Supplementary Material: SisFall, A Fall and Movement Dataset

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I. RESULTS

In this document we include tables with results of all 14 features tested (listed in Table IV of the paper). Table S1 shows the effect of filtering as preprocessing stage (paper Fig. 3) after a 10-fold cross-validation with all subjects (validation accuracy, mean and standard deviation).

TABLE S1
ACCURACY OBTAINED IN VALIDATION (451 TRIALS) AFTER A 10-FOLD CROSS-VALIDATION WITHOUT- (RAW DATA) AND WITH PREPROCESSING (FILTERED).

Feature	Raw data	Filtered
C_1	84.71 ± 1.39	88.81 ± 2.01
C_2	89.82 ± 1.30	95.01 ± 1.18
C_3	86.82 ± 1.10	91.97 ± 1.39
C_4	84.68 ± 1.78	86.41 ± 1.21
C_5	86.93 ± 1.10	88.37 ± 1.40
C_6	84.14 ± 1.92	79.89 ± 2.13
C_7	84.51 ± 2.05	85.91 ± 1.51
C_8	92.77 ± 1.19	96.15 ± 0.75
C_9	89.67 ± 1.14	91.45 ± 1.38
C_{10}	88.30 ± 1.64	88.52 ± 1.85
C_{11}	90.65 ± 1.27	87.88 ± 1.44
C_{12}	87.02 ± 1.13	86.47 ± 1.62
C_{13}	92.81 ± 1.11	90.21 ± 1.31
C_{14}	85.41 ± 2.36	85.06 ± 1.49

Table S2 shows results of training the algorithm with young people and validating with two groups: young and elderly people (paper Table V).

TABLE S2
SENSITIVITY (SE), SPECIFICITY (SP) AND ACCURACY (AC) AFTER TRAINING WITH YOUNG ADULTS AND VALIDATING EITHER WITH YOUNG ADULTS (355 TRIALS) OR ELDERLY PEOPLE (968 TRIALS).

Feature	Young			Elderly		
	SE	SP	AC	SE	SP	AC
C_1	93.79 ± 1.92	78.97 ± 4.60	86.38 ± 2.37	76.00	96.42	86.21
C_2	94.28 ± 1.88	96.13 ± 1.22	95.21 ± 1.17	77.33	97.65	87.49
C_3	98.53 ± 0.85	80.50 ± 3.26	89.51 ± 1.84	84.00	96.42	90.21
C_4	95.50 ± 1.30	75.41 ± 3.62	85.45 ± 2.14	66.67	85.33	76.00
C_5	97.13 ± 1.65	81.40 ± 2.48	89.27 ± 1.23	89.33	76.48	82.91
C_6	81.80 ± 3.04	87.96 ± 2.06	84.88 ± 1.88	52.00	89.36	70.68
C_7	83.73 ± 2.24	87.73 ± 2.45	85.73 ± 1.43	66.67	91.27	78.97
C_8	95.54 ± 1.24	96.38 ± 1.43	95.96 ± 0.72	85.33	98.10	91.72
C_9	97.80 ± 1.62	80.70 ± 3.35	89.25 ± 1.96	88.00	96.42	92.21
C_{10}	91.97 ± 2.31	80.18 ± 3.34	86.08 ± 1.38	82.67	94.29	88.48
C_{11}	88.47 ± 3.29	93.83 ± 1.01	91.15 ± 1.77	68.00	93.84	80.92
C_{12}	95.64 ± 1.15	73.44 ± 3.77	84.54 ± 1.95	73.33	91.94	82.64
C_{13}	92.56 ± 1.20	94.41 ± 1.50	93.49 ± 0.86	62.67	95.19	78.93
C_{14}	81.75 ± 3.09	90.87 ± 2.28	86.31 ± 2.32	58.67	86.00	72.33

Table S3 (corresponding to paper Table VI) shows results of validating with elderly people after training with young adults (test 1), and after training and validating exclusively with elderly people (test 2).

TABLE S3
VARIATION IN ACCURACY AND THRESHOLD T_1 AFTER TRAINING EXCLUSIVELY WITH YOUNG BUT VALIDATING WITH ELDERLY PEOPLE (TEST 1), AND THEN TRAINING AND VALIDATING WITH ELDERLY PEOPLE (TEST 2).

Feature	AC [%] with elderly		Threshold T_1	
	Test 1	Test 2	Test 1	Test 2
C_1	86.21	84.48 ± 5.89	1.27 ± 0.002	1.04 ± 0.069
C_2	87.49	90.45 ± 5.19	1.07 ± 0.029	0.97 ± 0.012
C_3	90.21	90.85 ± 7.25	1.48 ± 0.017	1.23 ± 0.024
C_4	76.00	79.47 ± 4.64	2.00 ± 0.001	1.56 ± 0.112
C_5	82.91	82.76 ± 4.39	0.53 ± 0.004	0.27 ± 0.008
C_6	70.68	74.62 ± 8.48	0.54 ± 0.014	0.33 ± 0.032
C_7	78.97	81.62 ± 8.18	8.08 ± 0.312	4.97 ± 0.092
C_8	91.72	92.36 ± 6.80	0.40 ± 0.005	0.36 ± 0.003
C_9	92.21	92.58 ± 7.09	0.43 ± 0.009	0.36 ± 0.002
C_{10}	88.48	90.58 ± 4.36	1.93 ± 0.020	1.86 ± 0.006
C_{11}	80.92	83.44 ± 5.74	1.36 ± 0.002	1.23 ± 0.047
C_{12}	82.64	83.66 ± 7.40	$0.09 \pm 5.34e\text{-}05$	0.09 ± 0.001
C_{13}	78.93	80.73 ± 5.62	$0.08 \pm 9.35e\text{-}05$	0.07 ± 0.002
C_{14}	72.33	76.79 ± 6.20	1.03 ± 0.002	0.95 ± 0.020

Table S4 shows validation results of all 14 features with threshold T_2 tested on all 38 subjects (paper Table VII)

TABLE S4
SPECIFICITY (SP) AND ACCURACY (AC) AFTER TESTING DATA FROM ALL SUBJECTS WITH THRESHOLD T_2.

Feature	SP	AC
C_1	49.11 ± 4.22	74.53 ± 2.08
C_2	32.97 ± 6.46	66.43 ± 3.06
C_3	59.04 ± 5.56	79.49 ± 2.71
C_4	37.66 ± 5.56	68.80 ± 2.70
C_5	34.54 ± 7.06	67.24 ± 3.44
C_6	7.48 ± 1.09	53.71 ± 0.52
C_7	26.41 ± 1.63	63.18 ± 0.80
C_8	38.34 ± 5.59	69.14 ± 2.71
C_9	67.97 ± 2.86	83.96 ± 1.37
C_{10}	39.52 ± 4.47	69.70 ± 2.13
C_{11}	27.78 ± 5.24	63.86 ± 2.53
C_{12}	47.64 ± 4.18	73.79 ± 2.09
C_{13}	37.80 ± 3.42	68.87 ± 1.69
C_{14}	24.31 ± 2.69	62.12 ± 1.32

II. INDIVIDUAL ACTIVITY ANALYSIS

This section includes figures with the individual activity analysis of the other 13 features (C_8 is shown in paper Fig. 4).
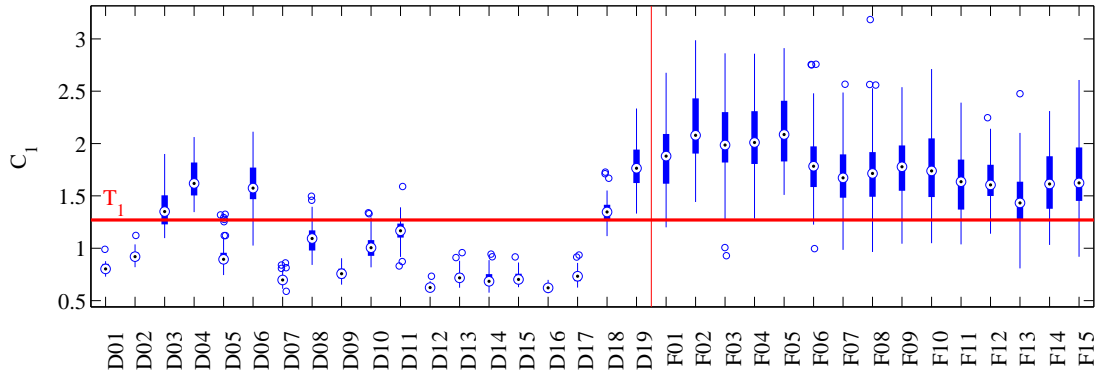

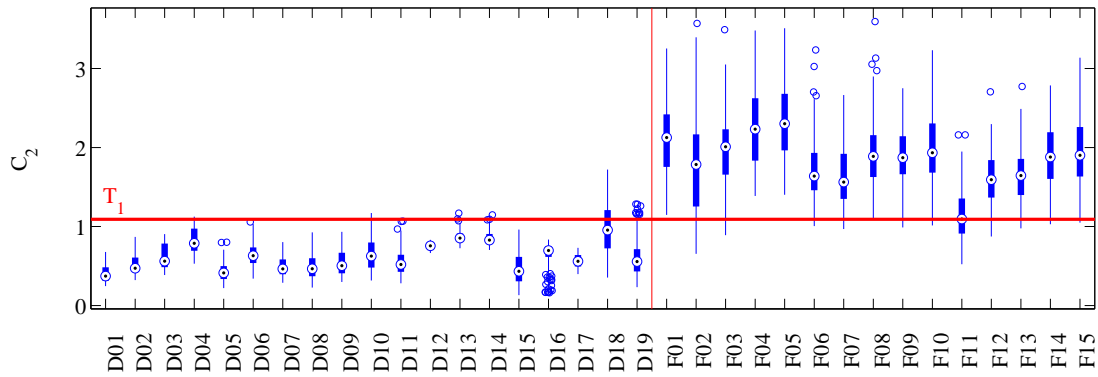Fig. S1. Maximum value per activity obtained with C_1.

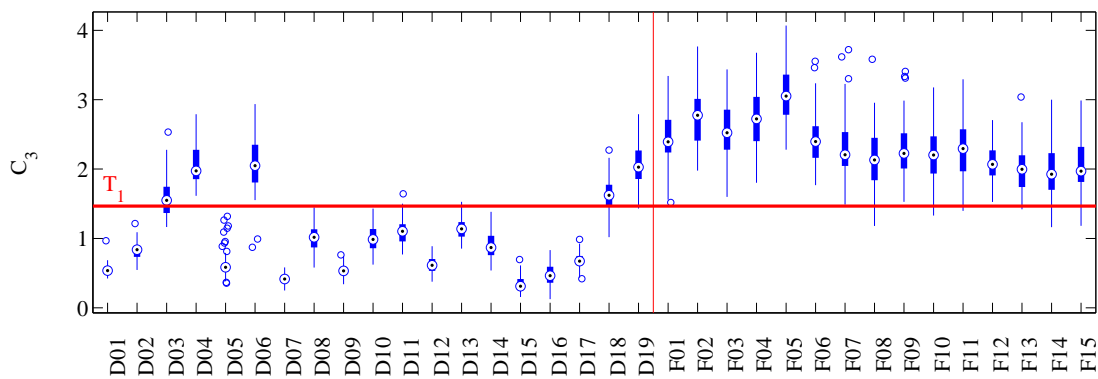Fig. S2. Maximum value per activity obtained with C_2.

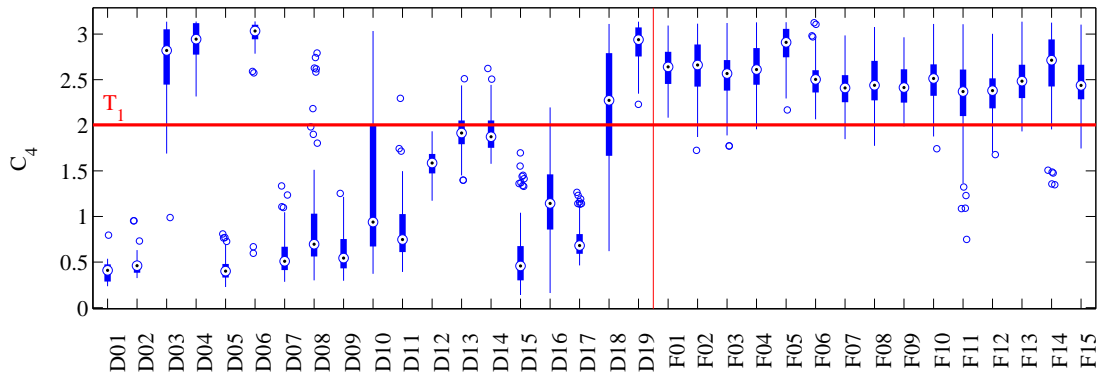Fig. S3. Maximum value per activity obtained with C_3.

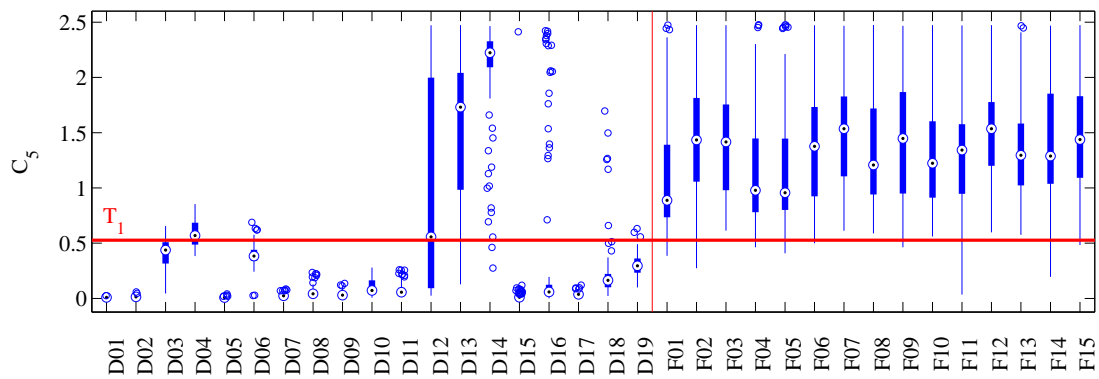Fig. S4. Maximum value per activity obtained with C_4.
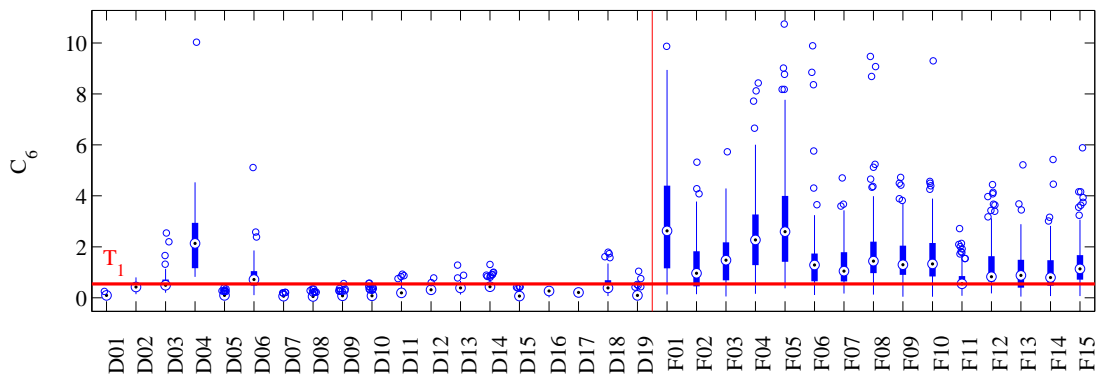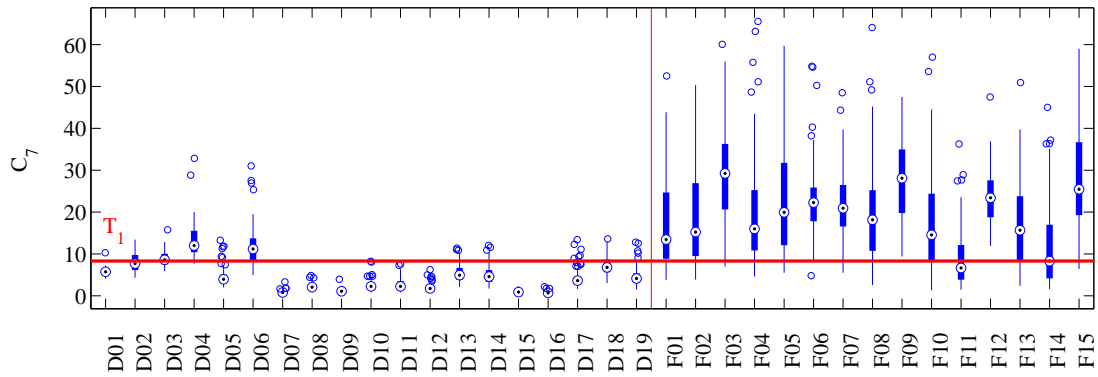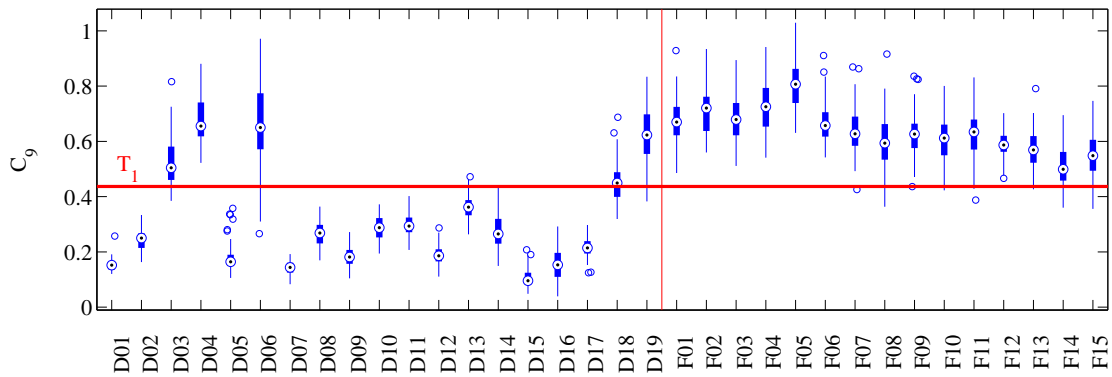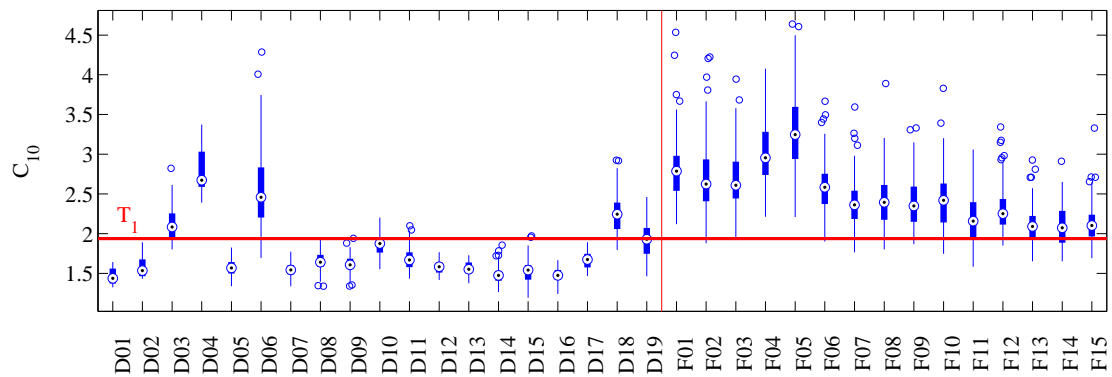
Fig. S5. Maximum value per activity obtained with C_5.

Fig. S6. Maximum value per activity obtained with C_6.

Fig. S7. Maximum value per activity obtained with C_7.

Fig. S8. Maximum value per activity obtained with C_9.

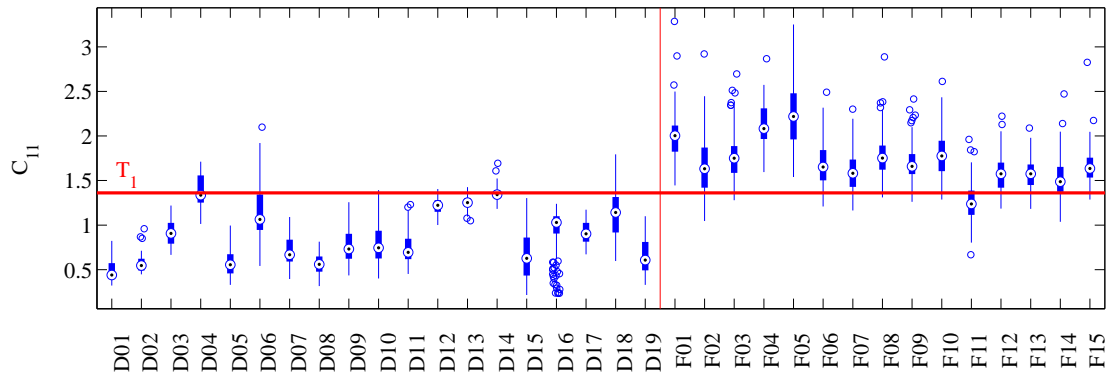Fig. S9. Maximum value per activity obtained with C_{10}.

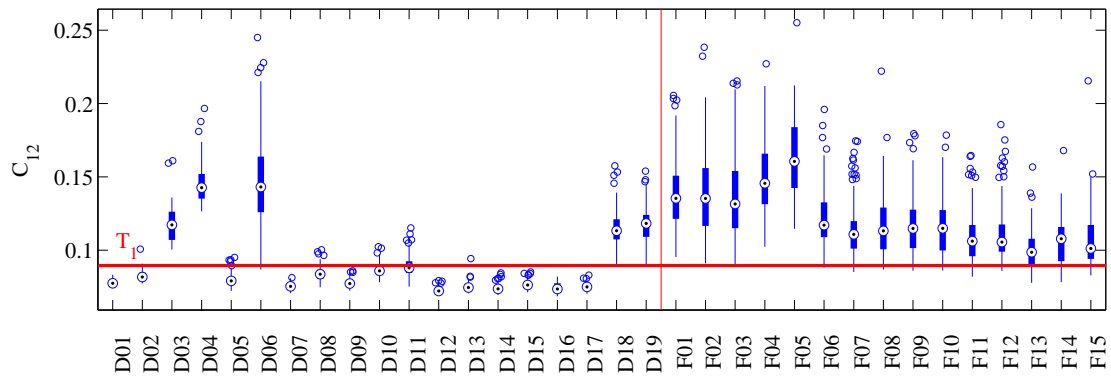Fig. S10. Maximum value per activity obtained with C_{11}.

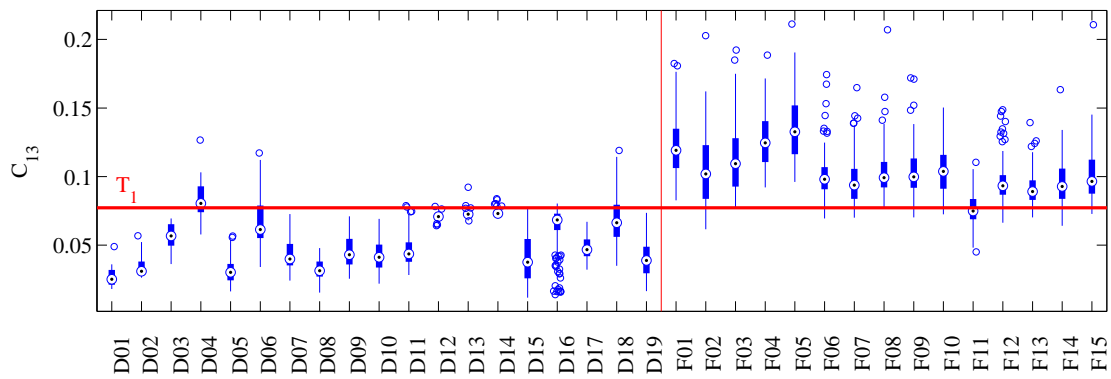Fig. S11. Maximum value per activity obtained with C_{12}.
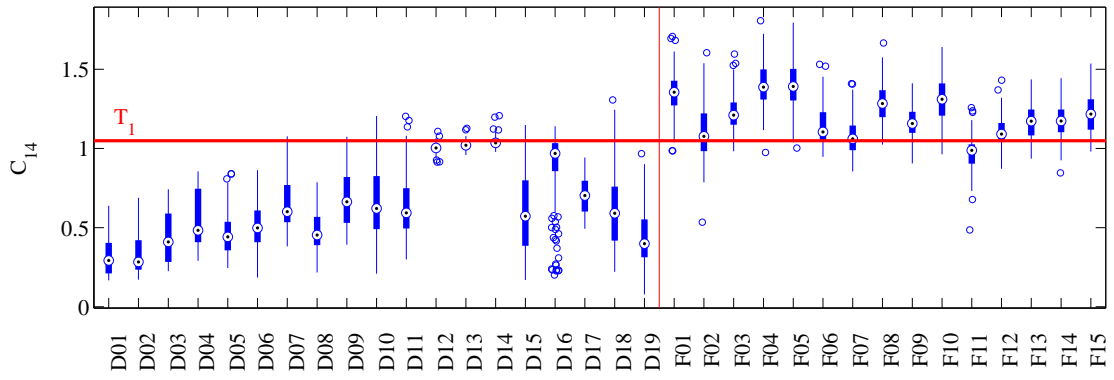

Fig. S12. Maximum value per activity obtained with C_{13}.

Fig. S13. Maximum value per activity obtained with C_{14}.