current allocation of Elatinskoy hydroelectric in Europe (Den Virtuella floran) is described, make sure that it is present throughout. The Lake Harini SL 11000 also demonstrated TjulM, greater than 17 ° C, to maintain climate results, Typha data. For this reason, if Russian distribution data is used, the Holocene tide is near. 2 ° C higher than TjulP. This highlights the difficulty of reliable and detailed distribution data and reliable meteorological data correlations. As mentioned earlier, greater continental regions have higher temperature limits, and regional variations should ideally be considered.

The most remarkable difference between refurbishing macrofossils and macrofossils is found in sub-Arctic and northern Fennoscandia boreal, which results in a temperature of 2 ° C – 4 ° C above 8500 KB (figure 2). Reconstruction is based on large numbers of aquatic and other molecules. At least a few species of water suggest TjulM. 13-14 ° C, but TjulM> 15 ° C. suggests the presence of Typha and Lithuania Glyceria in the northern boreal regions.

Macroscopic pine (P. sylvestris) indicates that the tide is 9,500 KB in the northern boreal region (Appendix 1b). TjulP delayed delay may affect late spreading near the northern border and low pollen production44. He did not reach the highest and highest places to the north discussed here. The pioneer vegetation Holocene taxa local vegetation covers, such as deposits and grass with a relatively weak indicator of temperature, abundant pollen, which can be suspended by the surface of the trees and the pollen-based temperature signal. Northern Bosnia and Herzegovina contrasts with the southern regions, in the case of the northeast of Europe and Russia, as well as the presence of the more significant trees, such as late glaciers. The slow spread of trees on the north side caused the most significant difference between TjulP and TjulM in northern Fennoscandia.

Description And Interpretation Of The Plant Macrofossil Data

Aquatic plants can quickly spread within their climate tolerances and rapidly suitable new colonization habitats after significant warming. In the last few days, with 50 km long Elodea canadensis and 50 km in Finland for more than 50 km for 50 years, Aquatic plants can spread through the Arctic Ocean about 500 years after the final ice border in Europe. Early insolatsiya46 high Holocene will lead to the hot summer season together with a weak summer temperature gradient between 60 and 70 ° c. Sh. During the early Holocene, he allowed a rapid breeding permit to the north. New habitats in the lake have been kept fast, with constant and continuous destruction and a lack of geographical obstacles11. In North America (6.7), aquatic species are spread rapidly along the edge of the ice cream melting and accessing modern distribution ranges in the Holocene, effectively increasing the appropriate environmental conditions, including the hot summer temperatures. This model has probably been reproduced in North Europe. On the contrary, TjulP, which is very dependent on the tree pollen tacson, does not detect rapid warming soon. Unlike water plants, woody species have long-lived features and the requirements of a relatively slow population drop between 20-500 years, low productivity, raspredeleniya44 pollen boundaries and soil requirements that are not immediately available ice. The sheet is melted.

Holocene summer temperatures in the Northern Hemisphere continue to become worse during emergency summer after 11,000 calories. BP46. However, depending on the model or proxy used, the maximum temperature of the Holocene years is usually ca. 9.000-7.000 KB and around ca. 5,000 cal. AD and the ice and ice dynamics1, 19, 49. In contrast, data from the European macrofossils show high latitudes, that previous heating began (Fig. 2) and that the modern Tulle was earlier than its resin based on pollen, ranging from 11 500-8500 BP22,50,51,52. Independent evidence declares the fastest concept of Holocaust in Northern Europe. This includes re-temperature by chironomids from the Kola Peninsula, northeastern Europe, Russia and northern Fennoscandia, diatomic and geochemical data from northeastern Russia, makrofossilnyh data from Karelia and Western Russia and reconstruction of surface temperature North North Atlantic.

It is important to check the early thermal maximum of the Holocene and the values obtained from the makrophosphatov in the soil through the systematic comparison of independent evidence. How generously did we make clear that the Holocene is stronger than previously appointed? More developers from North Europe are required to test the models that are currently shown because of limited data. Like all biological proximity, makrofozila disadvantages of the introduction of a lie to the fact that, as a rule, makrofossilina relatively small numbers of rejuvenations compared to pollen grains and a large number of false absences that can be caused due to low availability of macrofossils and limited conservation. However, molecules are often determined by species level that can be used by indicators.

In summary, the TyulM Bureau-emerald-lacustrine seductive plant-macrofossil in northern Europe is

characterized by a high temperature (> 13 ° C). Early modern silicone Holocene exceeds 2 ° C 7.500 KB Water and telemetric plants responding to Holocene heating cap may after the ice is melted carefully. Even results in Scarlet Markovic-Fossil waters show that local plants can be used as indicators of the recovery of Tulle. Pole TjulP, as a rule, is lower, and modern values are subsequently exceeded in micrographic records. The difference between the temperature assessment and the early Holocene makrofossilnoy temperature was the largest in northern Fennoscandia and lasted to 8500 KB, while the trees scattered across the region. The differences in the regions were boreal-nemoral and lower water but were consistent in the early Holocaust. The geographical pattern indicates that the spread of the membrane is relatively slow in the north, and the creation of the record pollen trees has a significant impact on TjulP, which causes the early Holocene temperature, based on pollen, due to non-climatic factors, is shown to reflect in the communities of the fossil pollen. At the centre of the Holocene, the TjulP and TjulM restructuring come together in each research area.

The lack of incompatibility between the macroscopic reconstruction and pollen of the history of Northern Europe leaves, perhaps especially in the Arctic, ignoring the effects of the high summer sun during the Holocene soon. The result requires a proxy work related to macrofossils and pollen, as well as another independent proxy that can provide a resumption of summer temperatures, such as Chironomidae recording. Paleoclimatic models are often shaped by the recent restructuring of climatic processes against pollen compared to pollen temperatures. If the Holocene is early, temperatures have been higher than the pollen regeneration temperature; it changes the concept of climate growth from the late Late Age to the Early Holocene Ice. The paleoclimatic models should be reassessed and tested against a new paleoclimatic case. If the climate change model can be successfully withdrawn, we can be more confident that climate change in the future for the model.

Discussion And Conclusions Of The Plant Macrofossil Analysis

The Tjul-based values of a hole are considered to be the burden in, e.g., from sample to sample, Cereal-specific media c. Average for Russian sites. Although it is slightly higher at 1,05-1,15 ° C for fennoskandianskih and Baltic areas with 0,85-0,95 ° C, because a calibration dataset in Russia is smaller, and by type, fewer responses have been announced for this reason. Practically, the pollen-based rebuild is usually a significant amount of a sample of noise from the sample (see, For example, Fig. 1a) due to random changes in the selection of Palin (a). Some samples are (b) tafonomicheskie processes and (c) non-climatic factors that affect pollen production. For this reason, the only pollen community climate value can be desirable. For this reason, stereographic-based rectification rights are often corrected using a local weight loss regime, as herein. To get the TjulP time window value, we use carrier-specific values for Tjul within the time window to represent the typical Polynesian Tjul value in the time window. In this case, we assume that the sample example is the example of the sample in the window-mostly noisy, and there is probably no real-time variability due to the windows of a short time.

Because the case is with the pollen, there are no estimates of error with specific models that can use the types of macrofossil markers. However, we believe that the method used here is a huge deficit in the estimated average Tjul recovered species. Tjul's restructured species share is based on the modern median centre of Tulle views in mesh cells in its unique education on the modern northern border. The Tjul Center values include each of the unique events, including those found in the appropriate mikrobitatah of an unusual level with the ideal Tjul microclimate and the perfect combination of environmental factors with secondary ecological importance. For this reason, we believe that it is inconceivable that the species-specific requirement is applicable and that Tjul be lower than the derivative value here. Also, we believe that TjulM has acquired conservative values (that is, low). Measures of the greatest TjulM imagine revaluation that can be found from the difference between the observed environment «Tjul» and «the lowest observed» Tjul, the northern distribution limits for each species. The average differences vary slightly from 0.50 ° C to 0.02 to 1.24 ° C (Table 2 Appendix). Therefore, if the July estimates are based on the lowest net Tjul – many of the reasons mentioned above would barely be enough – tjulm – tulip anomaly falls slightly more 0than,1 ° C, and in particular, The Holocene is a major anomaly> 2 ° C much higher than the estimated septum. Pollen-based reconstruction. In most cases, a proxy with the same sediment article was analyzed, and both proxy-based data based on the same model are age depths and uncertainties that relate to the early formation or depth of chronological age, meaning that they must be small.

Reconstruction Interpretation

The lowest average Tjul forecast derived from tjulm value and "false absences" is predictable, depending on the capabilities known, the higher Tjul requirements cannot be excluded on the basis that there is no large local object fossil tax fossil. It's a macro-fossil record in the factory. For the sake of comparison, improper pollen is inappropriate compared to macroscopic plants and is impossible when much larger amounts of data are produced, and pollen, due to the uniform distribution and most likely to cause a negative deviation compared to jump, is a positive taphonomic process. Due to the low estimate for the average tjulm Tjul Tjulm negative nature – it is challenging to interpret anomalies such as anomalies, high temperatures or the absence of large-scale fossil abuse. Most major slopes require that they be significantly verifiable. macrofossil or pollen. To compare, TjulP-TjulP anomalies that can be seen to be more reliably more reliably can show a negative deviation in TjulP values. In particular, for methodological reasons (see. The preceding article), it is considered that the value of its overemphasized TjulM cannot be predominantly. Ba – (tjulp tjulm positive anomalies) were significant (up to 2 ° C); we pay particular attention to cases where the frequency is greater than the space-time of our analysis, the estimated tjulm value tjulp. Pollution is a negative tendency in the reconstruction.

Most of the well-prepared salts and pollen (more than 50% of all samples) are offered. According to a survey carried out in a large aquatic environment, the police community depends, as a rule, on regional elements. Most of the pollen granules that accumulate in smaller, small pools are the largest local elements. Bennett (1986), as mentioned in this paper, suggests that the grunge of the police

from the reservoir will exceed the wind through existing waterways. However, polygonal analysis on surface sediment in Lagoa Salgado, in the north of the province of Rio de Janeiro, showed a great impact of wind direction on the accumulation of pollen grains.

Grass in the Guanabara Bay pollen communities. Ba Poatea was the dominant rangeland of pollen type, followed by the density of Brassica, Amarantus / Chenopodiachea Borrero and Chamaese.

In addition to the island Mandaue sector, grassland taxonomy was observed in 90% of the samples analyzed in the western region, north of the island Gonolador. This reflects the new vegetation on the edge of the island (Fundão and Governador). These plants were mainly considered in the damaged parts of the bay and on the riverbank. The northwestern part of Guanabara Bay is considered to be the most contaminated area, associated with the evacuation of the most polluted rivers and offering the lowest amount of pollen grains. The most populous forest enrichment of regional pollen types, derived from vegetables and high salts, mainly Guapimirin (East Bay) values, are observed in its sediments with the river in the north of the Ape edge of the ocean. In the western part of the bay north of Bayador Island, it was the umbrella branch of an umbrella (more than 10% in each sample).The most important of alcaloïde, Anadenather to, Arecaceae, Karkasovye, I Hedyosm, Lecythidaceae, lecythis comes Rapane and treme. According to one study, Alchorne, Arecaceae, and Celtis are Hedyosm, Meliacea and Treme, which are important Ombrophilous vegetation of tree forests living in the lowlands.

Podocarpus lambertii, in order of Montana Forest, was given in a unique example near the southwest edge of the best bay. Cyperaceae, Scrophulariaceae and Typha were the most important types of Hydrorophyte pollen. An increase in the percentage of samples near Guapimirima APA may be associated with vegetation on rivers flowing into the sheep sector. One mascot, mangroves, which is registered at the edge of the southern Gulf of the middle and eastern parts of the innermost part of the harbour, can be attributed primarily to the proximity of the Guapimirima APA mangroves. Rhizophora is the most common type of mangrove pollen and a producer of pollen. Avicennia is a low pollen manufacturer and is considered wind-pollinated Rhizophora and Avicennia insect pollination. According to Jackson (1990), the ugly pollen that carries animals tends to be near the source of the plants and does not adapt to the spread of the wind. Barreto et al. (2007) and Barth et al. (2004) Holocene investigation nucleus deposition nucleus present pollen located near a packet island (approximately 8 km from mangrove forests Guapimirimskogo).

A.P., showing mangroves at sediment level 4,210 years. San Thiago (São-Thiago, 2005) analysis of a sedimentary core collected in some northeastern part of the bay, adjacent to the Guapimirima APA opening the original landscape forests with proximity to mangrove forest wood and tropical rainforest.

The largest percentage of exotic breeds, mainly, is considered at the entrance to the Gulf and the island of Fundao. The regions of these regions depend greatly on these regions. Pinus pollinus, an exotic appearance, was more widespread than used to recover the same areas of Europe, which emphasized human activity in the region. In all cases of this industry, the concentration of Fern

disputes was almost constant. The presence of Botryococcus (moss) indicates that the freshwater source is nearby.

Details were found on the hole that had a good representation of regional vegetation, and various collar concentrations were observed in different parts of the bay. For this reason, each sector should be analyzed separately to better understand the distribution of palynomorphs in the coarse sediments.

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