THE KINSYS TREE-RING RESEARCH SYSTEM

The KINSYS tree-ring research system was originally developed for supporting Metla's tree-ring analysis. The first Fortran code lines were written in 1977, and still the coding work continues as a minor activity. The KINSYS system uses a special tree-ring data structure called the Finnish Tree-Ring Data Format, but is also compatible with some ITRDB formats. The KINSYS-ITRDB software includes some special features extracted from the both approaches, e.g. the Cofecha-Kinsys Dating method.

The KINSYS software exchanges tree-ring information between the ITRDB and the KINSYS formats. The software has 15 separate applications manipulating and graphing tree-ring and climate data characteristics; running dating procedures; processing RBar and EPS values; performing some analysis like linear regression with interactive residual analysis, RCS-modelling and Age Banding and time series analysis; etc.

Table 4. Some KINSYS applications.

Some KINSYS applications 10-June-2012					
Program	Characteristics	No of Subr.	Fortran Code Lines	No of Chars	A4 pages*
KINDATA	Manipulate, transform and analyse tree-ring data	187	31 958	991 322	496
KIFMT	Transform tree-ring data	55	6 375	185 914	93
KIPRO	Prepare data and results to common PC software	72	10 389	291 036	146
COFCOR	Create dating suggestions from Cofecha	11	1 652	47 914	24
COFEDIT	Dating table editor	12	964	27 772	14
KINGRAPH	Graphical analysis of tree-ring data	366	54 042	1 660 886	830
KINREKO	Modelling software (linear regression, RCS)	186	21 647	579 302	290
REKORES	RCS module for KINREKO	3	756	22 042	11
KINDAILM	Ojansuu-Henttonen climate model conversions	9	699	21 660	11
KINDACL	Climate data manipulation	34	9 833	386 364	193
DATTOMTX	Excel output to ITRDB formats	21	1 894	48 960	24
KINRECLI	Create climate modelling data	33	6 116	186 944	93
KINDAENV	Create environmental data for tree-ring analysis	5	3 940	105 807	53
ITRFILES	Convert tree-ring data to ITRDB format with header lir	14	2 223	70 304	35
KINSTAT	Statistical description of tree-ring data	12	1 024	30 166	15
KIND1	Prepare tree-ring data to index calculation	16	2 413	76 405	38
KIND2	calculate tree-ring indices	62	10 612	352 550	176
KINDKPL	Analyse insect damage from tree-rings	22	2 350	72 200	36
KINFRT	Simple t- and F-test analysis for time series	40	2 959	78 504	39
KINSSW	Manipulation of tree-ring data	73	3 536	78 972	39
Total	KINSYS Software	1 233	175 382	5 315 024	2 658
					* 2000 chars

Description of the some KINSYS applications

KINDATA Exchanges tree-ring data between the KINSYS and the ITRDB data formats. It is the most important part of the COFECHA-KINSYS dating method. Kindata has over 80 functions. Some of the main functions are: data manipulation, sorting, quality controlling, dating and statistical parameter calculation (e.g. RBAR and EPS).

Details: MS/DOS based Languages, help function. Lahey-fortran, version 5.20. 187 subroutines, 32000 Fortran code lines (496 A4-pages). Finnish and English.

KIFMT Converts tree-ring data files from one to another format between the KINSYS and the ITRDB systems.

Details: MS/DOS based Languages, help function.Lahey-fortran, version 5.20. 35 subroutines, 6400 Fortran code lines (93 A4-pages). Finnish and English.

KIPRO Summarises the KINSYS analysis results and makes them compatible with MS/Windows programs. The main functions: converts the output files to ascii sheets (MS/EXCEL etc.), converts the residual variation of the REKO models into indices etc.

Details: MS/DOS based Languages, help function. Lahey-fortran, version 5.20. 72 subroutines, 10400 Fortran code lines (146 A4-pages). Finnish and English.

COFCOR Forms a part of the COFECHA–KINSYS dating system. The program makes it possible to date samples effectively and half-automated. It analyses the output of DPLCOFECHA and creates a dating suggestion presented in a .COR file. The user can add own solutions there. The dating suggestion is then authored as KINDATA file and verified in DPLCOFECHA's quality control. The accepted datings can finally be checked segment by segment in COFEDIT.

Details: MS/DOS based Languages, help function. Lahey-fortran, version 5.20. 11 subroutines, 1650 Fortran code lines (24 A4-pages). Finnish and English.

COFEDIT Forms a part of the COFECHA-KINSYS dating method. The program makes a suggestion for removing the badly correlating edge segments of the dated samples. It edits the .COR file created by COFCOR, to be further analysed in KINDATA.

Details: MS/DOS based Languages, help function. Lahey-fortran, version 5.20. 12 subroutines, 1000 Fortran code lines (14 A4-pages). Finnish and English.

KINGRAPH Analyses tree-ring data and outputs graphics. Main functions: tree-ring analysisdating, index calculation, pointer year analysis etc. (over 200 functions).

Details: MS/DOS based Languages, help function. Lahey-fortran, version 5.20. 366 subroutines, 54000 Fortran code lines (830 A4-pages). Finnish and English.

KINREKO Fine-tuned regression analysis for climate modelling. Some approaches: linear regression analysis, ridge regression, stepwise regression analysis, RCS-modelling etc.

Details: MS/DOS based Languages, help function. Lahey-fortran, version 5.20. 55 subroutines, 22000 Fortran code lines (290 A4-pages). Finnish and English.

REKORES Averages the residual variation of RCS modelling created by KINREKO.

Details: MS/DOS based Languages, help function. Lahey-fortran, version 5.20. 3 subroutines, 756 Fortran code lines (11 A4-pages). Finnish and English.

KINRECLI Creates combined climatic, tree-ring data and environmental datasets.

Details: MS/DOS based Languages, help function. Lahey-fortran, version 5.20. 33 subroutines, 6100 Fortran code lines (93 A4-pages). Finnish and English.

KINDACL Creates monthly and annual climate sheets.

Details: MS/DOS based Languages, help function. Lahey-fortran, version 5.20. 28 subroutines, 4000 Fortran code lines (53 A4-pages). Finnish and English.