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**KINSYS-KS/.MIT**  
**tree-ring data measurement**  
**and**  
**other data formats**  
**used in**  
**the Finnish KINSYS-KS**  
**Tree-Ring Measurement System**

1. KINSYS-KS / “.MIT” TREE-RING DATA STORAGE FORMAT
2. KINSYS-KS / “.KIN” TREE-RING DATA STORAGE FORMAT
3. INSYS-KS / “.KIN” TREE-RING DATA STORAGE FORMAT
4. ITRDB / DECADAL (Tucson) “.TUC” TREE-RING DATA STORAGE FORMAT
5. ITRDB / Compact “.CPT” TREE-RING DATA STORAGE FORMAT

## The structure of a KINSYS/KS-Tree-Ring Measurement File or a “.mit” file Header

Parameter	Measurement example	Meaning
30.01.09	8.28.00	Measurement time
# 0	3436/Growth Trends/KMiel	Project code/Project name/Responsible person
# 1	19.11.91	Sampling day (fieldwork)
# 2	7500.000/500.000/200	Y/X KKJ Uniform Grid Coordinate/elevation
# 3	414/1/Rovaniemi	Experiment/Period of measurement/Location
# 4	10/1	Plot/Subplot
# 5	1/5549	Measurement series/ID code or 5-7 digit code
# 6	1	Tree species
# 7	1991	Last measurement year/Subsample code
# 8	0/10/1	Incomplete growth /Estimated age increase/Earlywood/Latewood
# 9	a/1/600/K	Measurement direction/Method/Height/Height code
# 10		User-defined parameters
# 11	./90/1	Number of tree-rings/Data type/Measurement method
# 12	32	Number of measured tree-rings

### Detailed information:

**Measurement time** refers to the exact date and time of the measurement event. The KS system registers it automatically.

# 0 **Project code/Project name/Responsible person.** These information are needed for administrative and database purposes.

# 1 **Sampling day in field.** This note is important especially in cases sampling was done before the end of growing season. Format : ddmmyy.

# 2 **Y/X KKJ Uniform Grid Coordinate/Elevation.** Coordinate and elevation accuracy 1 meter.

# 3 **Experiment/Period of measurement/Location.** *Experiment and Period of measurement* code follow the KPL practice. *Location*, filled in free-form alphabetic, is important, because the default rule in defining the ID field of an ITRDB Decadal (“Tucson”) file is to adopt the three first letters of the location name.

# 4 **Plot/Subplot.** Plot and subplot coding follow the KPL practice.

# 5 **Sample tree number/Running measurement code/ID number or 5-7 digit code.** *Sample tree number* refers to the cored tree individual. A 4-6 digit *running measurement number* comes automatically from the KS measurement program. If not available, then a manually written alphabetic ID code is ok.

**Note 1:** if there are several samples are cored from the same tree, sample tree number remains the same.

**Note 2:** Several measurement lines may be measured from cross-sections. It is very important that the device-produced running measurement number (or the manual ID code) are carefully marked on the cross-sections, too. This confirms safe identification in cases when the same sector was measured several times.

- # 6 **Tree species.** The VMI (Finnish National Forest Inventory) coding used here. Alternatively use the ITRDB tree species coding compiled by Henri D. Grissino-Mayer: <http://web.utk.edu/~grissino/species.htm>.
- # 7 **Last measurement year /subsample code.** *Last measurement year* defines the calendar year of the last found tree-ring found in the measurement line. *Subsample code* is marked by "a", "b", "c" etc. in cases when a core has broken into several pieces. Use a code "x", if the core appears to be a very problematic case, causing probable difficulties in forthcoming analyses.
- # 8 **Incomplete growth /Estimated age increase/Earlywood/Latewood.** *Incomplete growth* is neglected, if not measured; otherwise it has to be coded as "1". *Estimated age increase* means the number of tree-rings between the birth point of a tree and the coring height. VMI produces age correction tables by site and regional location for this purpose.  
Coding of *Early* and *Late wood*: 1= Earlywood 2=Latewood.
- # 9 **Measurement direction/Method/Height/Height code.** *Measurement direction* in degrees of angle (division 1/400). Also free-form coding like sections a, b, c etc. can be applied. *Measurement method* = 0, if a sample is measured from surface to pith, and =1, if vice versa. *Measurement height* is defined as distance from ground level. *Measurement height code* is an extra free-form parameter.
- # 10 **User-defined parameters.** Free-form parameter.
- # 11 **Number of tree-rings/Data type/Column width/Number of decimals.** *Number of tree-rings.* Use the dot sign (".") for all ring-widths to be measured. For only 5 ring-widths to be measured: use "5". *Data type*: 90=ring width, 91=height shoots, 92=volume growths, 93=early wood, 94=latewood (default= 90). *Column width*: number of digits (default= 3). *Number of decimals*: default= 2.
- # 12 **Number of measured tree-rings.** The KS measurement program outputs the number of measured ring-widths.

### The Identification information

Many difficulties will be avoided if the ID information of samples and measurements are properly recorded in the .MIT files. What should be done?

- a) Parameter # 2: mark the y- ja x-coordinates and site elevation;
- b) Parameter # 3: mark experiment, measurement period and location;
- c) Parameter # 4: mark sample plot and subplot;
- d) Parameter # 5: mark tree number and measurement ID code;
- e) Parameter # 9: mark measurement direction.

KINDATA creates automatically the needed sample ID information. Non-standard coding results overlapping sample identification, thus confusing functions both in the KINSYS (Kindata) and ITRDB (Cofecha) programs.

Tree-ring data in KINSYS standard measurements are always stored in a **.mit** file. The KS tree-ring measurement program uses this format.

The KINSYS/.mit Standard is very handy for tree-ring and metadata storing. It is, however, not very suitable for data analysis. A better solution is offered e.g. by the ITRDB system.

## Data types of KINDATA

KINSYS-analyses produce several files. Some of them are worth archiving. Different file types are separated by the extension parts of the filenames. Some examples:

### Document

Abbrev.	Explanation	Status
.COC	Quality Control File created by the ITRDB/Cofecha	permanent_ok
.COR	Output file created by the KINSYS/COFCOR program	permanent_ok
.COW	Cofecha dating file	occasional
.KIN	KINSYS analysis file	permanent
.LOG	Log file created by the KINSYS/Kindata program	occasional
.MAC	Master series created by the Cofecha program	permanent_ok
.MIT	KINSYS/KS-Sauvala measurement file	permanent
.OUT	Cofecha output file	occasional
.RAW	Raw tree-ring data file	permanent
.SKE	Pointer year statistics created by the KINSYS/Kingraph program	permanent
.TUC	ITRDB/Decadal or "Tucson" file	perm

## 1B. KINSYS-KS / “.MIT” TREE-RING DATA STORAGE FORMAT

30-05-09 11:09:05			
# 0 Project Index/Timonen	100	124	114
# 1 30.05.2009	121	129	100
# 2 4905692/7596282/365	*** DATA END ***	141	82
# 3 100//Kalmankaltio	30-05-09 11:09:13	128	68
# 4 110	# 0 Project Index/Timonen	114	99
# 5 19/6787	# 1 30.05.2009	124	46
# 6 1	# 2 7594779/2528739	125	78
# 7 2008	# 3 100//Kalmankaltio	105	65
# 8 0	# 4 110	138	138
# 9 a	# 5 20/6789	154	150
# 10 Fire scars	# 6 1	148	123
# 11 .	# 7 1998	221	152
# 12 25	# 8 0	265	119
57	# 9 a	103	193
57	# 10 Tree cut in september	104	*** DATA END ***
74	1998	235	30-05-09 11:09:27
76	# 11 .	239	# 0 Project Index/Timonen
57	# 12 34	227	# 1 30.05.2009
51	184	165	# 2 7594771/2528766
59	202	98	# 3 100//Kalmankaltio
90	145	112	# 4 110
82	129	182	# 5 21/6792
95	168	154	# 6 1
67	200	162	# 7 2008
78	143	158	# 8 0
99	124	78	# 9 b
79	129	99	# 10 ok.
87	141	220	# 11 .
112	128	88	# 12 44
87	114	112	32
88	124	183	49
81	125	*** DATA END ***	30
77	105	30-05-09 11:09:22	53
94	138	# 0 Project Index/Timonen	69
110	154	# 1 30.05.2009	63
81	148	# 2 7594783/2528755	74
108	221	# 3 100//Kalmankaltio	45
129	265	# 4 110	53
*** DATA END ***	205	# 5 21/6791	55
30-05-09 11:09:09	235	# 6 1	48
# 0 Project Index/Timonen	239	# 7 2008	60
# 1 30.05.2009	227	# 8 0	55
# 2 7594744/2528730	165	# 9 a	56
# 3 100//Kalmankaltio	211	# 10 ok.	76
# 4 110	182	# 11 .	89
# 5 19/6788	154	# 12 44	63
# 6 1	162	36	37
# 7 2008/x	158	41	77
# 8 0	203	30	77
# 9 b	220	53	81
# 10 Core split into five	235	69	102
pieces. Difficult to measure!	183	61	113
# 11 .	*** DATA END ***	74	74
# 12 25	30-05-09 11:09:17	45	75
55	# 0 Project Index/Timonen	53	83
70	# 1 30.05.2009	54	66
70	# 2 7594787/2525754	48	65
55	# 3 100//Kalmankaltio	60	118
51	# 4 110	55	72
59	# 5 20/6790	56	116
94	# 6 1	76	102
82	# 7 1998/x	81	82
95	# 8 0	63	68
67	# 9 b	37	94
74	# 10 Tree cut in september	77	46
99	1998. Frost damage,	84	78
79	problematic to measure	81	65
89	# 11 .	109	134
92	# 12 38	110	150
103	184	74	122
88	202	74	152
85	145	83	119
77	129	66	190
94	168	65	*** DATA END ***
111	200	118	
82	143	72	

## 2. KINSYS-KS / “.KIN” TREE-RING DATA STORAGE FORMAT

```
01 Project Index/Timonen
05 030
08 6
10100 01100 0 0 0 000 000 000 0 01 0 0000030 5*** 00 0Kalmankaltio
15Kal_19a /Kal_19b /Kal_20a /Kal_20b /Kal_21a /Kal_21b /
20 19 19 20 20 21 21
21 2008 2008 1998 1998 2008 2008
25 1 2 1 2 1 2
31490569275947447594779759478775947837594771
32759628225287302528739252575425287552528766
33 365 0 0 0 0 0
90 57 55184184 36 32
90 57 70202202 41 49
90 74 70145145 30 30
90 76 55129129 53 53
90 57 51168168 69 69
90 51 59200200 61 63
90 59 94143143 74 74
90 90 82124124 45 45
90 82 95129129 53 53
90 95 67141141 54 55
90 67 74128128 48 48
90 78 99114114 60 60
90 99 79124124 55 55
90 79 89125125 56 56
90 87 92105105 76 76
90112103138138 81 89
90 87 88154154 63 63
90 88 85148148 37 37
90 81 77221221 77 77
90 77 94265265 84 77
90 94111205103 81 81
90110 82235104109102
90 81100239235110113
90108121227239 74 74
90129 0165227 74 75
90 0 0211165 83 83
90 0 0182 98 66 66
90 0 0154112 65 65
90 0 0162182118118
90 0 0158154 72 72
90 0 0203162114116
90 0 0220158100102
90 0 0235 78 82 82
90 0 0183 99 68 68
90 0 0 0220 99 94
90 0 0 0 88 46 46
90 0 0 0112 78 78
90 0 0 0183 65 65
90 0 0 0 0138134
90 0 0 0 0150150
90 0 0 0 0123122
90 0 0 0 0152152
90 0 0 0 0119119
90 0 0 0 0193190
```

### 3. KINSYS-KS / “.KIM” TREE-RING DATA STORAGE FORMAT

VUOSI YEAR	Kal_19a 2008AD	Kal_19b 2008AD	Kal_20a 1998AD	Kal_20b 1998AD	Kal_21a 2008AD	Kal_21b 2008AD	Rw mean	StDev	SE	N
2008	57	55	-	-	36	32	45	13	6	4
2007	57	70	-	-	41	49	54	12	6	4
2006	74	70	-	-	30	30	51	24	12	4
2005	76	55	-	-	53	53	59	11	6	4
2004	57	51	-	-	69	69	62	9	5	4
2003	51	59	-	-	61	63	59	5	3	4
2002	59	94	-	-	74	74	75	14	7	4
2001	90	82	-	-	45	45	66	24	12	4
2000	82	95	-	-	53	53	71	21	11	4
1999	95	67	-	-	54	55	68	19	10	4
1998	67	74	184	184	48	48	101	65	27	6
1997	78	99	202	202	60	60	117	68	28	6
1996	99	79	145	145	55	55	96	41	17	6
1995	79	89	129	129	56	56	90	33	14	6
1994	87	92	168	168	76	76	111	44	18	6
1993	112	103	200	200	81	89	131	55	22	6
1992	87	88	143	143	63	63	98	37	15	6
1991	88	85	124	124	37	37	83	39	16	6
1990	81	77	129	129	77	77	95	26	11	6
1989	77	94	141	141	84	77	102	31	12	6
1988	94	111	128	128	81	81	104	22	9	6
1987	110	82	114	114	109	102	105	12	5	6
1986	81	100	124	124	110	113	109	16	7	6
1985	108	121	125	125	74	74	105	24	10	6
1984	129	-	105	105	74	75	98	23	10	5
1983	-	-	138	138	83	83	111	32	16	4
1982	-	-	154	154	66	66	110	51	25	4
1981	-	-	148	148	65	65	107	48	24	4
1980	-	-	221	221	118	118	170	59	30	4
1979	-	-	265	265	72	72	169	111	56	4
1978	-	-	205	103	114	116	135	47	24	4
1977	-	-	235	104	100	102	135	67	33	4
1976	-	-	239	235	82	82	160	90	45	4
1975	-	-	227	239	68	68	151	95	48	4
1974	-	-	165	227	99	94	146	63	31	4
1973	-	-	211	165	46	46	117	84	42	4
1972	-	-	182	98	78	78	109	50	25	4
1971	-	-	154	112	65	65	99	43	21	4
1970	-	-	162	182	138	134	154	22	11	4
1969	-	-	158	154	150	150	153	4	2	4
1968	-	-	203	162	123	122	153	38	19	4
1967	-	-	220	158	152	152	171	33	17	4
1966	-	-	235	78	119	119	138	68	34	4
1965	-	-	183	99	193	190	166	45	23	4
1964	-	-	-	220	-	-	220	-	-	1
1963	-	-	-	88	-	-	88	-	-	1
1962	-	-	-	112	-	-	112	-	-	1
1961	-	-	-	183	-	-	183	-	-	1
Mean	83	83	173	153	80	80	109	-	-	-
Stdev	19	18	43	47	35	34	-	53	-	-
Se	4	4	7	8	5	5	-	-	4	-
N	25	24	34	38	44	44	-	-	-	209

#### 4. ITRDB / DECADAL (Tucson) “.TUC” TREE-RING DATA STORAGE FORMAT

KAL6787	1984	129	108	81	110	94	77	.	.	.	.
KAL6787	1990	81	88	87	112	87	79	99	78	67	95
KAL6787	2000	82	90	59	51	57	76	74	57	57	999
KAL6788	1985	121	100	82	111	94	.	.	.	.	.
KAL6788	1990	77	85	88	103	92	89	79	99	74	67
KAL6788	2000	95	82	94	59	51	55	70	70	55	999
KAL6789	1965	183	235	220	203	158	.	.	.	.	.
KAL6789	1970	162	154	182	211	165	227	239	235	205	265
KAL6789	1980	221	148	154	138	105	125	124	114	128	141
KAL6789	1990	129	124	143	200	168	129	145	202	184	999
KAL6790	1961	183	112	88	220	99	78	158	162	154	.
KAL6790	1970	182	112	98	165	227	239	235	104	103	265
KAL6790	1980	221	148	154	138	105	125	124	114	128	141
KAL6790	1990	129	124	143	200	168	129	145	202	184	999
KAL6791	1965	193	119	152	123	150	.	.	.	.	.
KAL6791	1970	138	65	78	46	99	68	82	100	114	72
KAL6791	1980	118	65	66	83	74	74	110	109	81	84
KAL6791	1990	77	37	63	81	76	56	55	60	48	54
KAL6791	2000	53	45	74	61	69	53	30	41	36	999
KAL6792	1965	190	119	152	122	150	.	.	.	.	.
KAL6792	1970	134	65	78	46	94	68	82	102	116	72
KAL6792	1980	118	65	66	83	75	74	113	102	81	77
KAL6792	1990	77	37	63	89	76	56	55	60	48	55
KAL6792	2000	53	45	74	63	69	53	30	49	32	999



