
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

Vers. MT-KS310509

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	19.11.1991	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 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 widthd, 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
# 1 30.05.2009
# 2 4905692/7596282/365
# 3 100//Kalmankaltio
# 4 110
# 5 19/6787
# 6 1
# 7 2008
# 8 0
# 9 a
# 10 Fire scars
# 11 .
# 12  25
 57
 57
 74
 76
 57
 51
 59
 90
 82
 95
 67
 78
 99
 79
 87
 112
 87
 88
 81
 77
 94
 110
 81
 108
 129
*** DATA END ***
30-05-09     11:09:09
# 0 Project Index/Timonen
# 1 30.05.2009
# 2 7594744/2528730
# 3 100//Kalmankaltio
# 4 110
# 5 19/6788
# 6 1
# 7 2008/x
# 8 0
# 9 b
# 10 Core split into five
   pieces. Difficult to measure!
# 11 .
# 12  25
 55
 70
 70
 55
 51
 59
 94
 82
 95
 67
 74
 99
 79
 89
 92
 103
 88
 85
 77
 94
 111
 82
 100
 121
*** DATA END ***
30-05-09     11:09:13
# 0 Project Index/Timonen
# 1 30.05.2009
# 2 7594779/2528739
# 3 100//Kalmankaltio
# 4 110
# 5 20/6789
# 6 1
# 7 1998
# 8 0
# 9 a
# 10 Tree cut  in september
      1998
# 11 .
# 12  34
 184
 202
 145
 129
 168
 200
 143
 124
 129
 141
 128
 114
 124
 125
 105
 138
 154
 148
 221
 265
 205
 235
 239
 227
 165
 211
 182
 154
 162
 158
 203
 220
 235
 183
*** DATA END ***
30-05-09     11:09:17
# 0 Project Index/Timonen
# 1 30.05.2009
# 2 7594787/2525754
# 3 100//Kalmankaltio
# 4 110
# 5 20/6790
# 6 1
# 7 1998/x
# 8 0
# 9 b
# 10 Tree cut  in september
      1998. Frost damage,
      problematic to measure
# 11 .
# 12  38
 184
 202
 145
 129
 168
 200
 143
 124
 129
 141
 128
 114
 124
 125
 105
 138
 154
 148
 221
 265
 103
 235
 239
 227
 165
 98
 112
 182
 154
 162
 158
 78
 99
 220
 88
 112
 183
*** DATA END ***
30-05-09     11:09:22
# 0 Project Index/Timonen
# 1 30.05.2009
# 2 7594783/2528755
# 3 100//Kalmankaltio
# 4 110
# 5 21/6791
# 6 1
# 7 2008
# 8 0
# 9 a
# 10 ok.
# 11 .
# 12  44
 36
 41
 30
 53
 69
 61
 74
 45
 53
 54
 48
 60
 55
 56
 76
 81
 63
 37
 77
 84
 81
 109
 110
 74
 74
 83
 66
 65
 118
 72
 114
 100
 82
 68
 99
 46
 78
 65
 138
 150
 123
 152
 119
 193
*** DATA END ***
30-05-09     11:09:27
# 0 Project Index/Timonen
# 1 30.05.2009
# 2 7594771/2528766
# 3 100//Kalmankaltio
# 4 110
# 5 21/6792
# 6 1
# 7 2008
# 8 0
# 9 b
# 10 ok.
# 11 .
# 12  44
 32
 49
 30
 53
 69
 63
 74
 45
 53
 55
 48
 60
 55
 56
 76
 89
 63
 37
 77
 77
 81
 102
 113
 74
 75
 83
 66
 65
 118
 72
 116
 102
 82
 68
 94
 46
 78
 65
 134
 150
 122
 152
 119
 190
*** DATA END ***
```

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
3149056927594744759477975947877594783759 4771
3275962822528730252873925257542528755252 8766
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
```

5. ITRDB / Compact ".CPT" TREE-RING DATA STORAGE FORMAT

```
   25=N    1984=I KAL_19A                                          -5(13i6)
129   108    81   110    94    77    81    88    87   112    87    79    99
 78    67    95    82    90    59    51    57    76    74    57    57
   22=N    1987=I KAL_19B                                          -5(13i6)
157   233   165   110   157   160   118   149   181   133   147   122   107
 97   147   176   126    84   112   152   123   126
   34=N    1965=I KAL_20A                                          -5(13i6)
183   235   220   203   158   162   154   182   211   165   227   239   235
205   265   221   148   154   138   105   125   124   114   128   141   129
124   143   200   168   129   145   202   184
   38=N    1961=I KAL_20B                                          -5(13i6)
183   112    88   220    99    78   158   162   154   182   112    98   165
227   239   235   104   103   265   221   148   154   138   105   125   124
114   128   141   129   124   143   200   168   129   145   202   184
   44=N    1965=I KAL_21A                                          -5(13i6)
193   119   152   123   150   138    65    78    46    99    68    82   100
114    72   118    65    66    83    74    74   110   109    81    84    77
 37    63    81    76    56    55    60    48    54    53    45    74    61
 69    53    30    41    36
   44=N    1965=I KAL_21B                                          -5(13i6)
190   119   152   122   150   134    65    78    46    94    68    82   102
116    72   118    65    66    83    75    74   113   102    81    77    77
 37    63    89    76    56    55    60    48    55    53    45    74    63
 69    53    30    49    32
```