Supplement of

Residential flood loss estimated from Bayesian multilevel models

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Table S1. Comparison of candidate models of each variants by their difference in the expected log pointwise predictive density (elpd) to the highest accuracy model (fit12) and the standard error of the differences; model candidates with cumulative predictors from 1 to 12

Single-Level				Flood Type*				Region				Event				Predictors set
Model	elpd_diff	se_diff	elpd_loo	Model	elpd_diff	se_diff	elpd_loo	Model	elpd_diff	se_diff	elpd_loo	Model	elpd_diff	se_diff	elpd_loo	
fit12	0	0	2134.6	fit12	0	0	2134.3	fit12	0	0	2125.2	fit12	0	0	2134.4	WD+BA+Con+Dur+Pre+Ins+Eff+Eme+Cel+Vel+ Exp+BQ
fit11	-4.1	3.1	2130.5	fit11	-2.4	2.9	2131.8	fit11	-3.2	2.8	2122	fit11	-0.7	2.5	2133.6	WD+BA+Con+Dur+Pre+Ins+Eff+Eme+Cel+Vel+ Exp
fit10	-9.4	4.5	2125.1	fit10	-8.4	4.6	2125.9	fit10	-4.7	3.8	2120.5	fit10	-1	3	2133.3	WD+BA+Con+Dur+Pre+Ins+Eff+Eme+Cel+Vel
fit9	-10.6	5.1	2123.9	fit9	-8.1	5	2126.2	fit7	-9.3	5.6	2115.9	fit9	-1.7	3.7	2132.6	WD+BA+Con+Dur+Pre+Ins+Eff+Eme+Cel
fit8	-12.6	5.4	2122	fit8	-8.8	5.3	2125.4	fit8	-9.8	5.4	2115.4	fit8	-3.9	4.4	2130.5	WD+BA+Con+Dur+Pre+Ins+Eff+Eme
fit7	-11.7	5.4	2122.9	fit7	-7.3	5.3	2127	fit9	-7.9	4.9	2117.3	fit7	-1.9	4.5	2132.5	WD+BA+Con+Dur+Pre+Ins+Eff
fit6	-16.5	6.5	2118.1	fit6	-10.2	6.5	2124	fit6	-13.3	6.4	2111.9	fit6	-4	5.3	2130.4	WD+BA+Con+Dur+Pre+Ins
fit5	-24.8	7.4	2109.8	fit5	-20.9	7.8	2113.4	fit5	-17.3	7.1	2108	fit5	-8	6.1	2126.4	WD+BA+Con+Dur+Pre
fit4	-42.3	9.1	2092.2	fit4	-36.2	9	2098.1	fit4	-30.9	8.6	2094.3	fit4	-12	6.7	2122.4	WD+BA+Con+Dur
fit3	-55	10.1	2079.6	fit3	-41	9.5	2093.2	fit3	-40	9.5	2085.3	fit3	-24.4	8.1	2109.9	WD+BA+Con
fit2	-100.8	14.1	2033.8	fit2	-76.9	13	2057.3	fit2	-83.5	13.9	2041.8	fit2	-60.2	12.8	2074.2	WD+BA
fit1	-148.1	17	1986.4	fit1	-115.6	15.3	2018.7	fit1	-122.6	16.3	2002.6	fit1	-98.1	15.7	2036.3	WD

Table S2. Comparison of candidate models of each variants by their difference in the expected log pointwise predictive density (elpd) to the highest accuracy model (by each model variant) and the standard error of the differences; model candidates with predictors 1 to 6 plus one of the remaining predictors

Single-Level				Flood Type				Region				Event				Predictor set (for Year variant)
Model	elpd_diff	se_diff	elpd_loo	Model	elpd_diff	se_diff	elpd_loo	Model	elpd_diff	se_diff	elpd_loo	Model	elpd_diff	se_diff	elpd_loo	

fit6+11	0	0	2123	fit6+11	0	0	2130.8	fit6+7	0	0	2115.9	fit6+7	0	0	2132.5	WD+BA+Con+Dur+Pre+Ins+Eff
fit6+7	-0.1	4.8	2122.9	fit6+7	-3.8	5	2127	fit6+10	-0.4	4.6	2115.6	fit6+9	-0.4	4.4	2132.1	WD+BA+Con+Dur+Pre+Ins+Cel
fit6+12	-1.7	4.5	2121.3	fit6+9	-6.4	4.3	2124.4	fit6+11	-0.9	4.4	2115	fit6+12	-1.3	3.6	2131.2	WD+BA+Con+Dur+Pre+Ins+BQ
fit6+9	-3.1	4.7	2119.9	fit6+12	-6.6	4.6	2124.2	fit6+9	-1.3	4.8	2114.7	fit6+10	-1.4	3.6	2131.1	WD+BA+Con+Dur+Pre+Ins+Vel
fit6+10	-4.1	3.8	2118.9	fit6	-6.7	3.9	2124	fit6+12	-2.8	4.2	2113.2	fit6	-2.1	3	2130.4	WD+BA+Con+Dur+Pre+Ins
fit6	-5	3.3	2118.1	fit6+10	-7.6	4.1	2123.2	fit6	-4	3.4	2111.9	fit6+11	-2.5	3.3	2130	WD+BA+Con+Dur+Pre+Ins+Exp
fit6+8	-5.8	3.3	2117.2	fit6+8	-8.4	3.9	2122.3	fit6+8	-4.3	3.7	2111.7	fit6+8	-3.5	3	2129	WD+BA+Con+Dur+Pre+Ins+Eme

Table S3. Comparison of candidate models of each variants by their difference in the expected log pointwise predictive density (elpd) to the reference model (fit6) and the standard error of the differences; model candidates with predictors 1 to 5 plus a combination of predictors 6, 7, and 11

Single-Level				Flood Type				Region				Year				Predictor set for Year variant
Model	elpd_ diff	se_ diff	elpd_ loo	Model	elpd_ diff	se_ diff	elpd_ loo	Model	elpd_ diff	se_ diff	elpd_ loo	Model	elpd_ diff	se_ diff	elpd_ loo	
fit5+7	-3.6	5.7	2114.5	fit5+7	-6.2	6.1	2117.8	fit5+11	-0.9	4.2	2111.0	fit5+11	-4.3	4.0	2126.1	WD+BA+Con+Dur+Pre+Exp
fit5+11	-3.1	5.5	2115.0	fit5+11	-3.5	6.4	2120.5	fit5+7	-0.2	4.7	2111.7	fit5+7	-2.3	4.6	2128.1	WD+BA+Con+Dur+Pre+Eff
fit6	0	0	2118.1	fit6	0	0	2124.0	fit6	0	0	2111.9	fit5+7+11	-1.4	5.0	2129.0	WD+BA+Con+Dur+Pre+Eff+Exp
fit5+7+11	1.6	6.7	2119.7	fit5+7+11	0.1	7.4	2124.1	fit5+7+11	2.3	5.5	2114.2	fit6+11	-0.3	1.7	2130.0	WD+BA+Con+Dur+Pre+Ins+Exp
fit6+7	4.9	3.5	2122.9	fit6+7	3.0	3.5	2127.0	fit6+11	3.1	2.8	2115.0	fit6	0	0	2130.4	WD+BA+Con+Dur+Pre+Ins
fit6+11	5.0	3.3	2123.0	fit6+11	6.7	3.9	2130.8	fit6+7	4.0	3.4	2115.9	fit6+7+11	1.5	3.5	2131.9	WD+BA+Con+Dur+Pre+Ins+Eff+Exp
fit6+7+11	9.6	4.8	2127.6	fit6+7+11	9.6	5.4	2133.6	fit6+7+11	6.4	4.3	2118.3	fit6+7	2.1	3.0	2132.5	WD+BA+Con+Dur+Pre+Ins+Eff

Table S4. Central values of each variable per region grouped by similarity after post hoc tests with a significance of 0.05 (central value is the average of numeric Variables, the mode of nominal variables)

REGION	**South**		**East**		**W_N**	
n	1155		3032		281	
Water depth	32.264	a	59.629	c	-64.798	b
Duration	93.741	a	173.3	b	115.87	a
Velocity	29.686	a	29.275	a	22.266	b
Contamination	0.48336	a	0.55967	c	0.25818	b
Emergency measures	55.463		52.309		57.544	
Property-level precautionary measures (PLPM) implementation	0.71342	a	0.68865	a	0.98932	b

Perceived Efficacy of PLPM	27.826	a	28.671	a	24.302	b
Flood experience class	10.084	a	0.87982	a	13.255	b
Building quality	23.026		22.732		2.316	
Building area	263.25	a	211.06	b	335.73	a
Cellar	80.9%	a	82.6%	a	90.3%	b
Insured	23.5%	a	56.7%	b	22.4%	a
Loss ratio	0.10197	a	0.11257	c	0.029909	b

(a–d) Notation of subsamples that are statistically similar to each other; same letters mean similar subsamples; two letters next to a central value means it is similar to both letters' groups (see text for reading example).

Table S5. Central values of each variable per event grouped by similarity after post hoc tests with a significance of 0.05 (central value is the average of numeric Variables, the mode of nominal variables)

YEAR	2002		2005		2006		2010		2011		2013	
n	1697		305		156		440		218		1652	
Water depth	64.212	a	-19.351	b	18.816	b,c	24.669	c	-23.271	b,c	53.526	d
Duration	142.89	a	52.371	b	146.18	c	57.962	b	101.21	a	206.04	d
Velocity	32.326	a	29.304	a,b	26.533	b,c	33.535	a	23.876	b,c	24.833	c
Contamination	0.67265	a	0.27	b	0.35099	b,c	0.54801	d	0.25463	b,c	0.45702	c
Emergency measures	44.137	a	57.344	b,c	69.103	b	51.545	a,c	67.615	b	59.467	b
Property-level precautionary measures (PLPM) implementation	0.27991	a	0.78689	b	1.141	c	0.87045	b	1.445	e	0.96792	d
Perceived Efficacy of PLPM	31.527	a	27.931	b	2.604	b,c	25.882	b	21.714	c	2.641	b,c
Flood experience class	0.47087	a	12.156	b	20.515	c	0.9536	d	21.814	c	11.394	b
Building quality	22.285	a	22.694	a	21.439	a	25.353	b	24.854	b	22.439	a
Building area	195.65	a	466.25	b	215.06	a,b,c	294.15	a,c	263.75	b,c	217.33	a
Cellar	82.5 %		87.4 %		84.5 %		81.6 %		88.4 %		81.3 %	
Insured	41.2 %	a	26.9 %	b	39.1 %	a,c	50.5 %	c	25.2 %	a,b,c	56.8 %	a,b,c
Loss ratio	0.12262	a	0.040601	b	0.069922	b,c	0.077278	c	0.019505	d	0.11732	a

(a–d) Notation of subsamples that are statistically similar to each other; same letters mean similar subsamples; two letters next to a central value means it is similar to both letters' groups (see text for reading example).