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TALLINN RADIOCARBON DATES VII

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This list comprises age measurements carried out at the Institute from 1979 to 1981. Anticoincidence variant was applied to attain higher counting efficiency of a 2-channel scintillation device. The introduction of a plastic scintillator as an active guard around the detector in the 2π geometry decreases the influence of high energy cosmic radiation and reduces the background ca 35 to 75% (Rajamäe & Punning, 1980). The application of an active guard with 4π geometry has proved most effective; as a result, the background decreased 85% to 0.65cpm with the volume of scintillation cocktail 5ml. We have improved our methods for decreasing the actual error of the background. The application of a control channel and consideration of barometric effect results in the increase of dating limits of up to 5000-6000 years (Rajamäe, 1981). Samples are calculated using a half-life of 5568 ± 30 years for ^{14}C. Results are reported in years before 1950. $\delta^{13}C$ measurements were performed on the mass-spectrometer MI-1201 and are reported with PDB as a reference standard. The reproducibility of results is ±0.2‰.

GEOLOGIC SAMPLES

Estonian SSR

Männikjärve series

Männikjärve Bog, ca 300ha, lies on S slope of Pandivere upland and belongs to Endla Bog system. Organic deposits, 765m thick are made up of 490cm bog peat, 50cm transition peat, 110cm mire peat. Peat deposits overlie sapropel, 150cm thick. Samples coll and pollen analyses 1978 by M Ilomets, Inst Geol, Acad Sci, ESSR.

Lab no.	^{14}C date	Depth (cm)	Sample	Degree of decomposition
Tln-364	690 ± 50	77-87	*Sphagnum* peat	8
-365	1450 ± 50	186-196	*S fuscum* peat	5
-394	1970 ± 50	235-245	*Sphagnum* peat	10
-366	2060 ± 40	286-296	*S fuscum* peat	5
-396	2780 ± 50	353-363	*Sphagnum* peat	5
-397	3340 ± 60	468-478	Medium peat	5
-367	3510 ± 80	500-510	Transitional *sphagnum* peat	25
-368	4370 ± 80	590-600	Fen peat	15
-395	4390 ± 50	646-656	Fen sedge peat	25
-369	9430 ± 70	743-753	Sapropel	—

Leeni series

Leeni Bog, 180ha, lies on SW slope of Sakala upland ca 20km from town of Kilingi-Nomme. Peat coll by hand-drilling in central part of bog

from deposit, 470cm thick, of which 380cm is peat. Samples coll and pollen analyses 1978 by M Ilomets.

Lab no.	^{14}C date	Depth (cm)	Sample	Degree of decomposition
Tln-402	200 ± 50	80-88	*Sphagnum* peat	10
-403	690 ± 40	160-170	Tussock *sphagnum* peat	5
-405	1000 ± 50	224-234	*S fuscum* peat	12
-404	1750 ± 40	268-276	*Sphagnum* peat	12
-379	2170 ± 40	323-331	*S fuscum* peat	10
-377	2420 ± 40	344-352	*Sphagnum* peat	30
-399	4080 ± 40	388-396	Transitional reed peat	70
-400	7770 ± 50	420-428	*Sphagnum* reed peat	20
-401	8320 ± 100	454-462	Sapropel	—

Tln-384. Korveküla **48,000 $^{+11,000}_{-\ 4460}$**

Upper part of sapropel from borehole 10km N of Tartu. Sapropel overlain by sandy loam and sands with organic remains. Sample dated on humus separated from sapropel. Coll 1978 by J M Punning and R Rajamäe.

Tln-398. Tostamaa **4920 ± 40**

Charred wood remains from 400cm depth, windward slope of dune, Tostamaa peninsula. Coll 1978 by E Martin, Inst Geol.

Tln-413. Viitka **10,950 ± 80**

Plant remains from borehole near Viitka settlement, SE Estonia. Sandy loam with organic remains underlies reddish brown till, 350cm thick. Coll 1979 by E Liivrand, Inst Geol.

Tapa series

Tln-430. Tapa **8470 ± 70**

Peat underlying lacustrine marl, 320cm thick, near town of Tapa, N Estonia. Palynol data by R Männil dates accumulation of marl to Boreal (Martma, Punning, & Putnik, 1981). Coll 1979 by T Martma and H Putnik, Inst Geol.

Tln-516. Tapa **6650 ± 50** $\delta^{13}C = -5.4‰$

Lake marl from depth 80 to 90cm.

Tln-517. Tapa **7880 ± 60** $\delta^{13}C = -5.7‰$

Lake marl from depth 180 to 190cm.

Tln-519. Tapa **9160 ± 80** $\delta^{13}C = -4.2‰$

Lake marl from depth 310 to 320cm from contact with underlying peat. Results show that effect of "hard" water has made sample older.

Karuküla series

Tln-443. Karuküla **⩾51,000**

Large tree trunk from intermorainic deposits in Karuküla sec, Borehole 2, in SW Estonia, near town of Kilingi-Nomme. Structure of section: humus horizon, till, sand, organic deposits (wood peat with wood remains, sapropelite), silt. Dated on cellulose fraction. Coll 1979 by J M Punning and R Rajamäe.

Tln-461. Karuküla **⩾52,000**

Same as Tln-443. Dated on lignin fraction.

Tln-452. Karuküla **⩾51,000**

Same as Tln-443, Borehole 5. Dated on cellulose fraction.

Tln-466. Karuküla **⩾52,000**

Same as Tln-452. Dated on lignin fraction.

Kunda series

Tln-497. Kunda **5670 ± 50**

Well-decomposed peat, 200cm thick, overlying lake marl from bog near Kunda, at depth 115 to 120cm. Coll 1980 by R Karukäpp, Inst Geol.

Tln-501. Kunda **8530 ± 70**

Well-decomposed peat at depth 196 to 198cm.

Tln-500. Kunda **9180 ± 300**

Well-decomposed peat from basal layer at depth 198 to 200cm.

Lahepera series

Lake, 102ha, E Estonia from relatively deep depression comprising thick sapropel layer (mean thickness 6 to 8m, max 13m). Three stages of lake development assoc with evolution of Peipsi-Pihkva lake basin. Mean accumulation rate of sapropel is 0.7 to 0.9mm/yr. In different climatic periods deposition rate fluctuated from 0.5 to 1.6mm/yr depending upon depth of basin (Palu *et al*, 1981). Coll 1981 by Ü Paap, Inst Geol.

Tln-547. **1020 ± 60**

Depth 220 to 230cm.

Tln-548. **1560 ± 140**

Depth 270 to 280cm.

Tln-499. **2250 ± 130**

Depth 400 to 410cm.

Tln-502. **2860 ± 70**

Depth 510 to 520cm.

Tln-503. **6680 ± 80**

Depth 810 to 820cm.

Tln-504. **8180 ± 80**

Depth 890 to 900cm.

Latvian SSR

Tln-475. Vetsatiki **38,000 $^{+3500}_{-2400}$**

Organic submorainic deposits from sec near Vetsatiki farm, Satiki settlement, Saldusi dist. Acccording to M Krukle, Geol Bd, Council Ministers, Latvian SSR, peat with sandy sapropel, 30cm thick, underlies till (60cm) and gray clay (170cm). Dated on biodetritus fraction ⩾ 1mm. Coll 1978 by M Krukle.

Tln-480. Shupulkalni **10,600 ± 50**

Wood peat from sec near Shupulkalni farm, Gubensky dist. Peat layer, 10cm thick, underlies medium sands, 180cm thick. Coll 1980 by J M Punning and R Rajamäe.

Tln-483. Lejasciems **36,000 $^{+3300}_{-2300}$**

Submorainic organic deposits on right bank of Gauja R near Lejasciems settlement. Scattered plant macrofragments overlain by till (550cm), medium sands with cryoturbation structures (85cm). According to pollen analysis by O Kondratiene (Arslanov *et al*, 1975) pollen types characteristic of periglacial flora prevail in submorainic complex. Earlier ^{14}C dates for same sec by H Arslanov are 32,260 ± 730: Lu-159 and 34,500 ± 790: Lu-311B (Arslanov *et al*, 1975). Coll 1980 by R Vaikmäe, K Joers, and R Rajamäe, Inst Geol.

Lithuanian SSR

Ratnichja section series

Exposure near estuary of Ratnichja R, town of Drusnininkai. Gyttja and peat with wood remains underlie sandy-clayey deposits. According to palynol data by O Kondratiene (1965) organic deposits are of Mikulian age. Deposits were dated previously by ^{14}C lab in Vilnius to 27,400 ± 440: Vs-56 (wood); 36,800 ± 1300: Vs-57 (peat) and by Tartu ^{14}C lab as 40,860 ± 50: TA-441 (wood) and 40,560 ± 600: TA-440 (peat) (Vonsavicius & Baltrunas, 1974). Coll 1977 by V Vonsavicius, Geol Bd, Council Ministers, Lithuanian SSR.

Tln-310. **⩾50,000**

Lignin fraction from wood in lowermost part of organic layer.

Tln-311. **⩾50,000**

Cellulose fraction from same wood.

Tln-406. **⩾50,000**

Cellulose fraction from wood in upper part of organic layer.

Tln-445. **⩾50,000**

Peat from upper part of organic layer.

Tln-467. Dange **39,000 $^{+1200}_{-1000}$**

Organic deposits from right bank of Dange R near Gvildziai settlement overlain by reddish brown till (100cm), various-sized sands (710cm), and silts (45cm). Coll 1978 by M Krukle. Dated on fraction insoluble in cold alkaline solution.

Tln-481. Dange **⩾55,000**

Fraction soluble in cold alkaline solution from Tln-467.

Byelorussian SSR

Tln-414. Borisova Gora **⩾53,000**

Wood remains from Borisova Gora, right bank of Zapadnaya Dvina R near town of Surazh. Sample from humus horizon overlying limestone and overlain by till. Coll 1980 by J M Punning and R Rajamäe.

Tln-424. Konevichi **35,000 ± 1300**

Peat from intermorainic deposits in scarp on left bank of Konevichi stream, flowing into Zapadnaya Dvina R. Clay loam with layers of well-decomposed peat overlain by till (ca 800cm) and sands (to 500cm). Coll 1979 by R Vaikmäe, K Joers, and R Rajamäe.

Tln-451. Konevichi **33,000 ± 950**

Peat (biodetritus) from same layer as Tln-424. Dates on fraction ⩾0.25mm.

Kasplyane section series

Sec in scarp on right bank of Kasplyane R ca 5km upstream from town of Surazh. Sec from top downwards: fine sand (175cm), purple till (480cm), and silt with layers of plant detritus (observable thickness, 210cm). Coll 1979 by R Vaikmäe, K Joers, and R Rajamäe. Dated on fraction of biodetritus ⩾0.25mm insoluble in alkaline solution.

Tln-425. **18,850 ± 80**

Sample from depth 20 to 30cm below moraine base.

Tln-473. **18,480 ± 470**

Sample from depth 80 to 85cm below moraine base.

Tln-472. **19,900 ± 180**

Sample from depth 110 to 115cm below moraine base.

Brigitpole section series

Sec lies on left bank of Zapadnaya Dvina R near Brigitpole settlement, ca 3km upstream from town of Surazh. Sec from top downwards: sands of different grain sizes (530cm), till (150cm), fine sand with scattered

plant detritus (65cm), clayey silt with layers of plant detritus (observable thickness, 65cm). Coll 1979 and 1980 by J M Punning and R Rajamäe. Inversion in ages may be due to allochthonous bedding of organic remains (Punning *et al,* 1982).

Tln-426. **30,000 ± 250**

Coll 1979 from topmost layer of organic remains ca 40cm below moraine base.

Tln-429. **17,300 ± 80**

Plant detritus from solifluction lenses ca 150cm below moraine base. Coll 1979.

Tln-438. **18,060 ± 90**

Coll 1979 from depth 150cm below moraine base.

Tln-484. **18,600 ± 130**

Coll 1980 from depth 140cm below moraine base.

Tln-482. **21,000 ± 110**

Coll 1980 from depth 150cm below moraine base.

Drichaluki section series

Sec in scarp on left bank of Usvyacha R (right tributary of Zapadnaya Dvina R) 2.5km upstream from town of Surazh. Sec from top downwards: clay loam (95cm), sands of different grain sizes (20cm), till (125cm), varved clay (25cm), fine sand (110cm), silt with interlayers of plant remains (100cm). Dates from ^{14}C lab at Leningrad State Univ on plant remains place culmination of last glacial transgression at ca 17,000 to 18,000 yr ago (Arslanov *et al,* 1971). Recurrent field work (1972-1980) and ^{14}C dates showed that submorainic plant detritus represents mixture of primary and redeposited (Mikulian?) organic matter (Punning *et al,* 1982). Coll 1979 and 1980 by J M Punning and R Rajamäe.

Tln-435. **18,100 ± 500**

Picea remains separated from macrofragments and sampled from depth 170cm below moraine base, id. by M Ilomets.

Tln-437. **18,700 ± 1000**

Betula nana remains separated from macrofragments by M Ilomets from same sample as Tln-435.

Tln-469. **15,960 ± 180**

Coll 1979 from depth 280cm below moraine base.

Tln-508. **22,000 ± 450**

Coll 1980 from same depth as Tln-469.

Tln-471. **17,880 ± 240**

Coll 1979 from depth 140cm below moraine base.

Tln-487. **19,760 ± 240**
Coll 1980 from same depth as Tln-471.

Tln-470. **20,000 ± 150**
Coll 1979 from depth 110cm below moraine base.

Tln-486. **19,700 ± 220**
Coll 1980 from same depth as Tln-470.

Arkhangelsk and Murmansk Districts of RSFSR

Tln-383. Koleshki **47,000 $^{+5900}_{-3400}$**

Peat from sec in scarp on right bank of Vaga R, tributary of Severnaya Dvina R, ca 3km downstream from estuary of Koleshki R. Sample from upper part of *Bryales* peat layer at alt +550 to 590cm. Coll 1979 by R Rajamäe.

Tln-410. Varzuga **⩾52,000**
Shells (*Chlamus islandica*) from sec on left bank of Varzuga R near village of Pletnego Poroga. Shells embedded in marine deposits overlain by till. Coll 1978 by R Rajamäe.

Tln-411. Varzuga **⩾51,000**
Shells (*Macoma calcarea*) from same complex as Tln-410.

Tln-439. Imandra **8860 ± 60**
Peat underlying marine deposits from depth 135 to 140cm on bank of Imandra Lake. Coll 1979 by B Koshetchkin, Inst Geol, Kola Branch, Acad Sci, USSR.

Tln-474. Sija **⩾55,000**
Wood remains from Sija sec on left bank of Severnaya Dvina R. Sample from clayey silt overlying sands with shells. Coll 1978 by R Rajamäe.

West Spitsbergen

Tln-363. Semmeldalen **4010 ± 40**
Plant detritus from 60m terrace in Semmeldalen valley. Coll by L Troitsky, Inst Geog, Acad Sci, USSR.

Wijdefjorden series
Samples coll from estuaries of valleys Helmdalen and Reinbokdalen. Dates help establish rate of neotectonic uplifts in N part of West Spitsbergen. Coll 1978 by L Troitsky.

Tln-375. Reinbokdalen **8680 ± 60**
Shells from surface of 10m terrace.

Tln-372. Reinbokdalen **9650 ± 50**
Shells from 50m terrace.

Tln-334. Reinbokdalen **9330 ± 70**
Shells from 60m terrace.

Tln-376. Helmdalen **8460 ± 50**
Shells from 4m terrace.

Tln-374. Helmdalen **8910 ± 60**
Shells from 10m terrace.

Tln-370. Helmdalen **8980 ± 60**
Shells from 20m terrace.

Tln-371. Helmdalen **9440 ± 60**
Shells from 30 to 35m terrace.

Tln-373. Helmdalen **9460 ± 70**
Shells from surface of 50m terrace.

Faksedalen series

Samples from moraine before Gulfaksedalen glacier in Faksedalen valley (Grosswald, 1972). Coll 1978 by L Troitsky.

Tln-388. **8530 ± 70**
Shells in sand layer at alt 4m above river level.

Tln-381. **8610 ± 60**
Shells in till at alt 13m above river level.

Tln-378. **8990 ± 50**
Shells in till at alt 20m above river level.

Tln-380. **9480 ± 80**
Shells in till at alt 40m above river level.

Tln-389. **9310 ± 80**
Shell fragments on surface of distal slope of till ridge at alt 45m above river level.

Tln-393. **7680 ± 60**
Wood from till at alt 10m above river level.

Lomfjord series

Samples from marine terraces in estuary of Fakseelva R flowing into Lomfjord. Coll 1978 by L Troitsky.

Tln-385. **8910 ± 60**
Shells from 11m terrace.

Tln-386. **8610 ± 50**
Shells from 20m terrace.

Tln-392. **8670 ± 70**
Shells from 32m terrace.

Tln-387. **9050 ± 50**
Shells at depth 3m in 40m terrace.

Tln-382. **9480 ± 50**
Shells from surface of 70m terrace.

Tln-390. Reindalen **8730 ± 90**
Shells from surface of 35m terrace in lower part of Reindalen valley near Pluto hut. Coll 1978 by A Makejev, Inst Geog.

Adventdalen series

Peat deposit, 200m thick on left bank of Adventdalen valley. Coll 1979 by L Troitsky.

Tln-427. **4700 ± 60**
Peat from depth 20 to 25cm.

Tln-428. **5470 ± 70**
Peat from depth 75 to 85cm.

Tln-436. **5570 ± 60**
Peat from depth 120 to 130cm.

Wijdefjorden series

Samples from sea terrace in central part of Wijdefjorden on Dirksodden cape. Coll 1979 by L Troitsky.

Tln-442. **9200 ± 100**
Hiatella arctica and *Mya truncata* from 13m terrace in valley of Kunna R.

Tln-447. **9380 ± 110**
Hiatella arctica and *Mya truncata* from 18m terrace.

Tln-446. **9580 ± 70**
Hiatella arctica and *Mya truncata* from 23 to 24m terrace near Reitern Lake.

Tln-468. **9000 ± 330**
Hiatella arctica and *Mya truncata* from 26 to 27m terrace near Reitern Lake.

Tln-441. **9360 ± 60**
Mya truncata from 30 to 32m terrace near Reitern Lake.

Tln-449. Brögger **9390 ± 80**
Chlamus islandica, Serriptes groenlandicus, and *Mya truncata* from till surface near glacier margin W Brögger. Coll 1979 by L Troitsky.

Caucasus

Tln-416. Bezengi **8000 ± 350**

Finely dispersed coal particles from buried soil in lower part of exposure near estuary of left tributary of Cherek-Bezengi R. Buried soil overlain by 5 till horizons in zone of Jukakhiiskyi marginal glacier formations. Pollen analysis by L Serebryannyi dates formation of soil to Early Holocene. Coll 1977 by N Golodkovskaya and L Serebryannyi, Inst Geog.

Halde series

Bog is near Halde village in depression of hummocky till. Peat deposit, 170cm thick, lies on till. Coll 1979 by J M Punning and L Serebryannyi.

Tln-478. **1270 ± 50**

Grayish-black peat from depth 50 to 55cm.

Tln-477. **1700 ± 70**

Brownish-black peat from depth 95 to 100cm.

Tln-476. **1870 ± 50**

Brownish-black peat from depth 145 to 150cm.

GEOCHEMICAL SAMPLES

In order to adjust coefficients of fractionation of carbon in different types of plants and to establish variations in ^{14}C activity in atmosphere (C_3 and C_4) variable terrestrial and aquatic plants coll in S Estonia 1978-1980. CO_2 samples coll from atmosphere during vegetational period (Punning *et al*, 1981). Coll by T Pärnik, Inst Experimental Biol, Acad Sci, Estonian SSR.

Lab no.	Colln date	Species	^{14}C ‰	$\delta^{13}C$ ‰	Δ ‰
Tln-355	1978	*Zea mays*	+367 ± 6.0	−11.0	+329
-358	1978	*Lathyrus pratensis*	+339 ± 5.0	−25.7	+341
-359	1978	Carex	+332 ± 5.0	−25.5	+333
-418	1978	CO_2 from atmosphere	+360 ± 7.4	−15.8	—
-453	1979	Phragmites	+335 ± 6.0	−26.6	+340
-460	1979	*Typha latifolia*	+320 ± 6.5	−27.8	+333
-454	1979	*Betula*	+341 ± 6.0	−28.2	+351
-450	1979	*Zea mays*	+371 ± 7.5	−13.4	+340
-465	1979	CO_2 from atmosphere	+365 ± 6.0	−13.8	+334
-505	1980	*Betula*	+324 ± 5.5	—	—
-506	1980	*Typha latifolia*	+306 ± 7.0	—	—
-518	1980	*Zea mays*	+343 ± 6.0	—	—
-515	1980	CO_2 from atmosphere	+326 ± 8.0	−10.7	+287
-549	1981	*Medicago*	+296 ± 4.5	—	—
-550	1981	*Betula*	+294 ± 7.0	—	—
-551	1981	*Typha latifolia*	+298 ± 8.0	—	—

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