



Supplement of

Sediment storage quantification in the Black Forest highlights tectonic influence on typically wide and shallow valleys

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Supplement

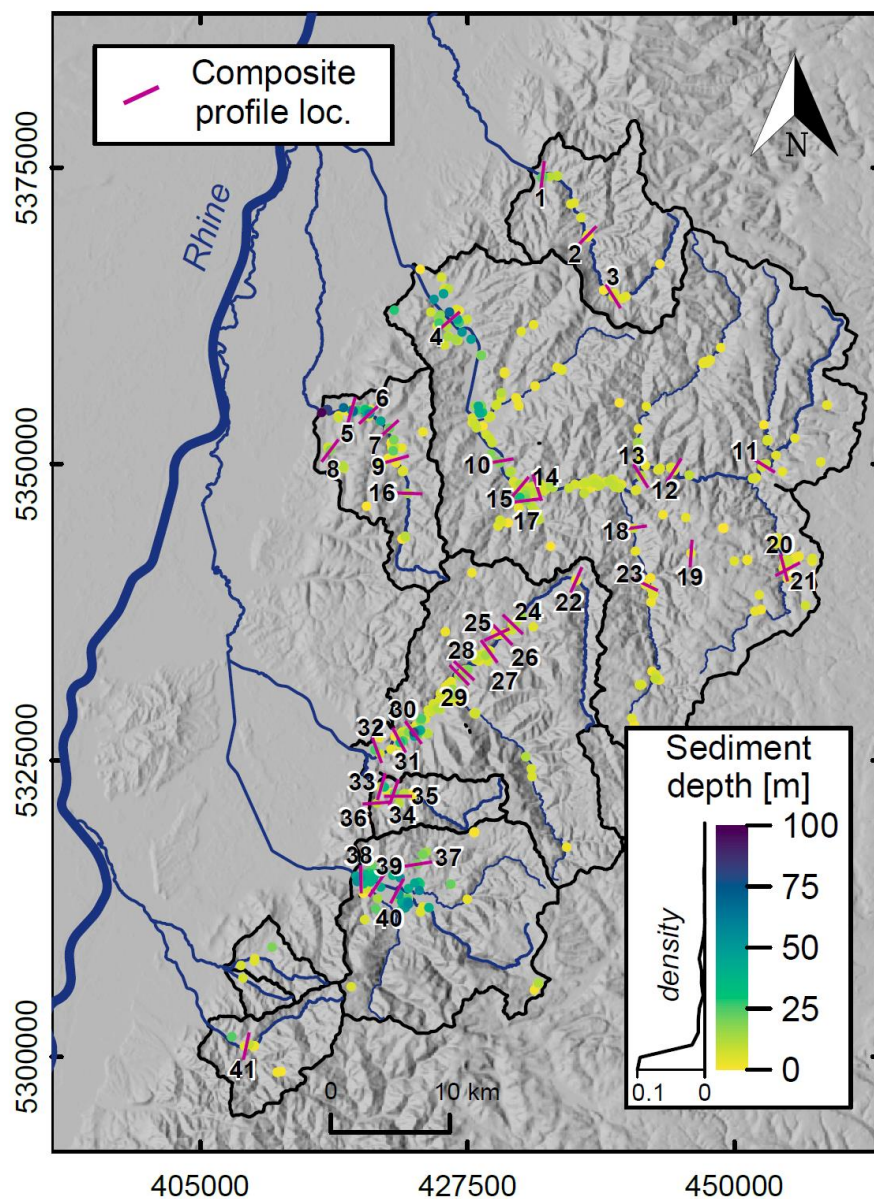
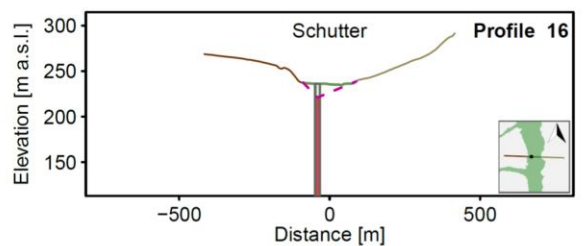
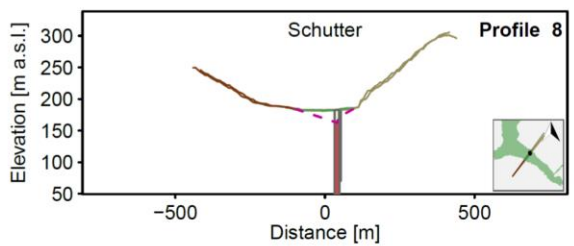
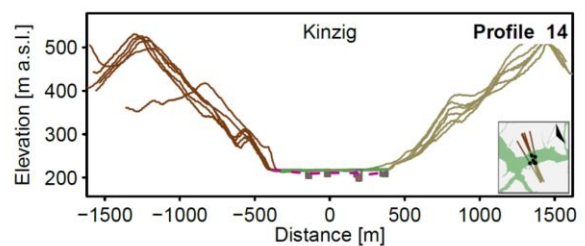
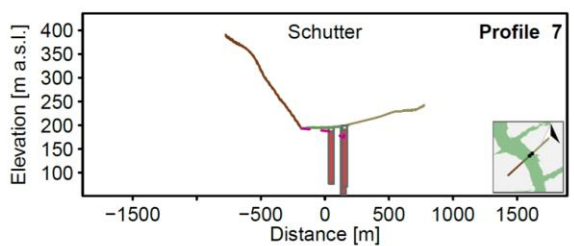
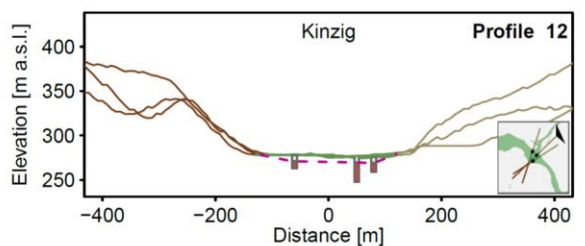
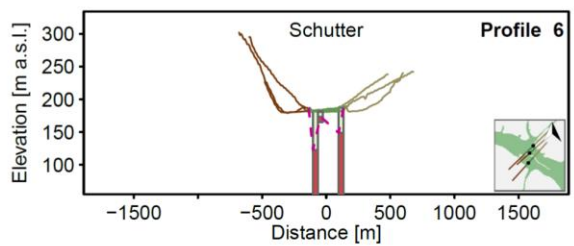
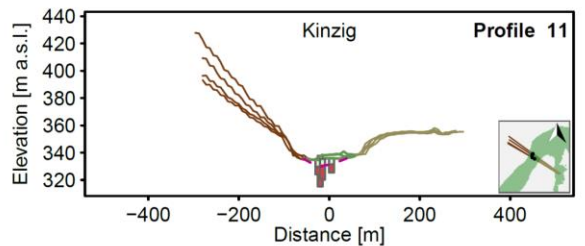
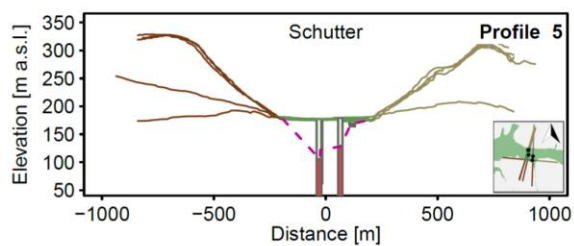
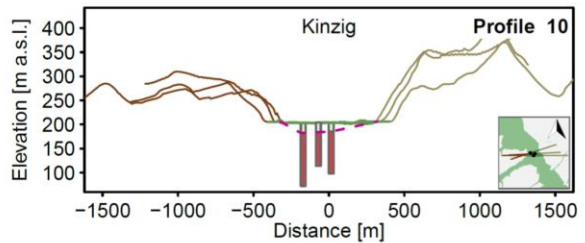
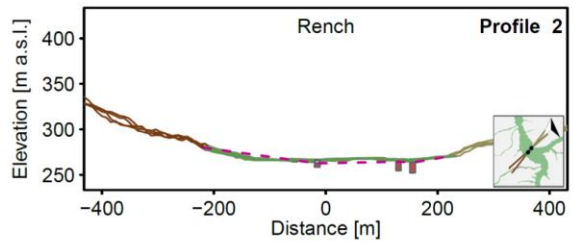
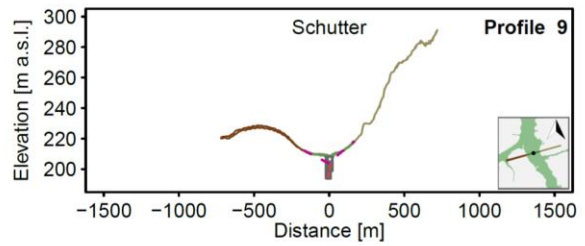
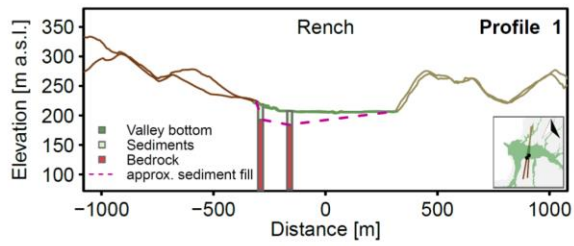
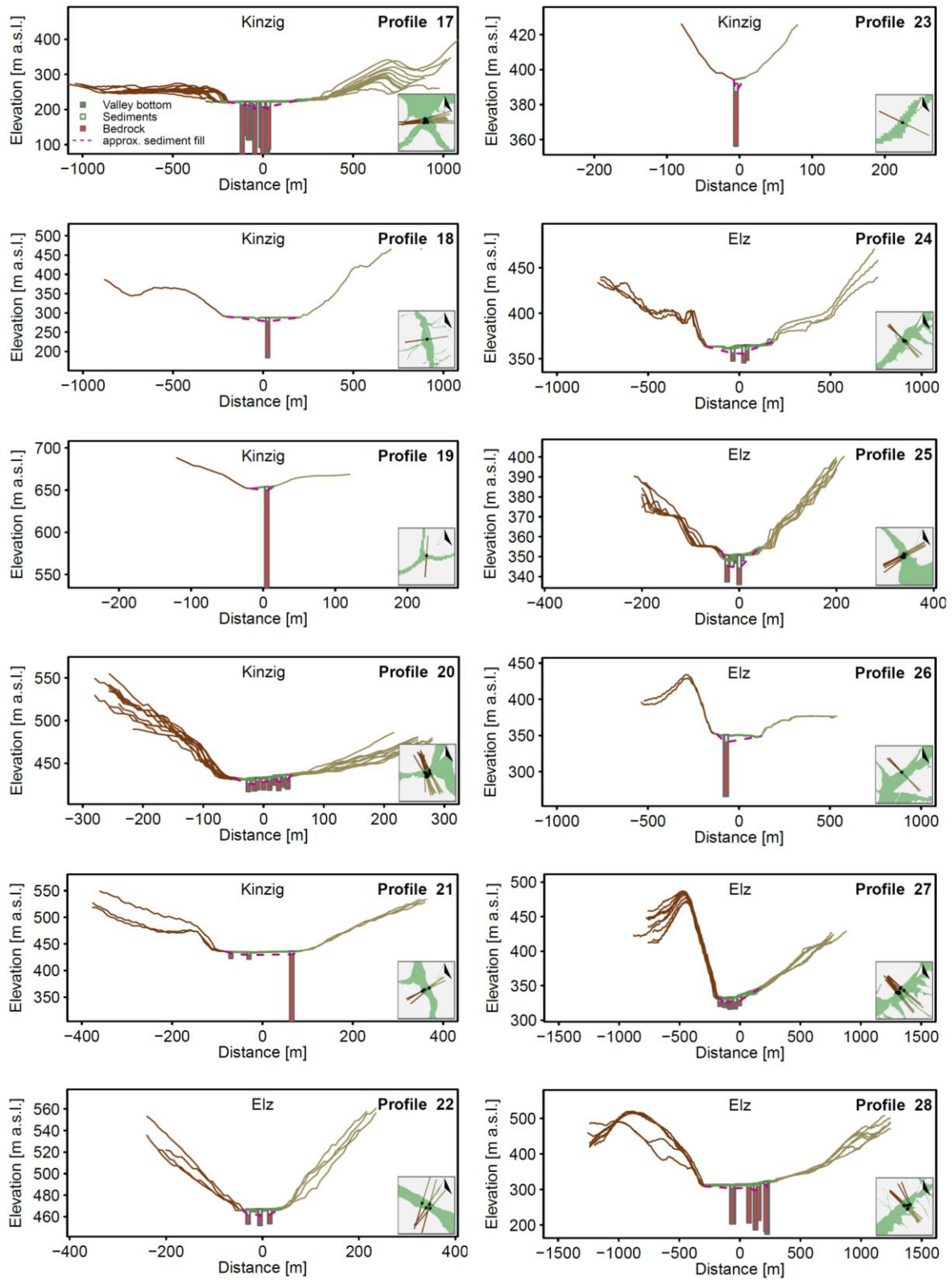


Figure S1: Sediment depth above bedrock of all 978 borehole points within the valley floor areas - including uncertain and imprecise (minimum depth) information - with indication of catchment borders, main rivers (compare Fig. 1 (a)) and data density distribution. (Note that the data points partly overlap, with larger values on top.) Locations and positions of all composite profiles are marked as well (compare Fig. 3 and 4). Catchments and river network: LUBW (2022); elevation data: SRTM (Jarvis et al., 2008).





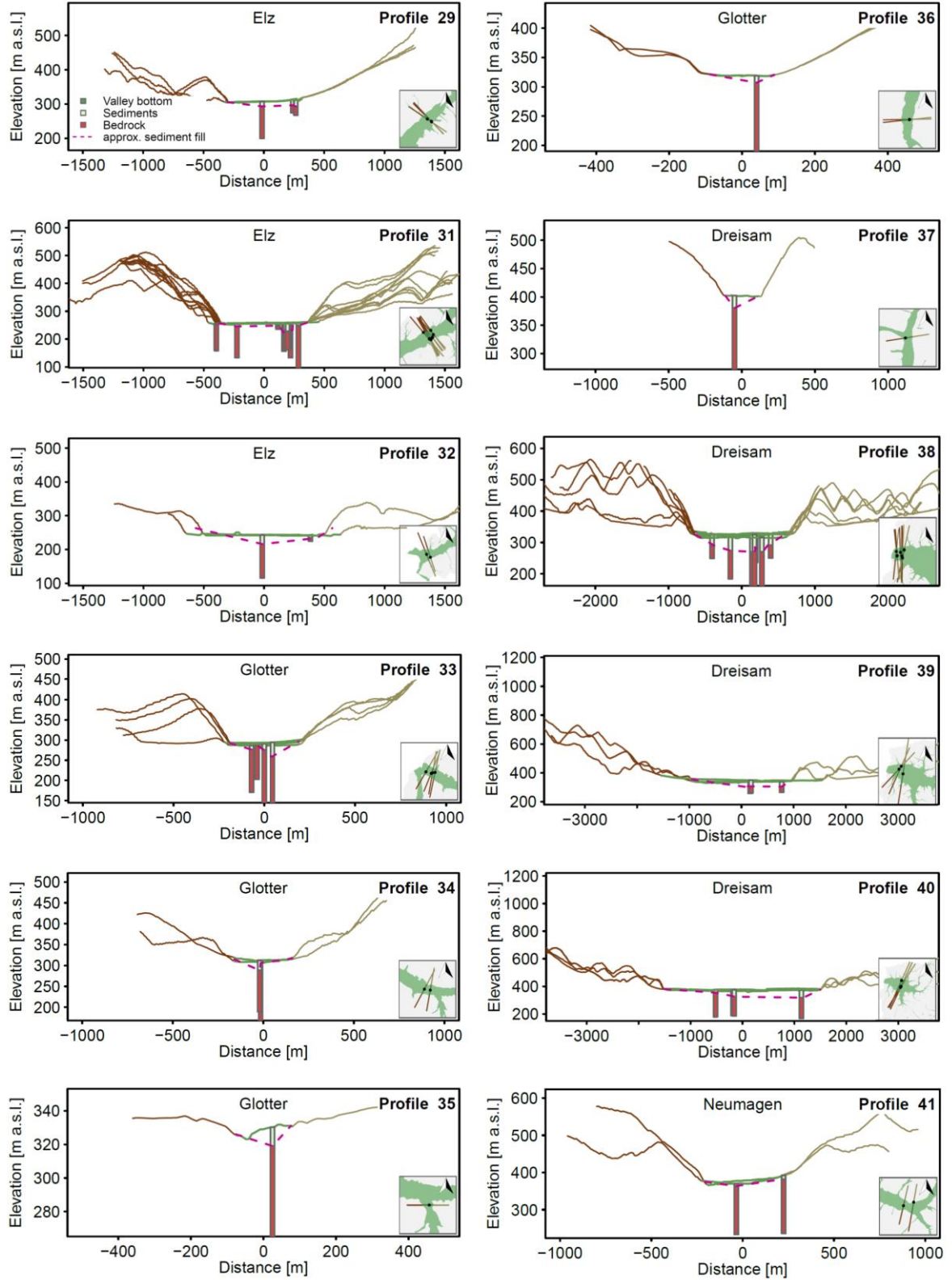


Figure S2: All valley cross sections (except those presented in Fig. 4), composed of one or more transects through boreholes, showing the approximated bedrock topography in the valleys. The x-axis zero positions mark the middle of the valleys, and x- and y-axis scaling is tailored to the respective valley dimensions. Cross profile running numbers refer to locations indicated in Fig. S1.

Table S1: Details on the composite valley cross sections (Fig. 4 and S2). The coordinate reference system is EPSG:35832, profile direction is specified clockwise starting from a north/south axis.

Valley cross profile number	Catchment	Central coordinate east [m]	Central coordinate north [m]	Direction [°]	Valley floor width W_a [m]	Average sediment depth d_a [m]
1	Rench	433849.7	5374424.3	7	620	14.0
2	Rench	437575.0	5369199.1	44	436	2.2
3	Rench	439756.6	5364119.4	148	48	4.4
4	Kinzig	425994.4	5362077.0	49	1440	36.0
5	Schutter	417745.1	5354482.4	16	384	32.1
6	Schutter	419218.4	5354182.7	47	272	25.5
7	Schutter	420845.2	5352940.1	48	356	7.6
8	Schutter	415919.0	5351147.1	37	196	9.0
9	Schutter	421430.9	5350356.4	74	328	2.0
10	Kinzig	430232.7	5350243.4	80	640	13.1
11	Kinzig	452406.1	5349883.9	122	112	3.3
12	Kinzig	444886.3	5349505.8	32	240	5.5
13	Kinzig	442092.2	5349006.0	148	304	6.9
14	Kinzig	433372.9	5347998.6	162	760	6.4
15	Kinzig	431904.1	5347977.1	40	792	6.8
16	Schutter	422520.4	5347533.7	92	176	7.5
17	Kinzig	432457.5	5346905.2	83	388	9.7
18	Kinzig	441458.4	5344586.5	82	400	5.0
19	Kinzig	446325.6	5342477.0	4	32	2.3
20	Kinzig	454159.4	5341247.6	165	96	4.3
21	Kinzig	454466.9	5341088.4	62	160	4.7
22	Elz	436652.1	5340209.8	24	84	3.8
23	Kinzig	442491.9	5339850.8	116	16	2.4
24	Elz	431308.5	5336439.6	134	360	4.1
25	Elz	429980.9	5335612.7	65	72	4.2
26	Elz	430448.5	5335568.7	136	240	5.2
27	Elz	429320.6	5334164.1	144	352	4.8
28	Elz	427217.7	5332550.5	133	584	7.7
29	Elz	426796.8	5332190.9	136	600	11.3
30	Elz	422948.9	5327329.5	144	952	36.3
31	Elz	421739.8	5326709.6	152	740	11.3
32	Elz	419863.7	5325908.0	160	1132	14.2
33	Glötter	420281.8	5322795.4	16	380	12.9
34	Glötter	421271.1	5322282.7	19	320	6.2
35	Glötter	421652.7	5321998.3	90	152	5.6
36	Glötter	419840.1	5321388.3	86	176	6.0
37	Dreisam	423378.4	5316264.4	81	224	11.0
38	Dreisam	418512.2	5314976.9	179	1264	35.0
39	Dreisam	419888.2	5314450.1	34	1904	28.2
40	Dreisam	421601.6	5313964.0	28	2996	33.7
41	Neumagen	408896.7	5300873.6	12	412	6.3

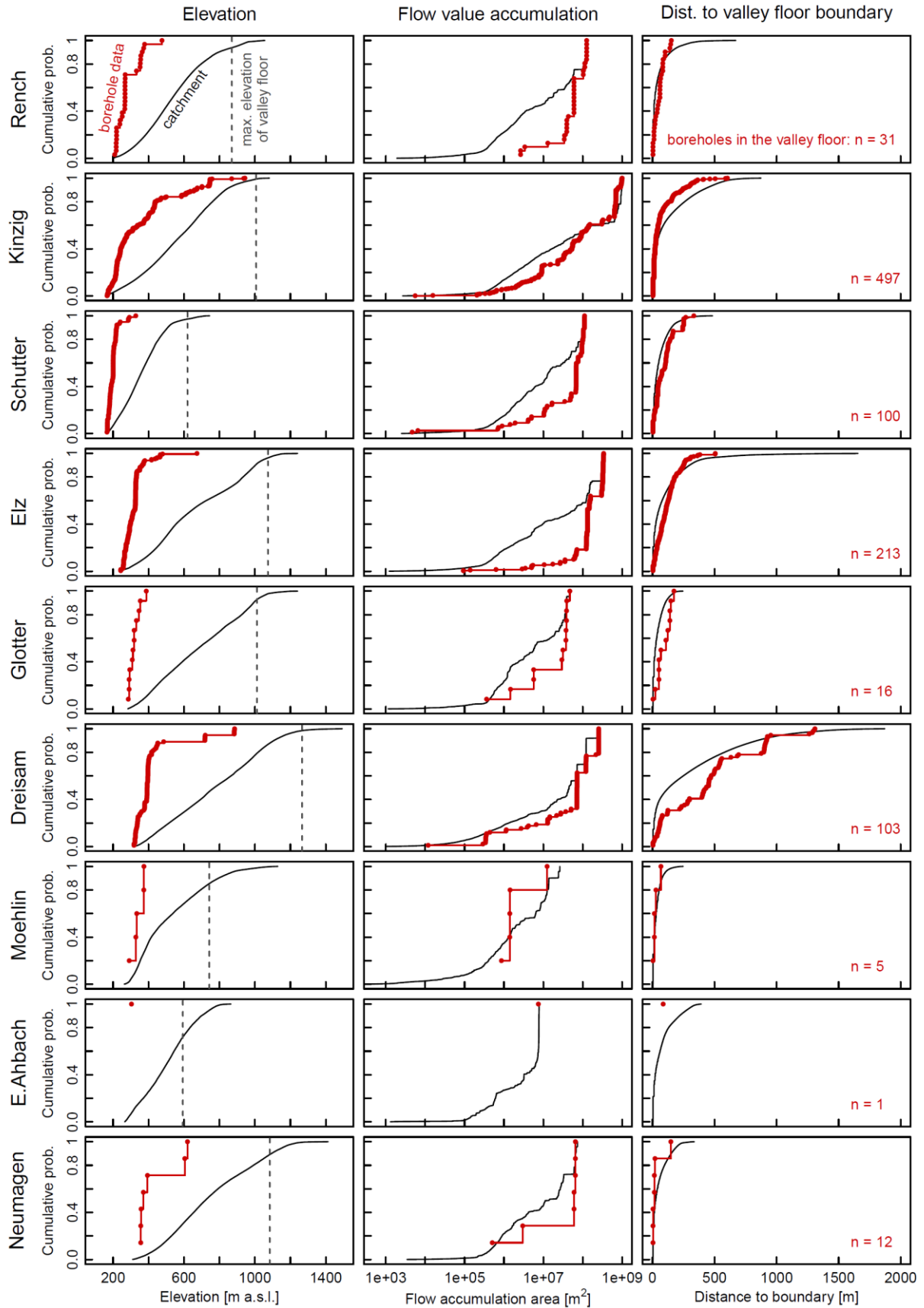


Figure S3: ECDFs (empirical cumulative distribution functions) per catchment for the elevation values as well as flow accumulation (predictor variable b) and distance to the valley floor boundary values (predictor a) within the specific valley floor areas. The catchment data were computed using grids in 8 m resolution, a random sample of 10 % of the data for reasons of computing time, and quantile steps of 0.001. Moreover, red lines with single dots show the ECDFs of the available borehole data reaching the bedrock within the valley floors of each catchment (see Tab. 1).

Table S2: Valley fill volumes computed on the basis of composite cross profiles (Fig. 5 method A).

Catchment	Valley fill estimate minimum [km ³]	Valley fill estimate 0.25 quantile [km ³]	Valley fill estimate 0.5 quantile [km ³]	Valley fill estimate 0.75 quantile [km ³]	Valley fill estimate maximum [km ³]
Rench	0.020	0.047	0.068	0.130	0.365
Kinzig	0.156	0.368	0.532	1.009	2.840
Schutter	0.023	0.055	0.080	0.151	0.424
Elz	0.059	0.140	0.202	0.383	1.078
Glötter	0.007	0.017	0.025	0.047	0.132
Dreisam	0.064	0.151	0.218	0.413	1.163
Moehlin	0.005	0.011	0.015	0.029	0.083
E.Ahbach	0.002	0.006	0.008	0.015	0.043
Neumagen	0.011	0.027	0.039	0.074	0.207
<i>entire study area</i>	0.347	0.822	1.187	2.251	6.335

Table S3: Valley fill volumes computed on the basis of linear regression modelling and precise input data (compare Fig. 5 method B).

Catchment	Valley fill estimate minimum [km ³]	Valley fill estimate 0.25 quantile [km ³]	Valley fill estimate 0.5 quantile [km ³]	Valley fill estimate 0.75 quantile [km ³]	Valley fill estimate maximum [km ³]
Rench	0.035	0.073	0.081	0.084	0.325
Kinzig	1.069	1.127	1.146	1.173	1.235
Schutter	0.171	0.189	0.196	0.203	0.361
Elz	0.313	0.341	0.348	0.355	0.376
Glötter	0.030	0.032	0.032	0.033	0.034
Dreisam	0.782	0.841	0.868	0.890	0.950
Moehlin	0.017	0.019	0.019	0.019	0.020
E.Ahbach	0.012	0.013	0.013	0.013	0.013
Neumagen	0.055	0.057	0.058	0.059	0.063
<i>entire study area</i>	2.484	2.692	2.761	2.829	3.377

Table S4: Valley fill volumes computed on the basis of random forest regression modelling and precise input data (compare Fig. 5 method B).

Catchment	Valley fill estimate minimum [km ³]	Valley fill estimate 0.25 quantile [km ³]	Valley fill estimate 0.5 quantile [km ³]	Valley fill estimate 0.75 quantile [km ³]	Valley fill estimate maximum [km ³]
Rench	0.063	0.076	0.078	0.081	0.092
Kinzig	0.936	1.058	1.082	1.104	1.180
Schutter	0.181	0.202	0.210	0.216	0.241
Elz	0.272	0.292	0.298	0.305	0.323
Glötter	0.035	0.038	0.004	0.041	0.046
Dreisam	0.787	0.837	0.854	0.870	0.921
Moehlin	0.023	0.025	0.025	0.026	0.028
E.Ahbach	0.013	0.015	0.015	0.015	0.017
Neumagen	0.059	0.063	0.064	0.066	0.073
<i>entire study area</i>	2.369	2.606	2.666	2.724	2.921