Dziguta 2

Further information regarding this site is contained in the article by Arslanov, Gei, Lyadov, and Tertychnaya (1980). This article contains the full pollen diagram which also appears in Levkovskaya's Atlas, but at the same time it is not identical to the two articles which preceded and succeeded it (1976 and 1987).

The article by Arslanov et al. (1976) dealt with the upper part of the peat bog (a thickness of 1.20 metres) and relied upon the samples taken in 1973. This article describes the results of the work carried out in 1975. A sounding was put down in the vicinity of the 1973 site, two metres higher up the slope, when it reached a depth of 6.30 metres, with an organic deposit 4.90 metres thick. The section is illustrated on the left of the peat bog Figure, with appropriate depths. In the key, 13=peat, 14=gyttja, 15=sandy loam. The top part of the deposit (layers 1 and 2) is not shown. The description of the layers, with their depth from the surface in metres, is as follows.

1.	pale yellow sandy *loam* with gravel and pebbles	0-1.0
2.	compact greyish-brown ferruginous *loam* with gravel and boulders	1.0-1.4
3.	brown clayey *gyttja* plastic and damp	1.40-1.75
4.	compact brown *peat* damp with tree trunk and branch remains	1.75-2.45
5.	brown compact *gyttja* plastic with remains of trees	2.45-3.05
6.	brown compact *peat* filled with remains of tree trunks and branches	3.05-4.60
7.	bluish-grey *sandy loam* with gravel and pebbles and branch fragments	4.60-4.70
8.	compact brown *peat* with some bluish-grey sandy loam, with tree trunk and branch remains up to 0.3 metres in diameter	4.70-5.30
9.	bluish-grey *sandy loam* with gravel and pebbles, not layered, with scattered remnants of tree trunks	5.30-5.85
10.	brown compact *peat* damp	5.85-6.10
11.	bluish-grey *sandy loam* with gravel and pebbles, water saturated	6.10-6.30

Gei studied 51 samples taken at 5-20 cm intervals from this section. In general, NAP is scarce. Spores are dominated by Polypodiaceae. 9 pollen complexes were identified (numbered I-IX in the Figure). The sequence was also analysed in terms of 7 stages, identical to the complexes, except that complexes V-VII were amalgamated into one. The stages show rhythmic changes in the natural conditions at the site. In the following summary, the complexes and stages are amalgamated, and mention is made of the radiocarbon dates at the appropriate point (they are listed together on page 137 of this article).

Stage I. Complex I. 6.3-4.5 metres.

Spores predominant 49-85%. AP 14-43%. NAP up to 5%. Within AP, dominant Abies 39-84%. Other coniferous Picea and Pinus not more than 10%. Alnus in a secondary position 8-41%. Deciduous species Carpinus, Ulmus, Tilia rare, only Fagus is constantly present.

This stage is marked by dominant woods of fir, with some beech and alder, the latter on low lying ground. Climate relatively cold and damp. The dates quoted, with their appropriate depths, are as follows.

42,760±660	LU-647A	4.70-4.85 m
41,710±740	LU-647B	4.70-4.85 m
44,130±630	LU-606	5.00-5.10 m
47,320±1050	LU-601	5.85-5.95 m

On this basis, it is considered that this stage could have lasted about 4500 years.

Stage II. Complex II. 4.5-4.05 metres.

Dominant AP 44-62%. NAP 1-6%. Spores 34-53%. Within AP, a sharp increase of Picea 31-61%. Abies 15-42%, Alnus 12-35%. Deciduous species rare, Fagus, Carpinus, Ulmus, Castanea, up to 0.5%.

This stage shows a reduction in fir and an increase in spruce, i.e., these are dark coniferous woods. Climate damp as before, but cooler.

Stage III. Complex III. 4.05-2.95 metres.

Dominant AP 48-91%. NAP up to 7%. Spores 3-23%. Within AP, dark coniferous reduced. Abies not above 11%, Picea sporadic. Alnus dominant 74-94%. A deciduous maximum of 16%, notably Fagus 0.6-11%, Carpinus 0.4-1%, Quercus 0.3-1.6%, Ulmus 0.4-1.4%, Tilia 0.5%.

This stage is characterised by dominant alder, with some fir and beech woods. This represents a sharp change and may indicate that there was a gap in accumulation of the deposits. Climate relatively warm and damp. The beginning of this period corresponds to the radiocarbon date of 41,200±710 (LU-648) on material at a depth of 3.70-3.90 metres.

Stage IV. Complex IV. 2.95-2.75 metres.

Dominant spores 46-57%. AP 39-48%. NAP 3-5%. Within AP, an increase in Abies 24-27%, although as before Alnus is dominant. No Picea, Pinus rare. Deciduous species include Fagus 0.8-5%, Carpinus 0.4-1.7%, Ulmus 0.4%, Quercus 0.8%.

This stage is transitional between stages III and V. Fir and beech woods have increased but alder is still dominant. Climatic conditions resemble those of Stage III.

Stage V. Complexes V-VII. 2.75-1.95 metres.

Complex V. 2.75-2.65 m. Dominant spores 51-68%. AP 29-47%. NAP 1-2.5%. Within AP, there is a continued increase in Abies 54-60%. Alnus 33-41%. The deciduous total does not pass 3%, with isolated specimens of Fagus, Ulmus, Castanea, Tilia.

Complex VI. 2.65-2.30 m. AP 41-64%. NAP 3-5%. Spores 32-55%. As in complex IV, AP is dominated by Alnus 52-64%, with Abies in second place 26-43%. Rare Picea and Pinus. The deciduous total does not pass 6%, with isolated specimens of Fagus, Carpinus, Castanea, Tilia.

Complex VII. 2.30-1.95 m. Practically identical to complex V, variations in the dominant species being in the range ± 5%.

This stage is characterised by fir woods, with some beech and alder. The larger area occupied by alder in complex VI is probably accounted for by changes in the ground water regime. Relatively cold and damp.

Stage VI. Complex VIII. 1.95-1.75 metres.

Dominant AP 72-84%. NAP 4-13%. Spores 15-19%. In terms of the AP component, this complex is sharply distinct from all the preceding ones. Dominant Pinus s/g Diploxylon 42-80%, Alnus quite high 16-50%. Picea and Abies as well as deciduous species rare.

This stage signified a drastic change to a colder and drier climate and the almost complete disappearance of dark coniferous woods. Pine and alder predominant. The beginning of this stage is said to correspond to the radiocarbon date of 38,280±240 (LU-599) on material at a depth of 1.75-1.90 metres.

Stage VII. Complex IX. 1.75-1.40 metres.

Dominant AP 42-65%. NAP 2-7%. Spores 32-46%. Within AP, Pinus is reduced to 2-17%. Alnus and Abies are increased to 58-87 and 15-33% respectively. Picea is rare. Fagus is present throughout 0.7-1.8%. Occasional Carpinus, Quercus, Ulmus, Tilia.

This stage shows that alder was dominant in low lying areas. Fir and beech had a significant role, while pine was much reduced. Relatively warm and damp.

In sum, it is concluded that the Dziguta peat bog accumulated over a period of about 9000 years, from c. 47,320 to c. 38,280 years ago. Most of the time the vegetation consisted of dark coniferous fir and spruce woods, with an admixture of beech and alder. The warmest interval, starting around 41,200 years ago, was characterised by fir and beech woods, together with alder. From 38,280 onwards, there was quite a pronounced cooling and aridification, as a result of which dark coniferous woods gave way to pine. Subsequently, there was some improvement, with the presence of fir and beech woods. In general, the Middle Würm period, represented here, was colder than now.

Comments

Dating. Referring back to the earlier comments, in relation to the 1976 and 1987 papers, as well as Levkovskaya's diagram, one or two things are clearer. We now have laboratory numbers for the two dates which were hitherto without (41,710 and 44,630) LU-647B and LU-606 (except that 44,630 should be 44,130). 41,610±760 (LU-376) - which is included by Levkovskaya - does not appear in the 1980 article, it is taken from the 1976 account, where it was said to be at a depth of 2.40 metres (albeit in a different section). There seems to be a problem with the date 38,280±240 (LU-599) which was found at a depth of 1.75-1.90 metres and was reported for the first time in 1980. It is supposed to mark the beginning of complex VIII (stage VI). In the 1987 account, this date is now said to correspond to the end of "warm period 2". The beginning of that period is said to be marked by the date 41,200±710 (LU-648). At a depth of 3.70-3.90 metres, this date in 1980 was said to characterise the beginning of complex III (Stage III). The implication seems to be that in the 1987 account stages III to V have been amalgamated into a single "warm

period 2". This may well be the case. It would provide a correlation between the 1980 complex VIII (Stage VI) which is definitely colder with dominant pine and the "colder interval" in the 1987 version which is said to follow "warm period 2". Levkovskaya's diagram seemingly does not use this date at all, but rather 38,580±920 (LU-378) which comes from the 1976 account where (as already pointed out) it is recorded as being at a depth of 1.50 metres and not 2.0 metres. [NOTE. On page 2 of the printed first Dziguta summary where the 1976 dates are listed Microsoft Word has wrongly inserted successive numbers! The depths for the second and third dates are **1.50** and **2.40** metres respectively!]

Stage/zone correlation. Levkovskaya's "published zones" for Dziguta, if they refer to the 1980 version, are not correct. For example, stage I (complex I) is supposed to be at a depth of 6.3-4.5 metres, but in Levkovskaya's version this corresponds to zones 1 and 2. There are similar discrepancies with regard to her zones 3-5. Her zones 6 and 7 do however approximately coincide with stages VI and VII (complexes VIII and IX). This matter does need to be clarified.

New results in 1987. The latter part of the sequence, published in the 1987 article, is quite new, from "warm period 2" onwards. The radiocarbon dates (apart from LU-545, which provides a link to the 1976 section) have not hitherto been reported. Presumably the results from a third section at the site are reflected here, carrying the story forward to the late glacial period and then the Holocene.

Reference

Arslanov, Kh.A., N.A. Gei, V.V. Lyadov, T.V. Tertychnaya. (1980). New data concerning the geochronology and palaeogeography of the Middle Würm in Abkhazia. (in Russian). In ed. I.K. Ivanova, N.V. Kind, *Geokhronologiya Chetvertichnogo Perioda*, Nauka, Moscow, 131-138.

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August 17 2006.