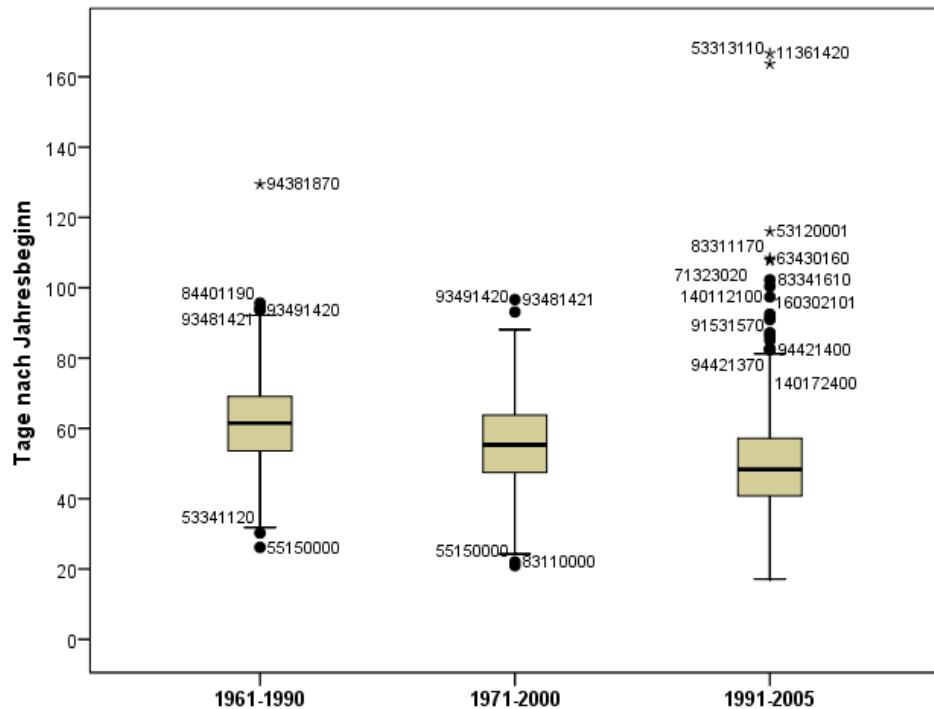


Anhang

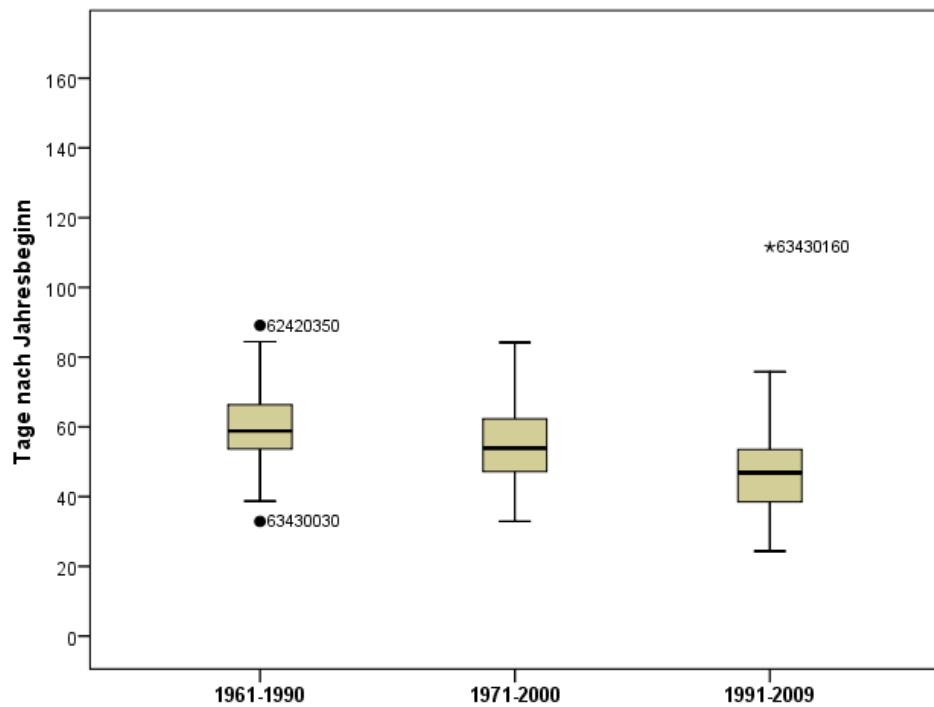
- Anhang 1 Qualitätskontrolle: Ausreißer und Extremwerte (mit Angabe der Stationsnummer) der mittleren Phaseneintritte in Deutschland und Hessen in den Zeiträumen 1961-1990, 1971-2000 und 1991-2005 bzw. 1991-2009
- Anhang 2 Deskriptive Statistik I: Histogramme pro Phänophase für Deutschland und Hessen der Zeiträume 1961-1990, 1971-2000 und 1991-2005 bzw. 1991-2009
- Anhang 3 Deskriptive Statistik II: Kennwerte der 35 ausgewählten Phänphasen langjährig gemittelt über verschiedene Zeiträume für Deutschland und Hessen
- Anhang 4 Deskriptive Statistik III: Verlaufdiagramme zum Phasenbeginn zwischen 1961 und 2005/2009 in Deutschland und Hessen
- Anhang 5 Deskriptive Statistik IV: Verlaufdiagramme für die Jahresschnittstemperatur und den Eintritt der Leit- und Ersatzphasen ausgewählter phänologischer Jahreszeiten zwischen 1961 und 2009 in Hessen
- Anhang 6 Bivariate Statistik I: Ergebnisse der einfachen linearen Regressionsanalyse zwischen langjährig gemittelten Daten zur Lufttemperatur und zum Phaseneintritt in Deutschland für 35 ausgewählte Phänphasen für die Zeiträume 1961-1990, 1971-2000 und 1991-2005
- Anhang 7 Bivariate Statistik II: Regressionsdiagramme zwischen den langjährigen Durchschnittstemperaturen ausgewählter Monate (Monatsreihen) und dem Phasenbeginn
- Anhang 8 Regression Kriging: Flächenhafte Darstellung der vergangenen und zukünftigen pflanzenphänologischen Entwicklung in Hessen
- Anhang 9 Projektion der Phänphasen: Langjährig gemittelter Beginn ausgewählter Phänphasen in Hessen zwischen 1961 und 2100 basierend auf DWD Messungen und vier Klimamodelldaten
- Anhang 10 Multivariate Statistik – CART-Analyse: Entscheidungsbäume ausgewählter Phänphasen für Hessen und Deutschland im Zeitraum 1971-2000

Anhang 1

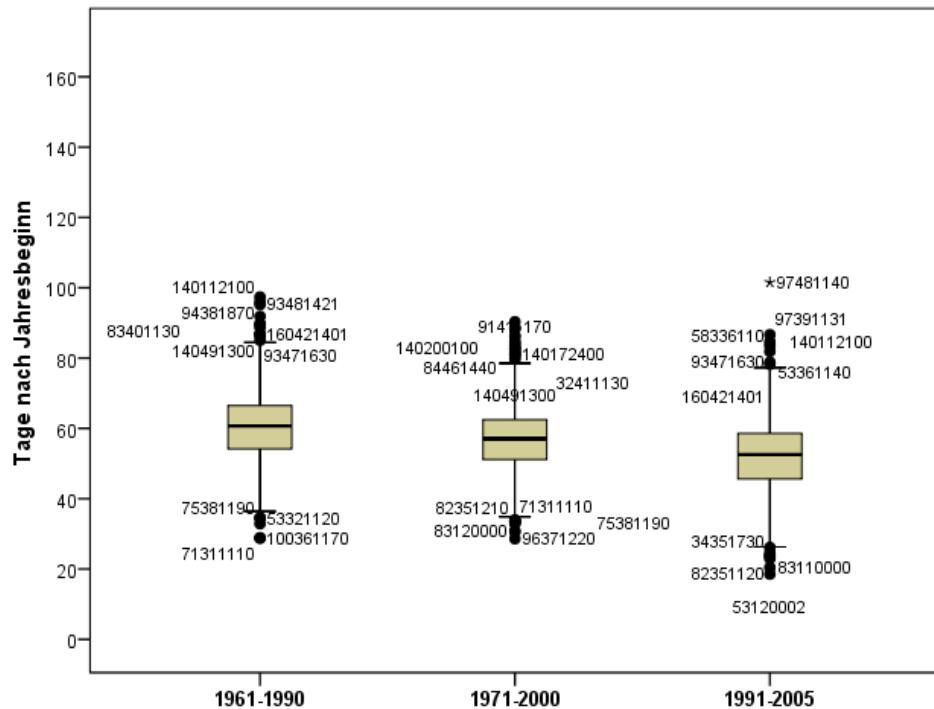
Qualitätskontrolle:
Ausreißer und Extremwerte (mit Angabe der Stationsnummer)
der mittleren Phaseneintritte in Deutschland und Hessen
in den Zeiträumen 1961-1990, 1971-2000 und 1991-2005 bzw. 1991-2009



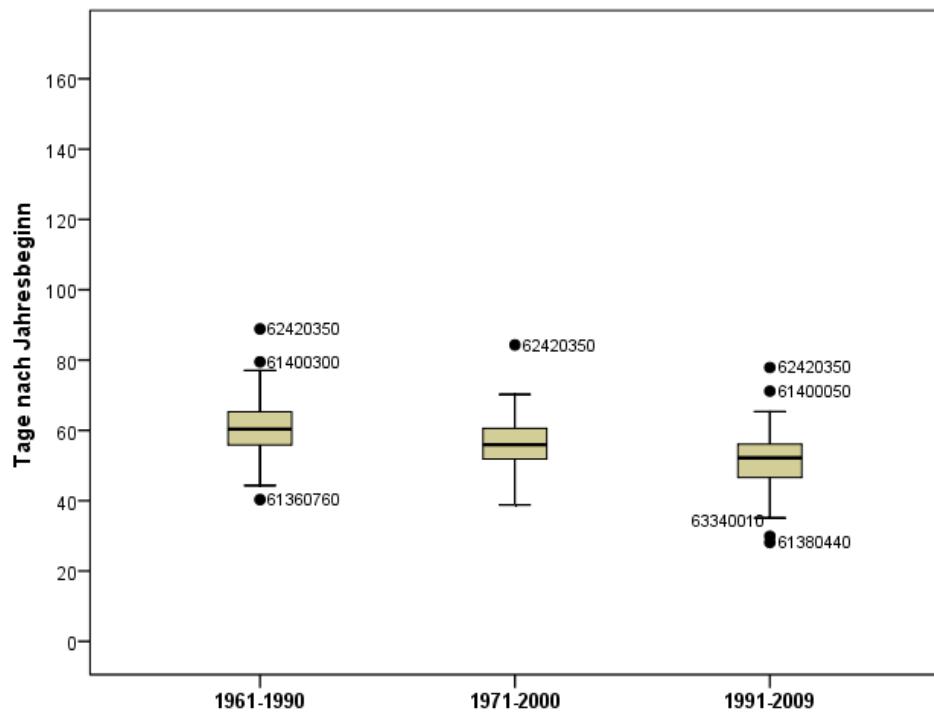
Phase 1 – Hasel, Beginn der Blüte (Deutschland)



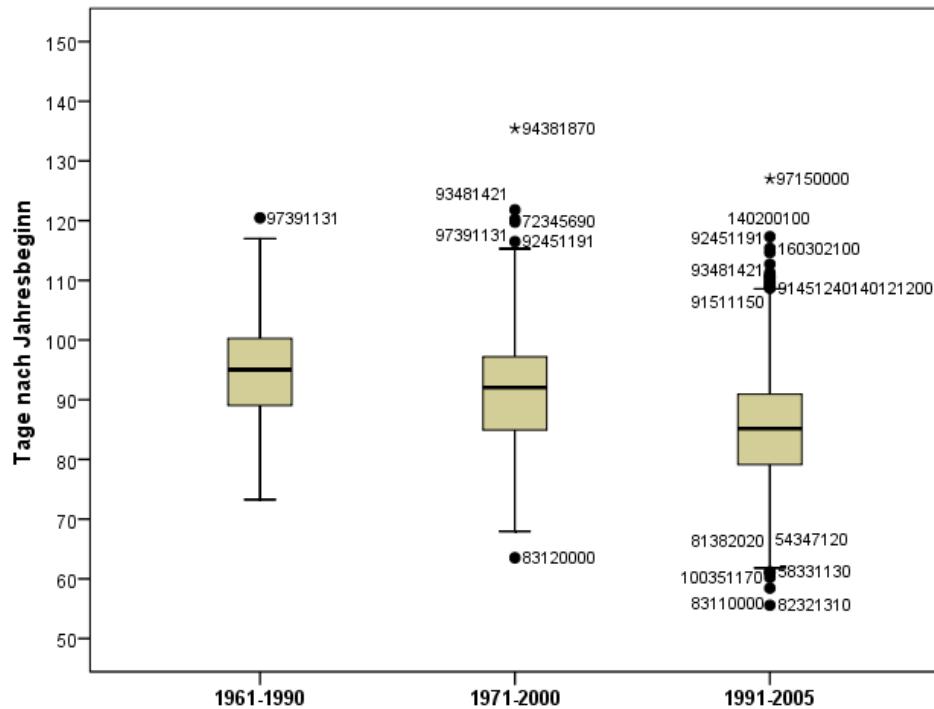
Phase 1 – Hasel, Beginn der Blüte (Hessen)



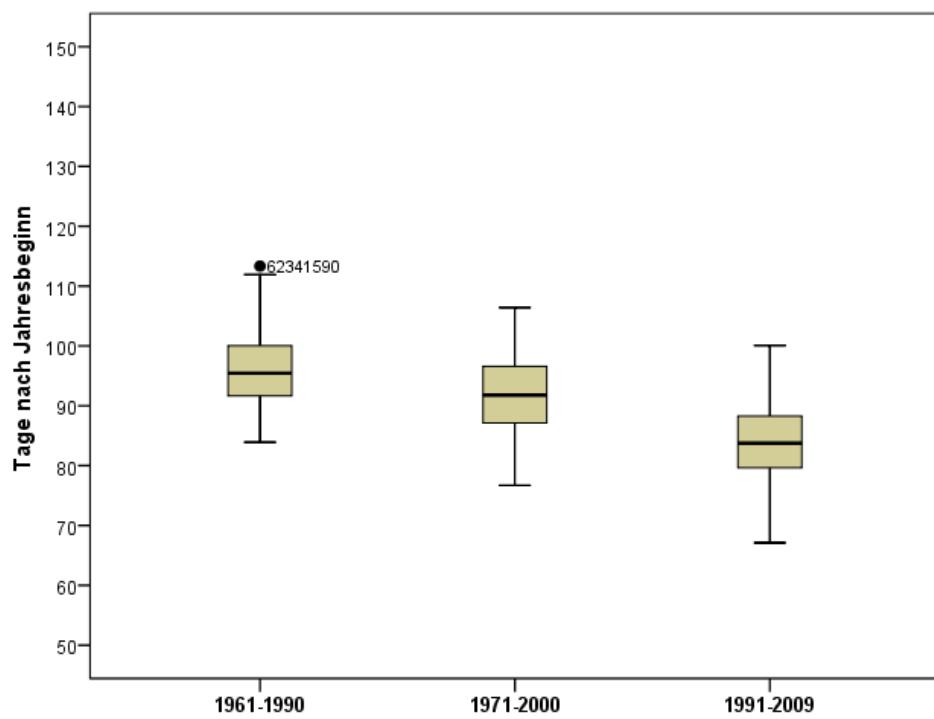
Phase 2 – Schneeglöckchen, Beginn der Blüte (Deutschland)



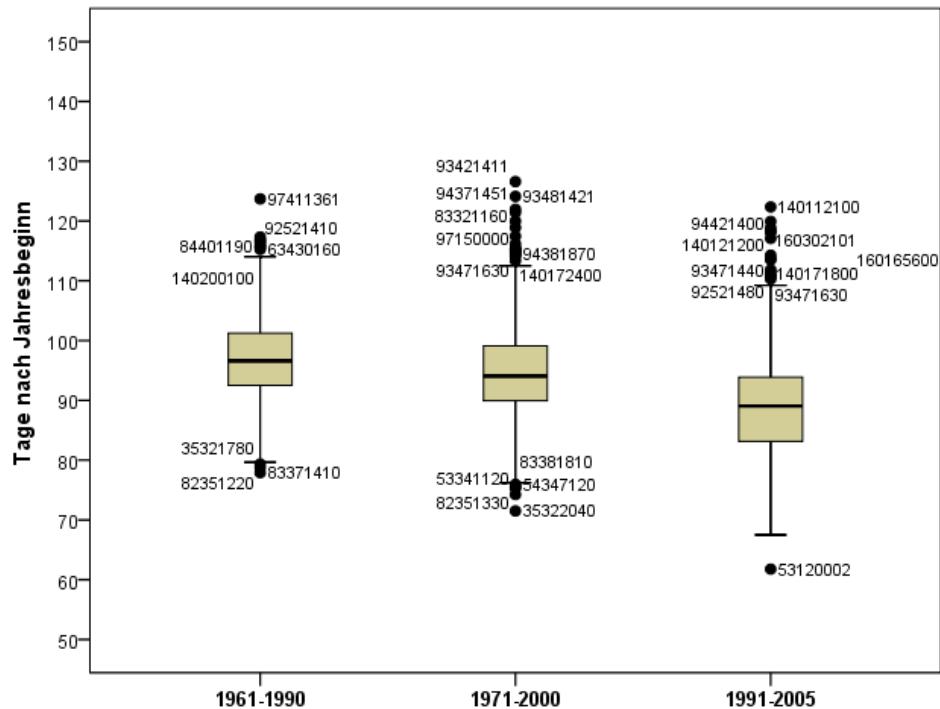
Phase 2 – Schneeglöckchen, Beginn der Blüte (Hessen)



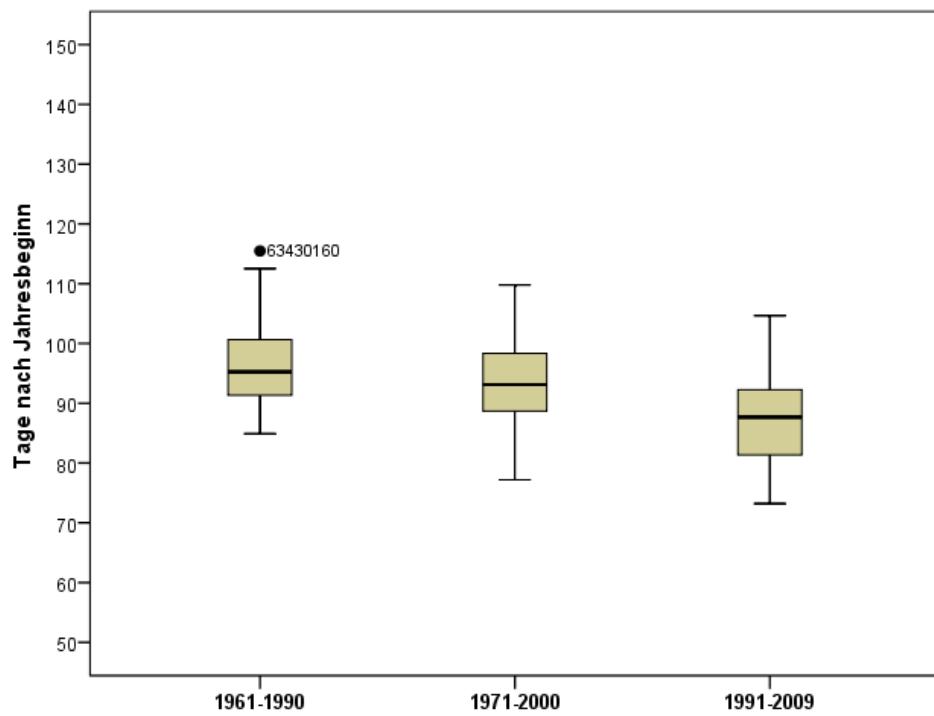
Phase 6 – Forsythie, Beginn der Blüte (Deutschland)



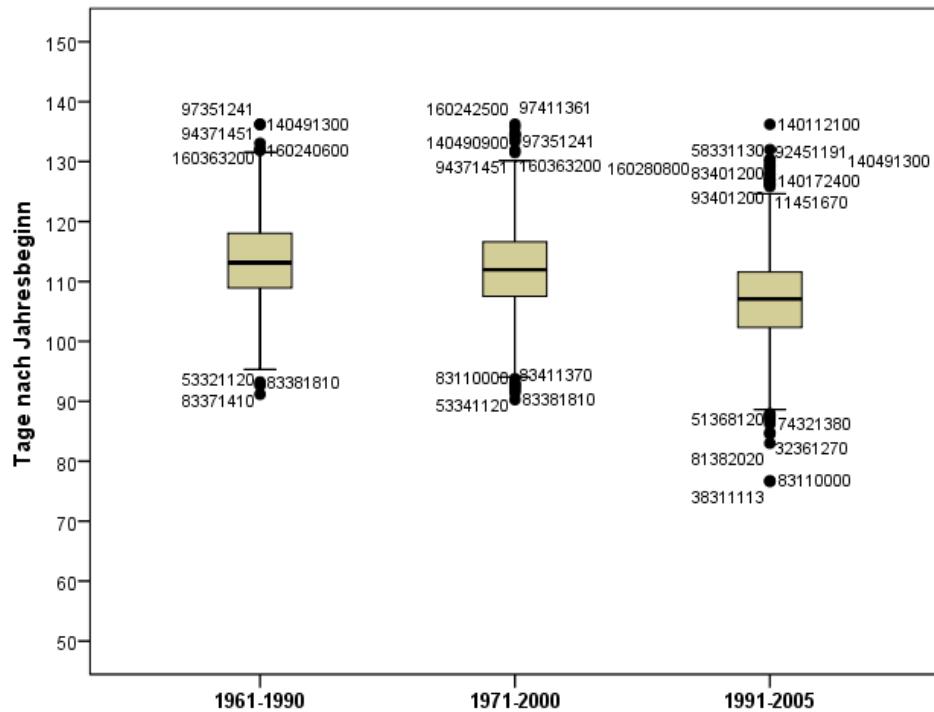
Phase 6 – Forsythie, Beginn der Blüte (Hessen)



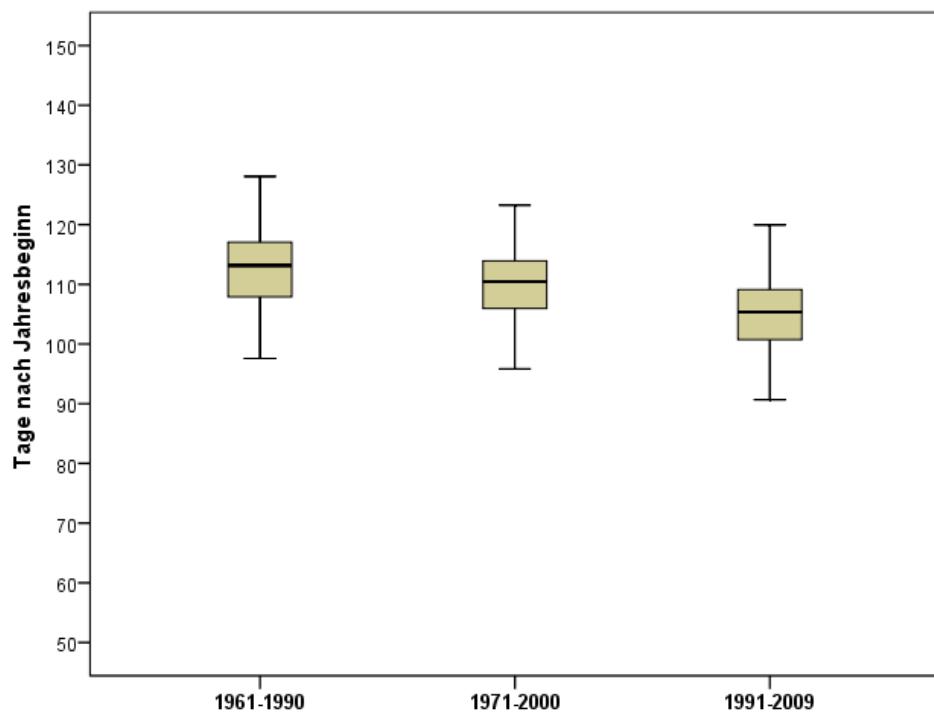
Phase 52 – Stachelbeere, Beginn der Blattentfaltung (Deutschland)



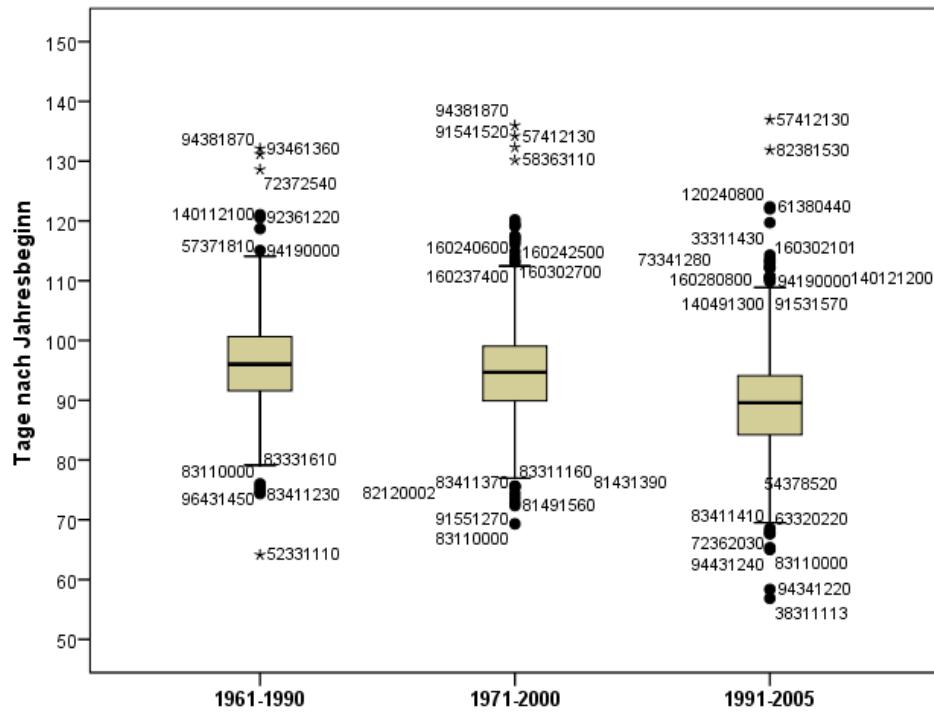
Phase 52 – Stachelbeere, Beginn der Blattentfaltung (Hessen)



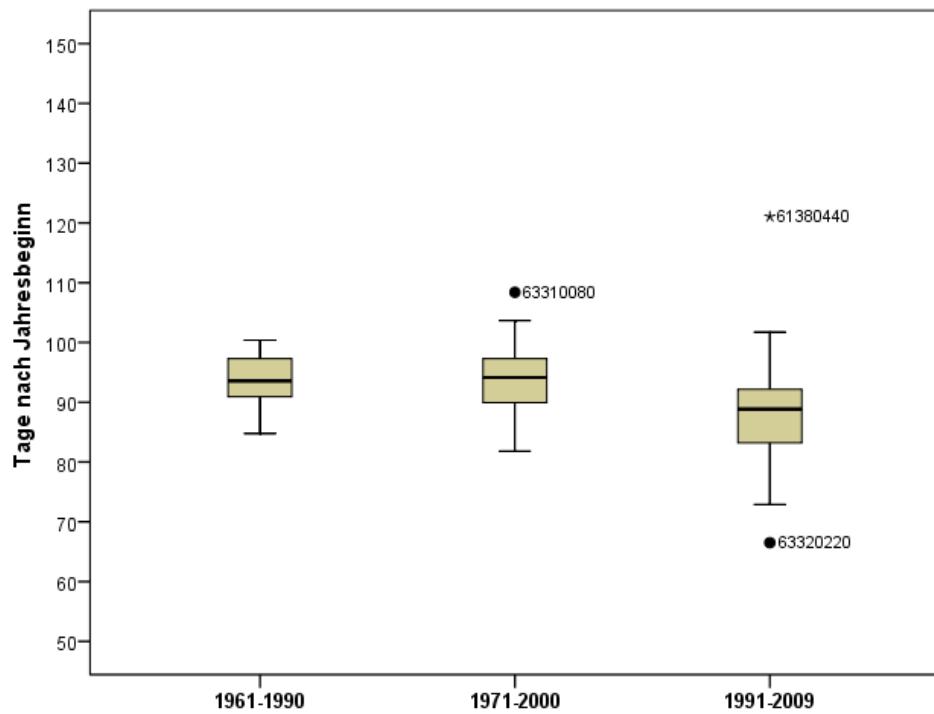
Phase 7 – Rosskastanie, Beginn der Blattentfaltung (Deutschland)



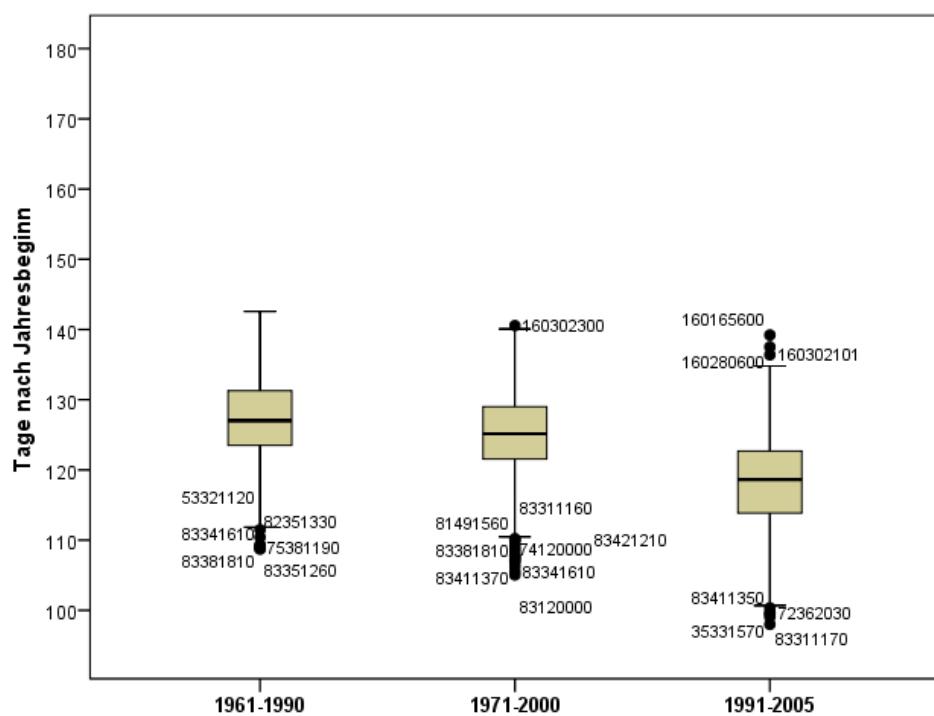
Phase 7 – Rosskastanie, Beginn der Blattentfaltung (Hessen)



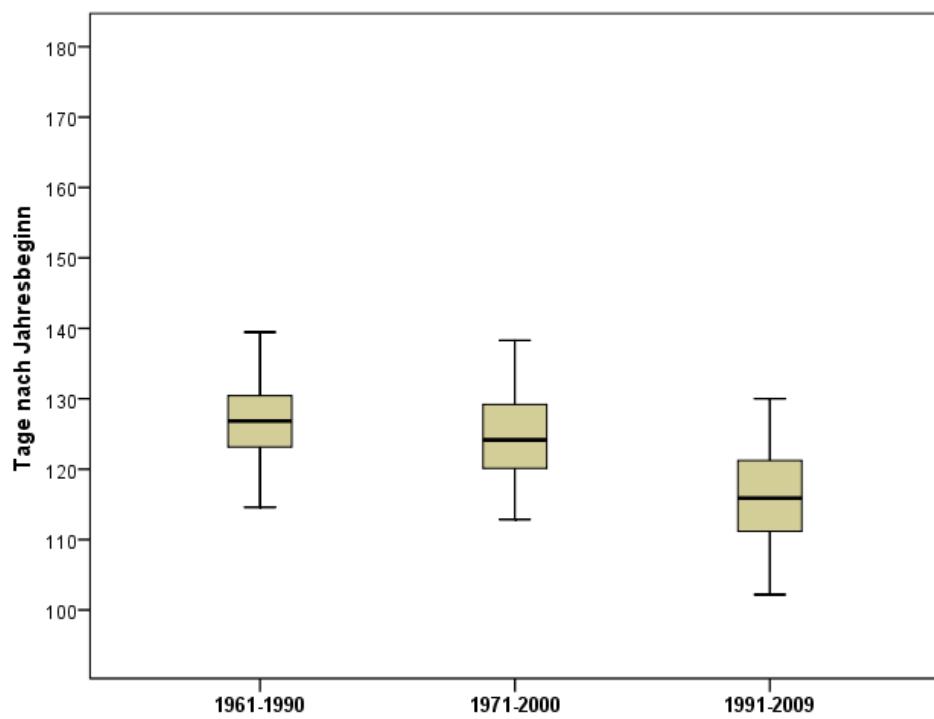
Phase 115 – Buschwindröschen, Beginn der Blüte (Deutschland)



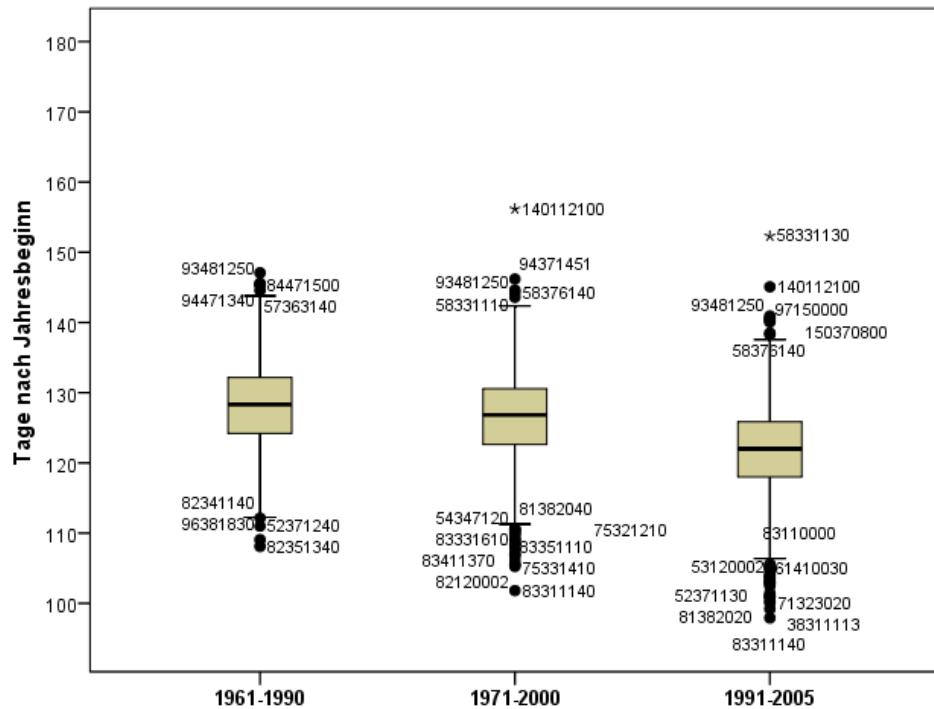
Phase 115 – Buschwindröschen, Beginn der Blüte (Hessen)



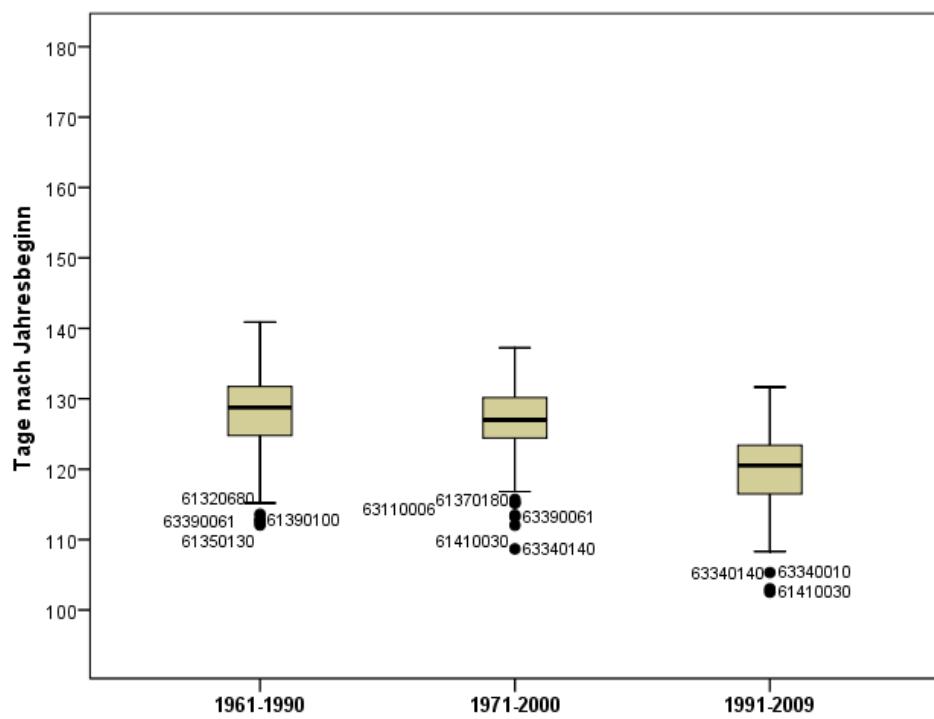
Phase 62 – Apfel, Beginn der Blüte (Deutschland)



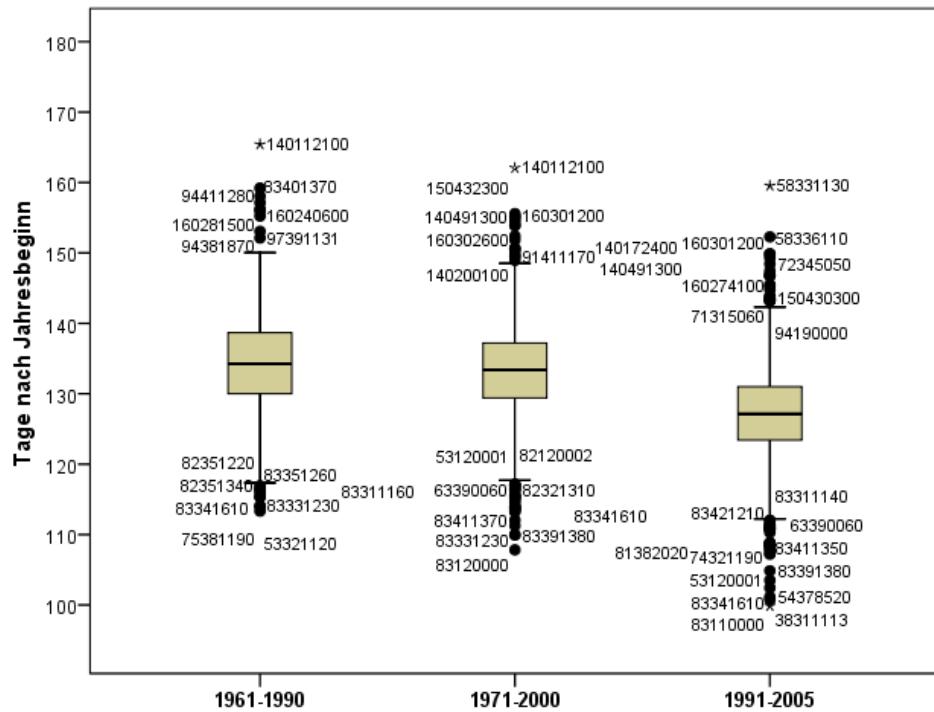
Phase 62 – Apfel, Beginn der Blüte (Hessen)



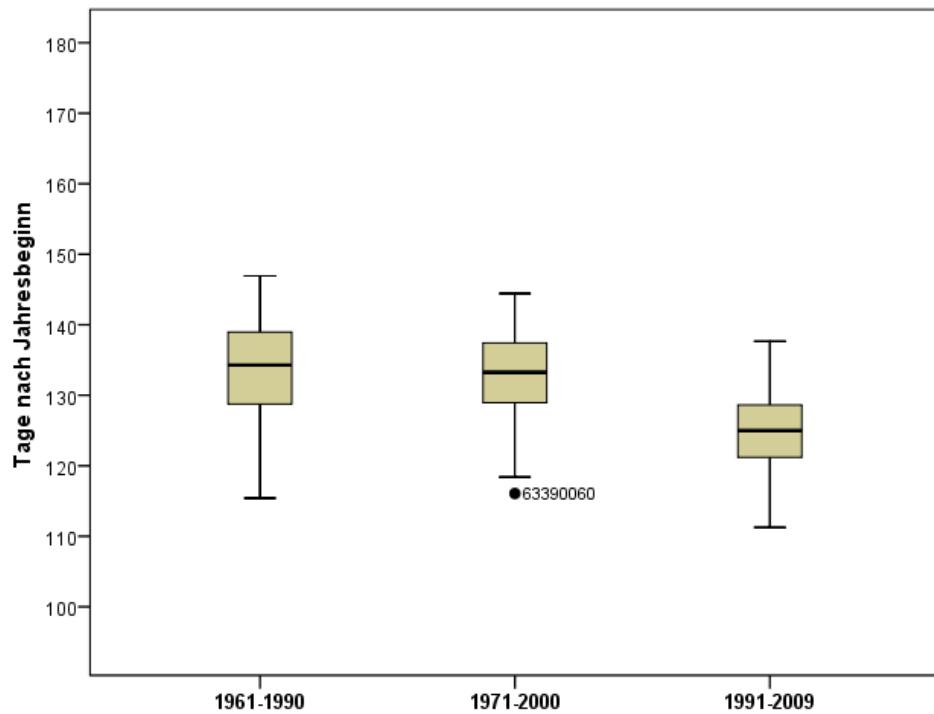
Phase 13 – Stiel-Eiche, Beginn der Blattentfaltung (Deutschland)



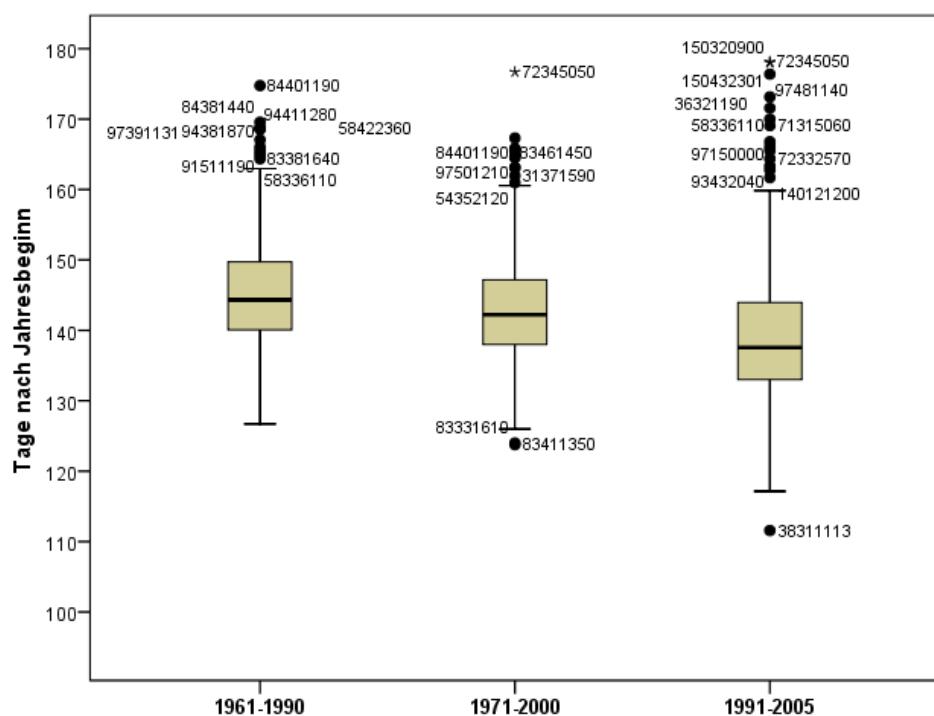
Phase 13 – Stiel-Eiche, Beginn der Blattentfaltung (Hessen)



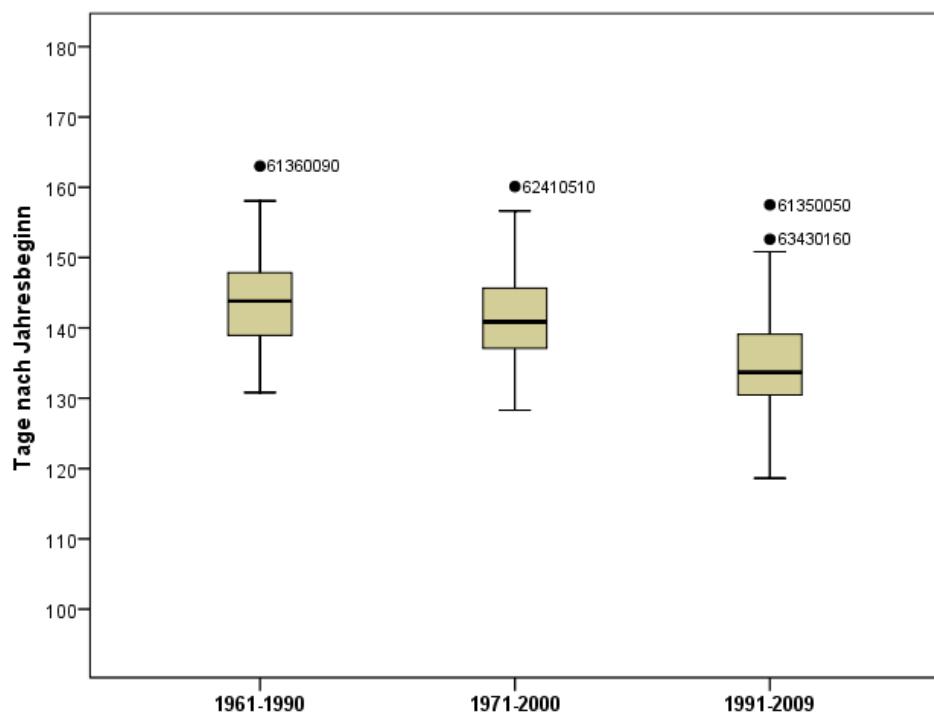
Phase 15 – Flieder, Beginn der Blüte (Deutschland)



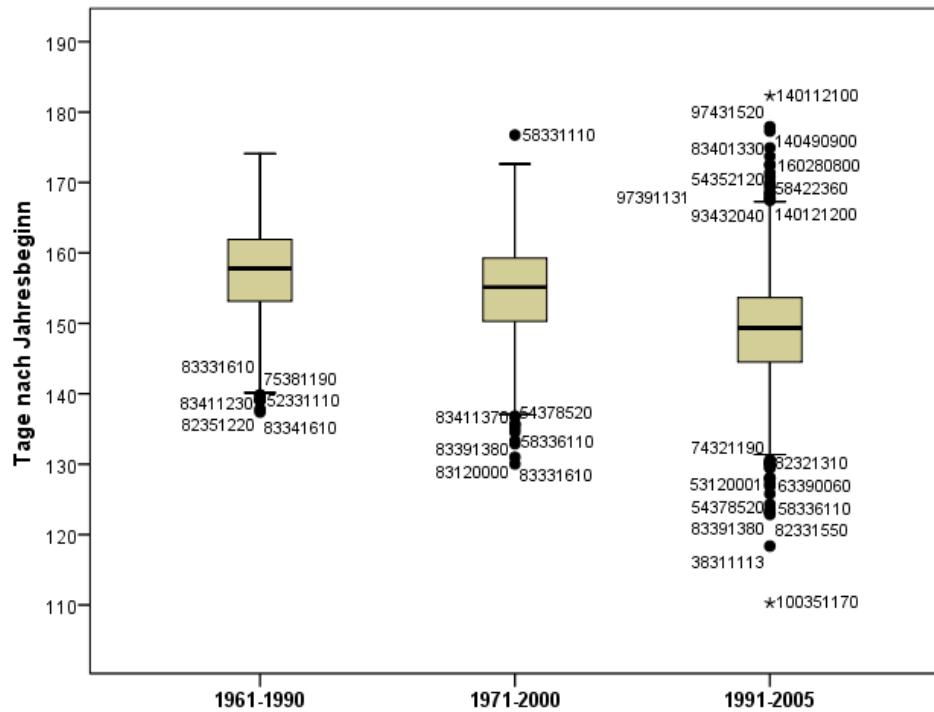
Phase 15 – Flieder, Beginn der Blüte (Hessen)



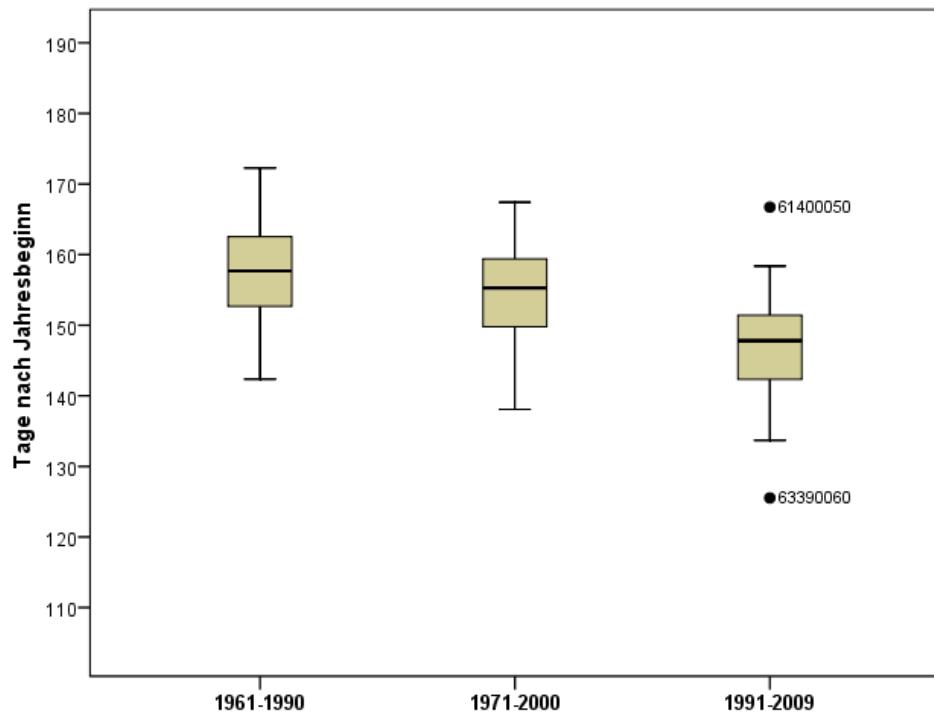
Phase 19 – Wiesen-Fuchsschwanz, Beginn der Vollblüte (Deutschland)



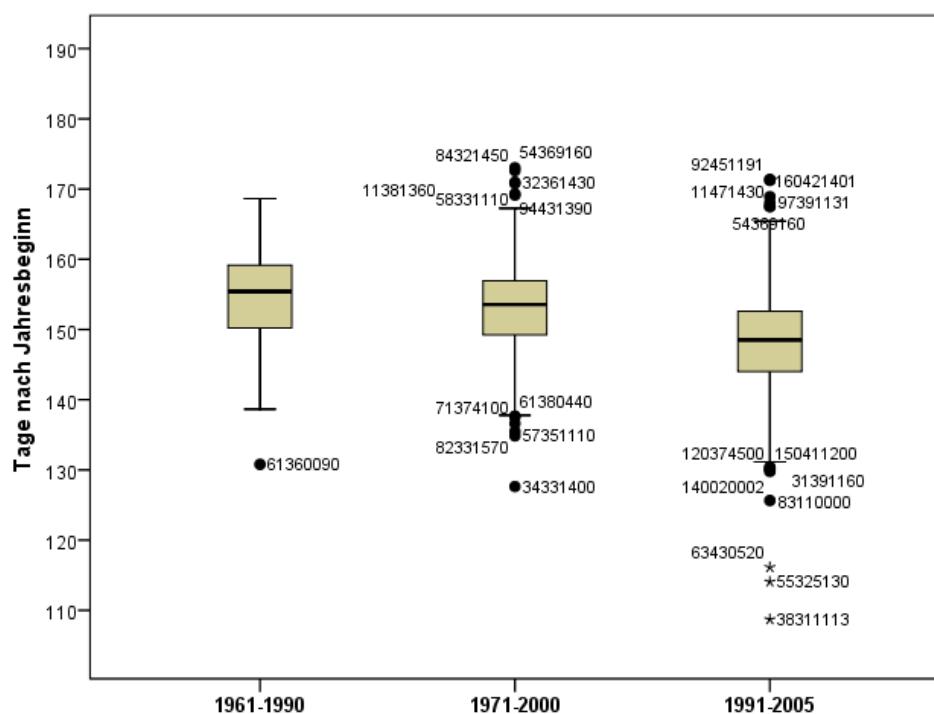
Phase 19 – Wiesen-Fuchsschwanz, Beginn der Vollblüte (Hessen)



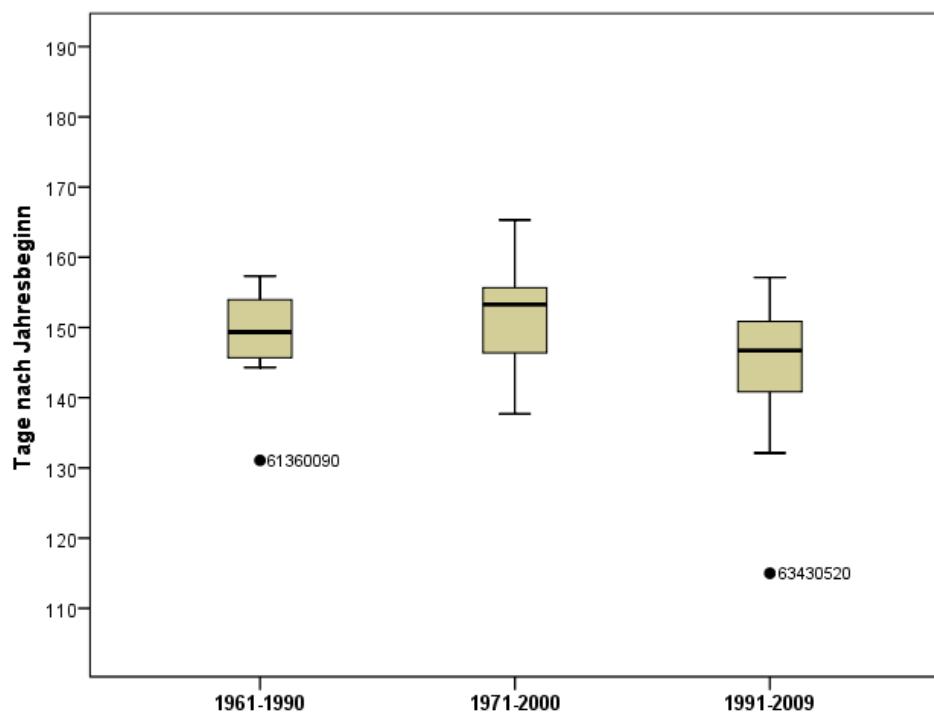
Phase 18 – Schwarzer Holunder, Beginn der Blüte (Deutschland)



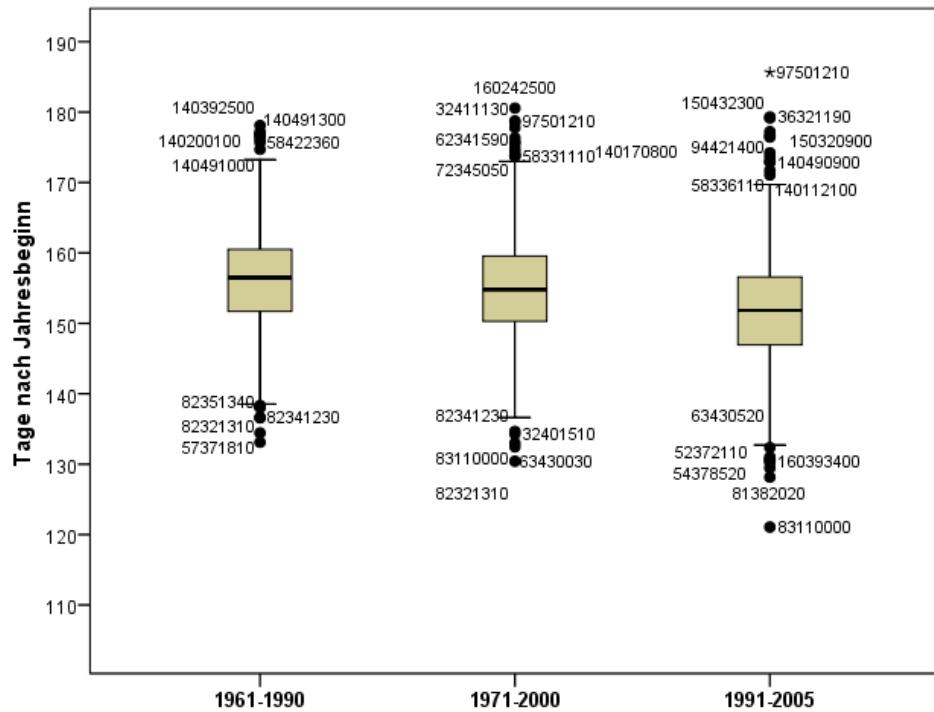
Phase 18 – Schwarzer Holunder, Beginn der Blüte (Hessen)



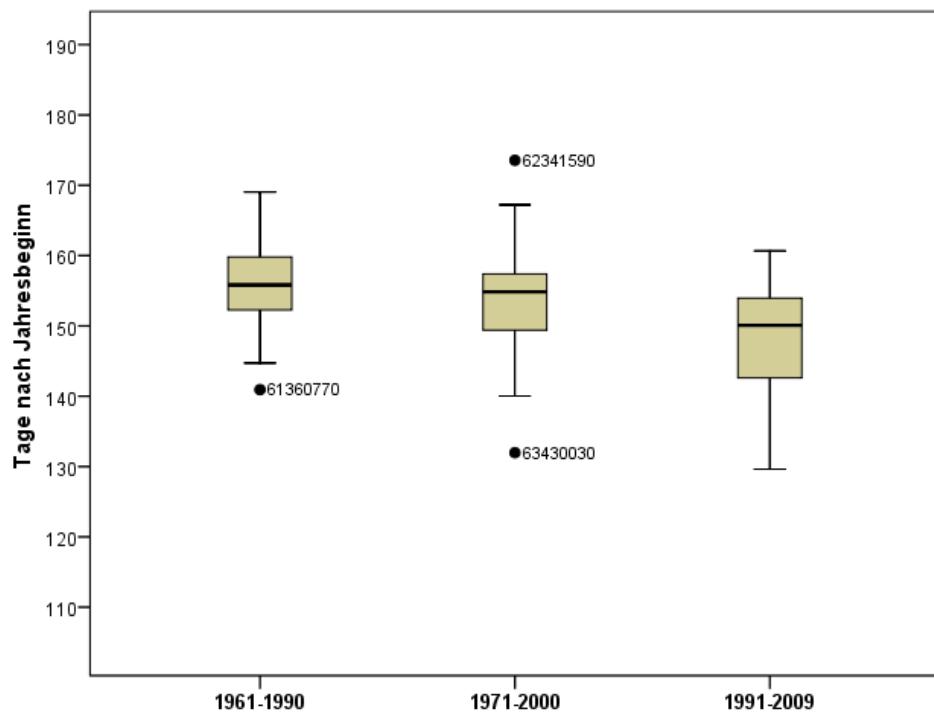
Phase 123 – Robinie, Beginn der Blüte (Deutschland)



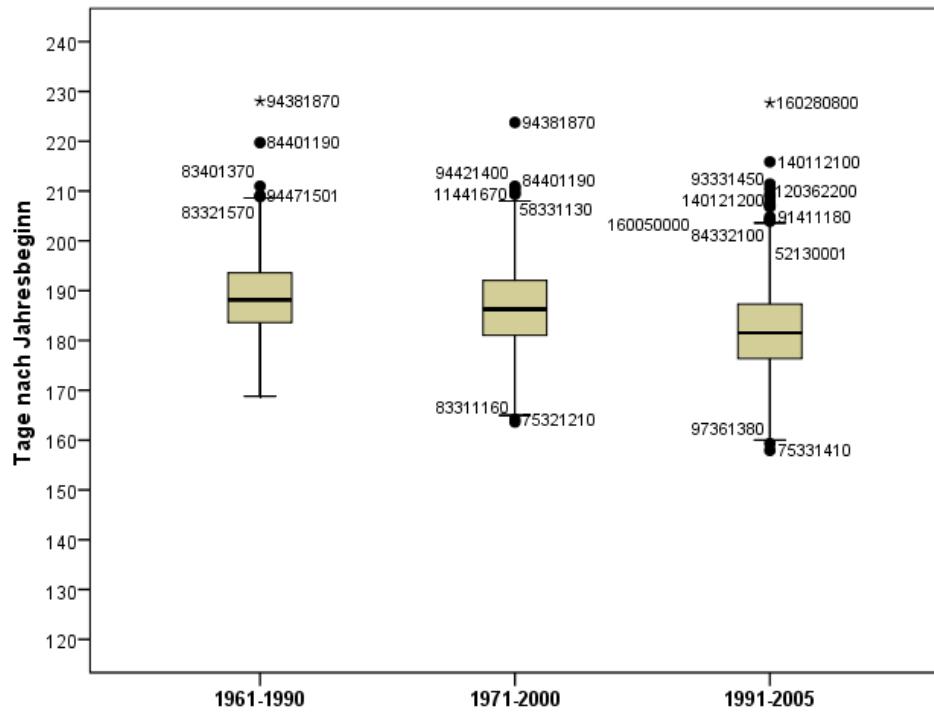
Phase 123 – Robinie, Beginn der Blüte (Hessen)



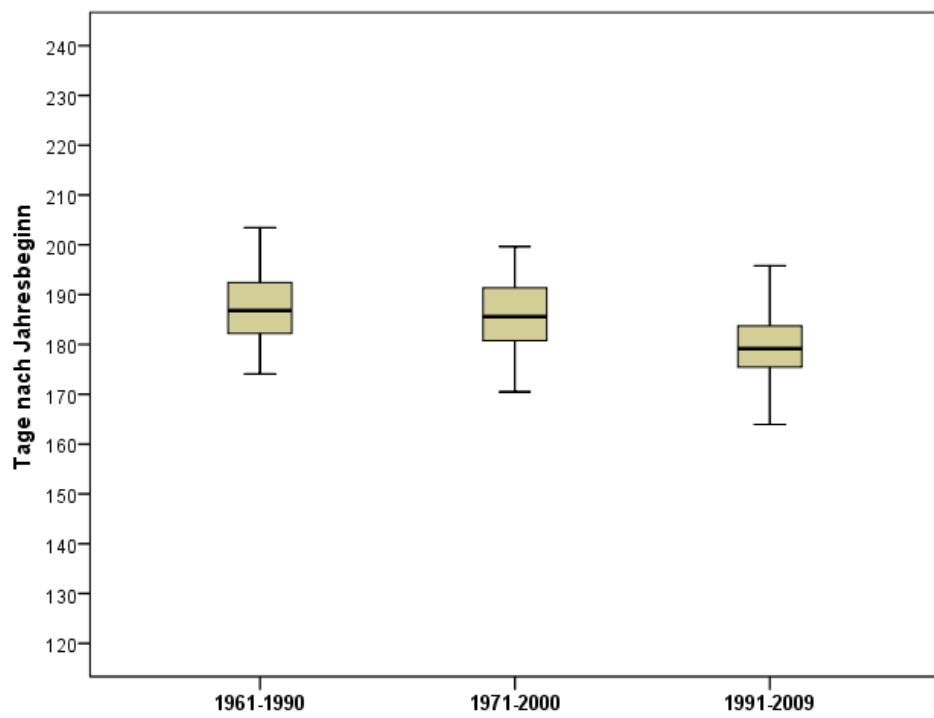
Phase 20 – Wiesen-Knäulgrass, Beginn der Vollblüte (Deutschland)



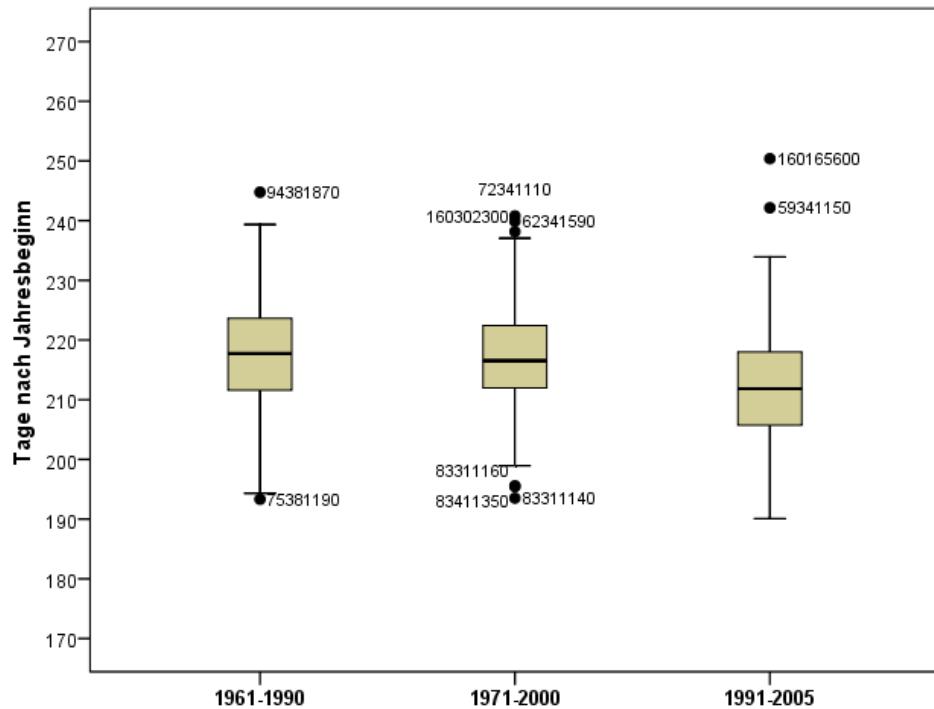
Phase 20 – Wiesen-Knäulgrass, Beginn der Vollblüte (Hessen)



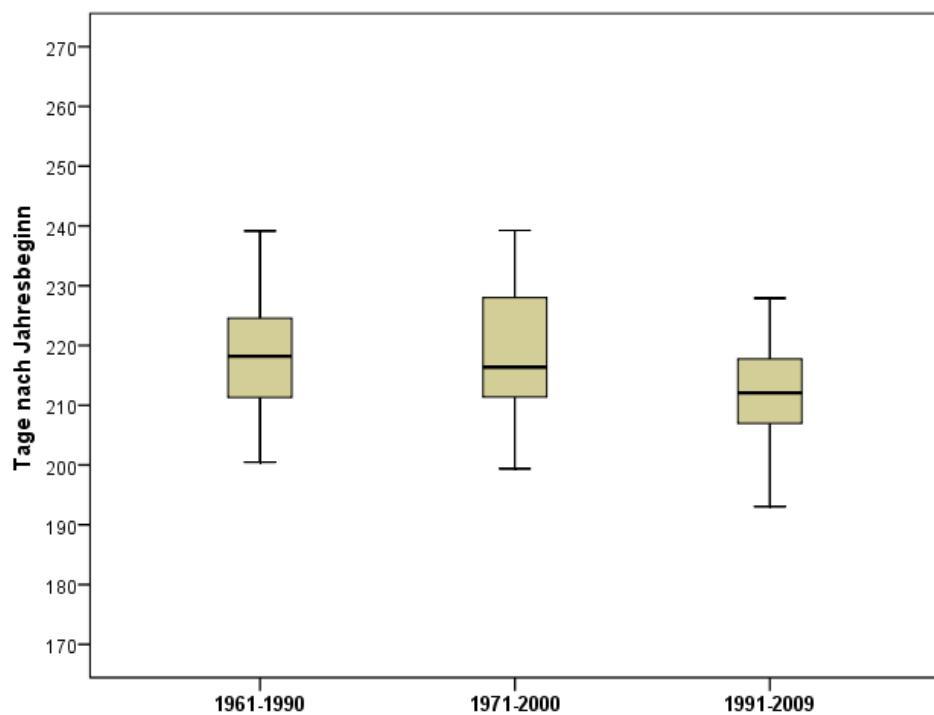
Phase 100 – Rote Johannisbeere, Beginn der Pflückreife (Deutschland)



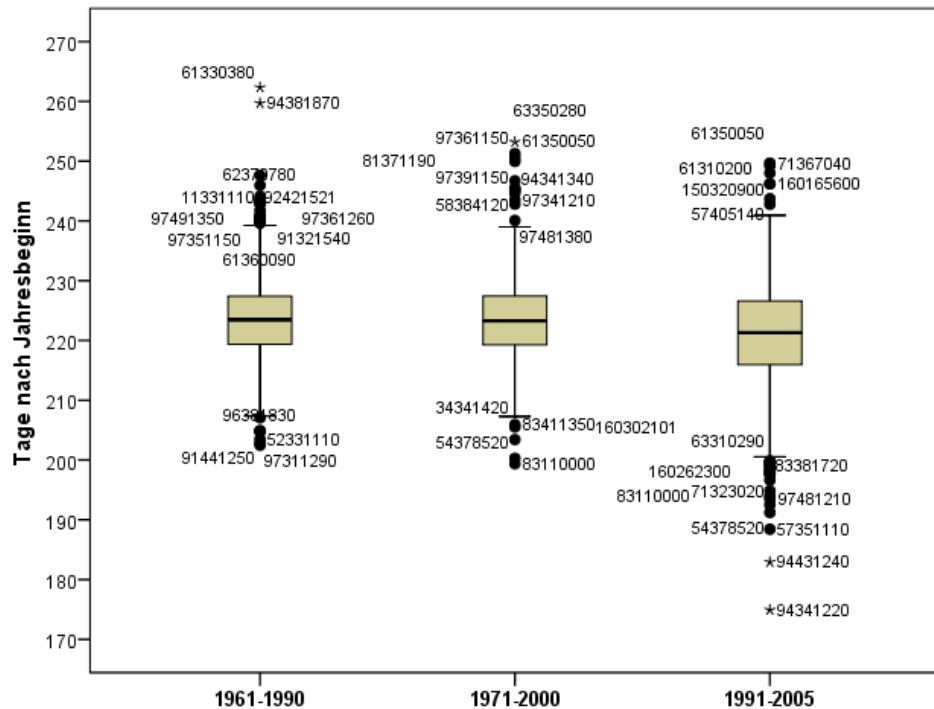
Phase 100 – Rote Johannisbeere, Beginn der Pflückreife (Hessen)



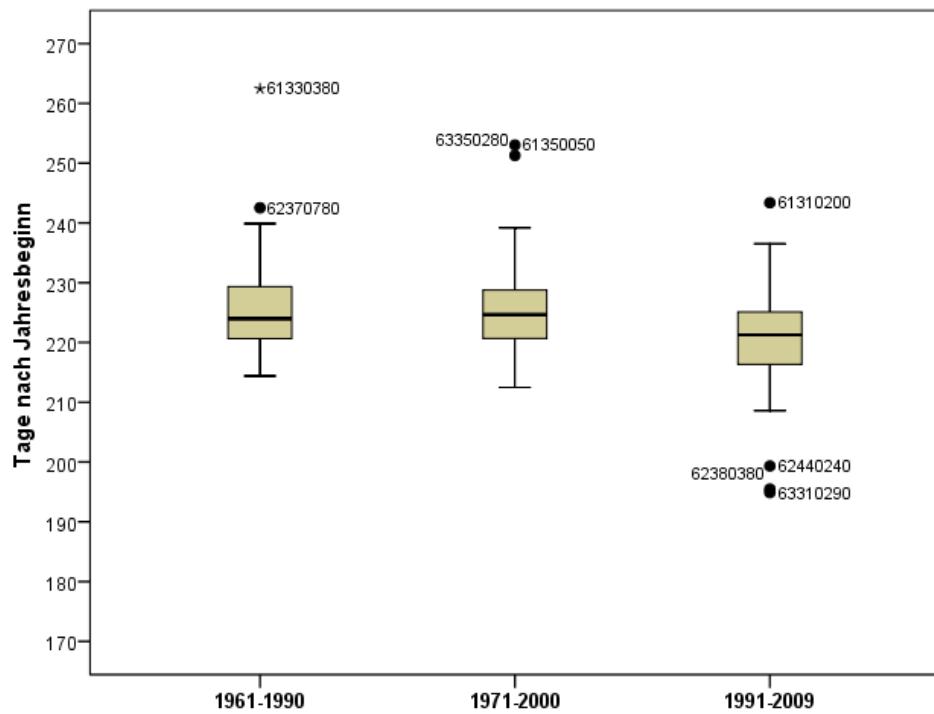
Phase 109 – Apfel (frühreifend), Beginn der Pflückreife (Deutschland)



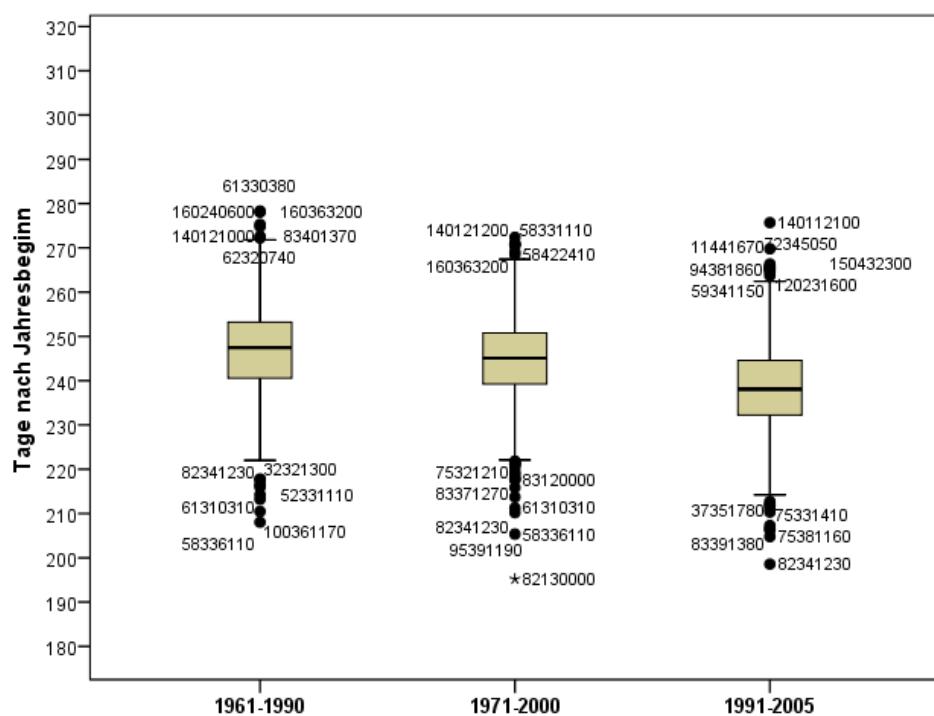
Phase 109 – Apfel (frühreifend), Beginn der Pflückreife (Hessen)



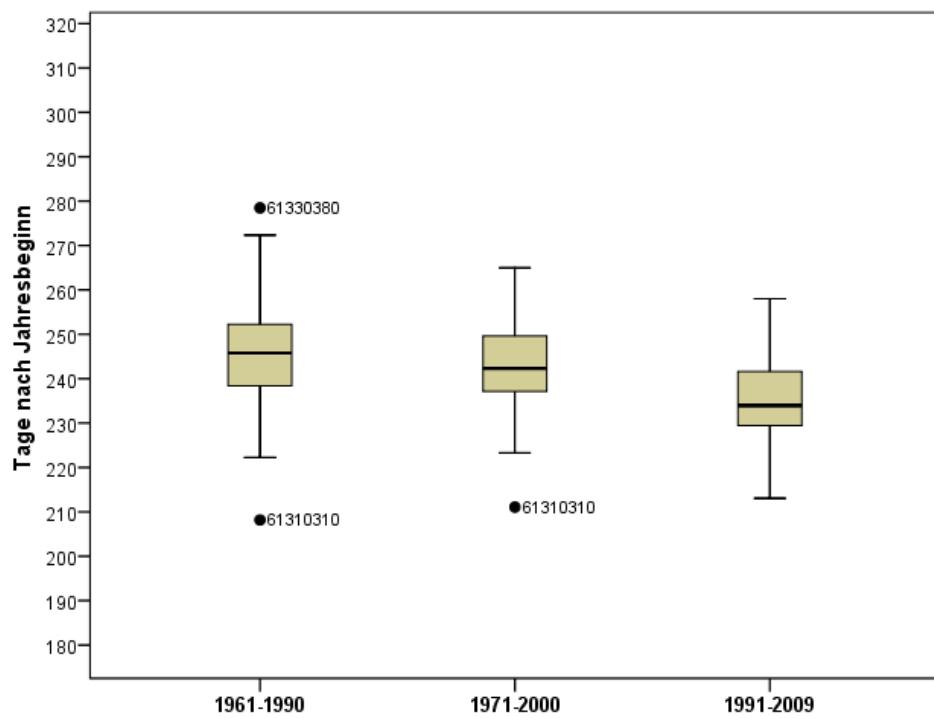
Phase 65 – Heide-Kraut, Beginn der Blüte (Deutschland)



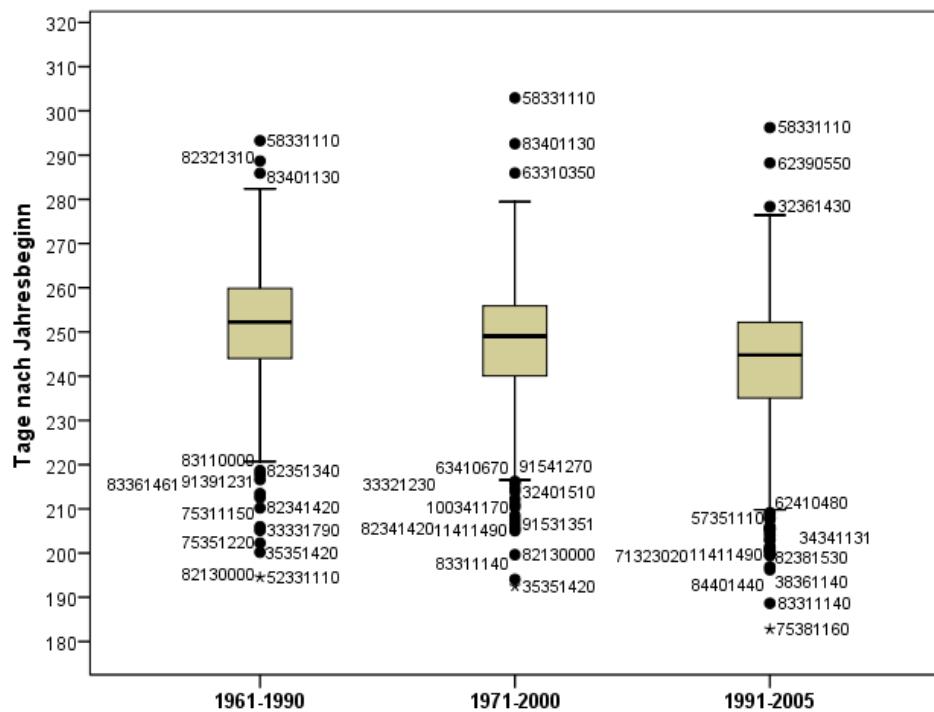
Phase 65 – Heide-Kraut, Beginn der Blüte (Hessen)



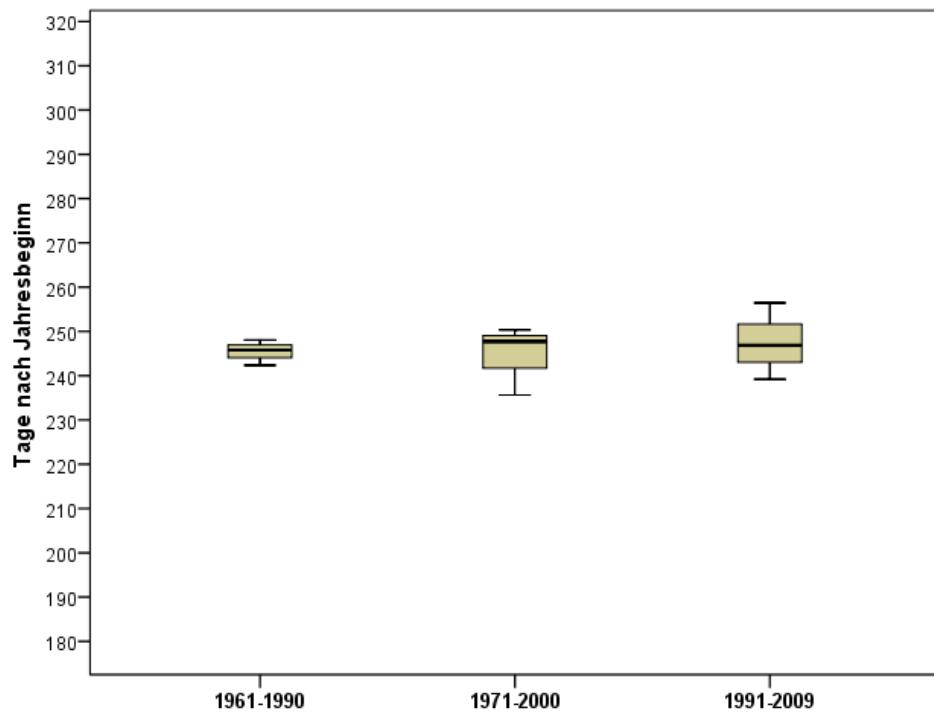
Phase 67 – Schwarzer Holunder, erste reife Früchte (Deutschland)



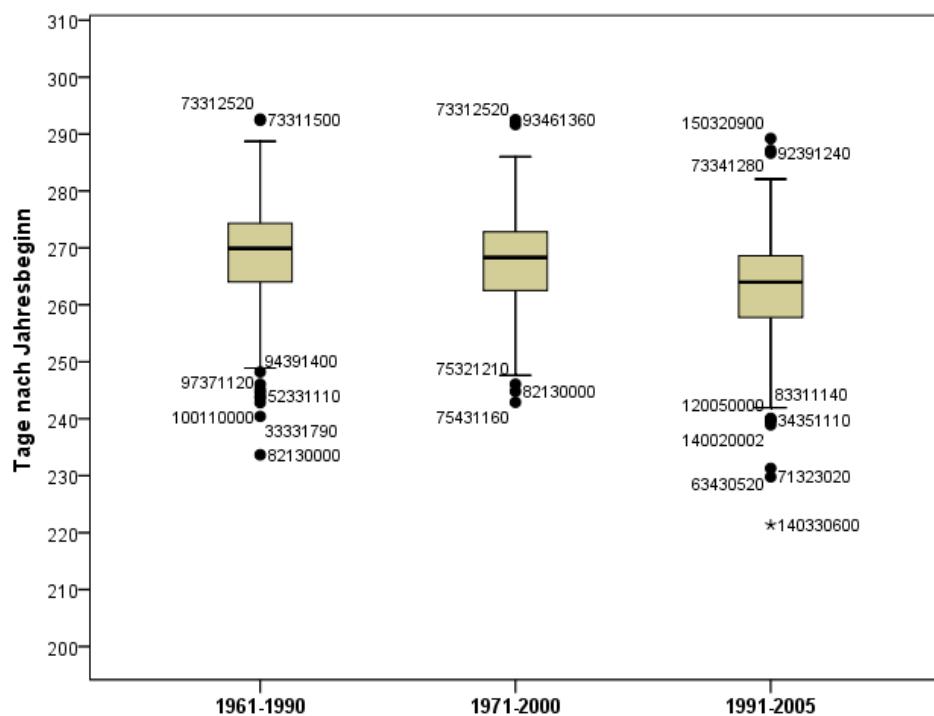
Phase 67 – Schwarzer Holunder, erste reife Früchte (Hessen)



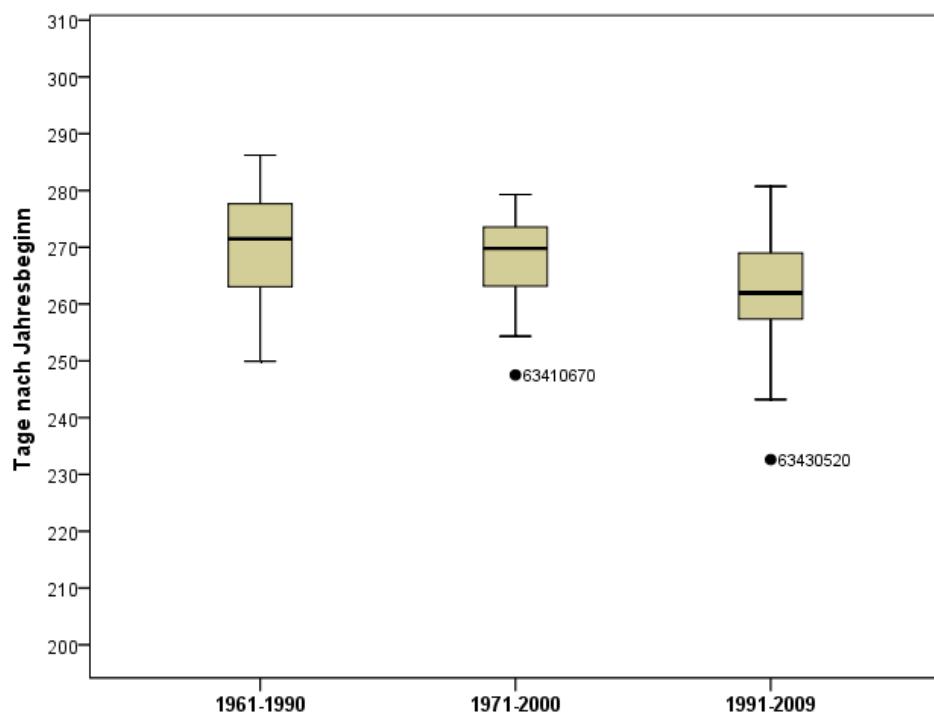
Phase 177 – Hunds-Rose, erste reife Früchte (Deutschland)



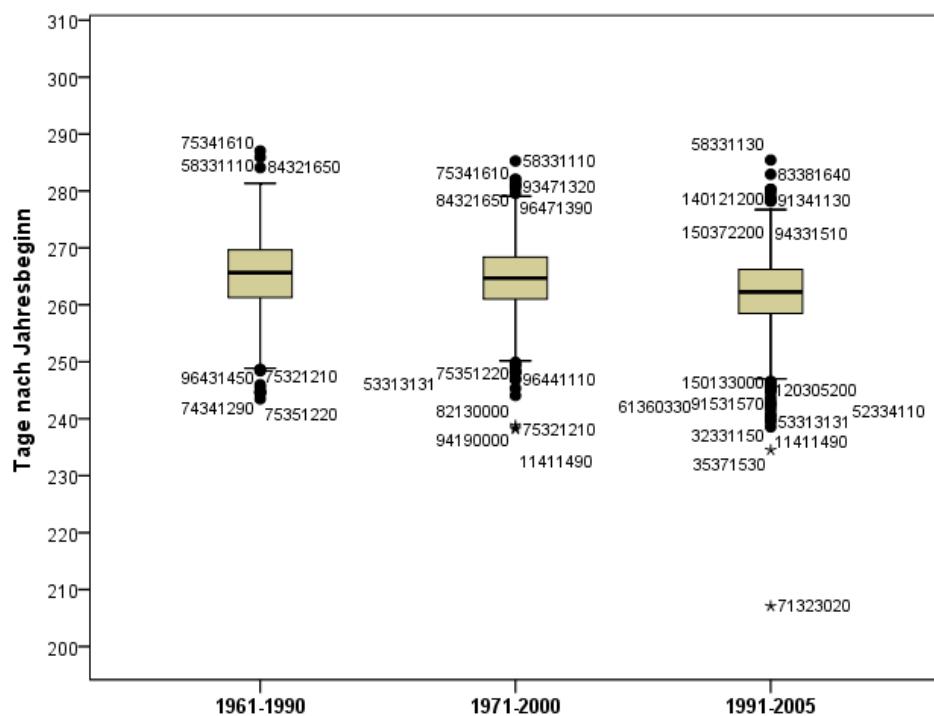
Phase 177 – Hunds-Rose, erste reife Früchte (Hessen)



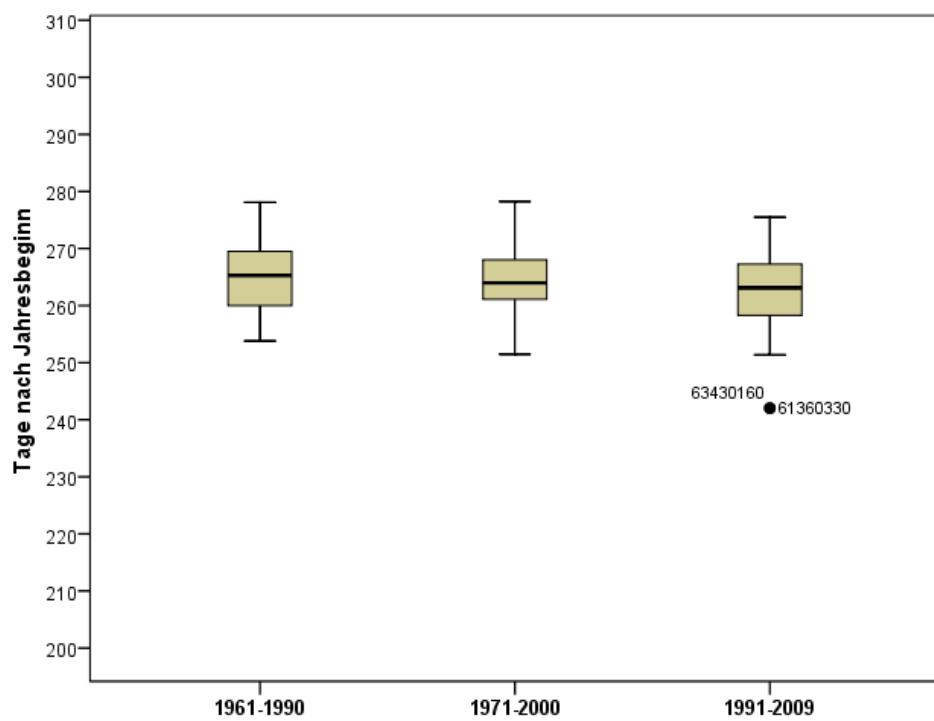
Phase 72 – Stiel-Eiche, erste reife Früchte (Deutschland)



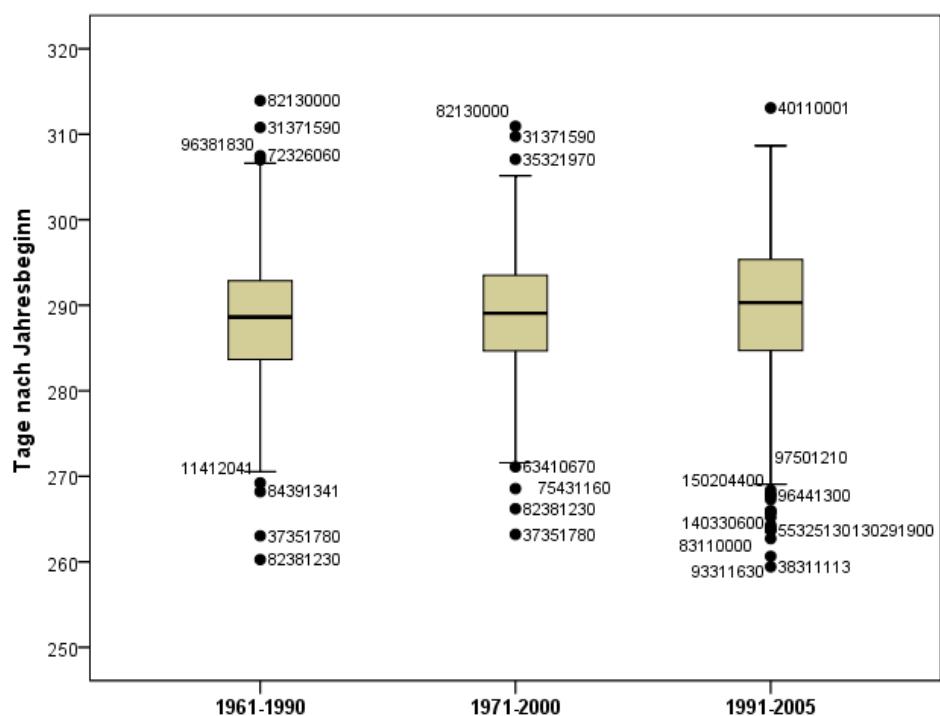
Phase 72 – Stiel-Eiche, erste reife Früchte (Hessen)



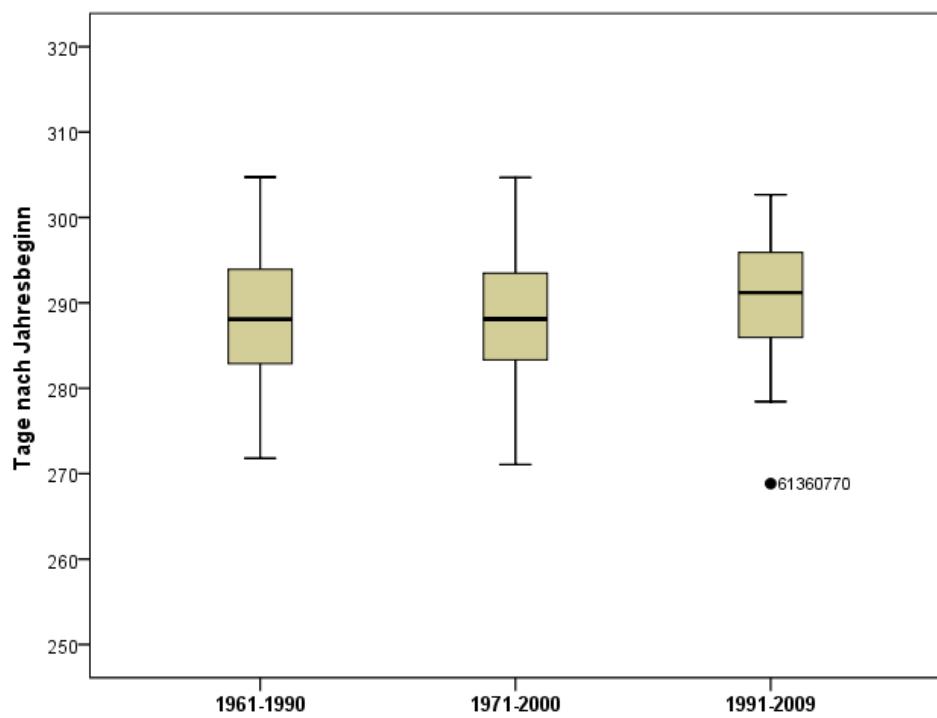
Phase 68 – Rosskastanie, erste reife Früchte (Deutschland)



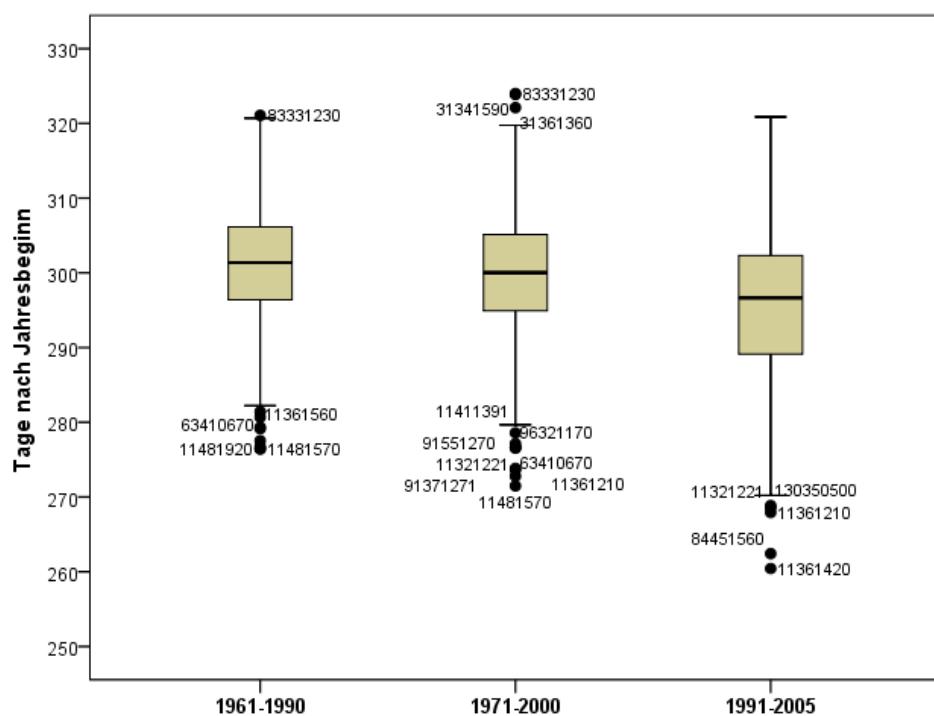
Phase 68 – Rosskastanie, erste reife Früchte (Hessen)



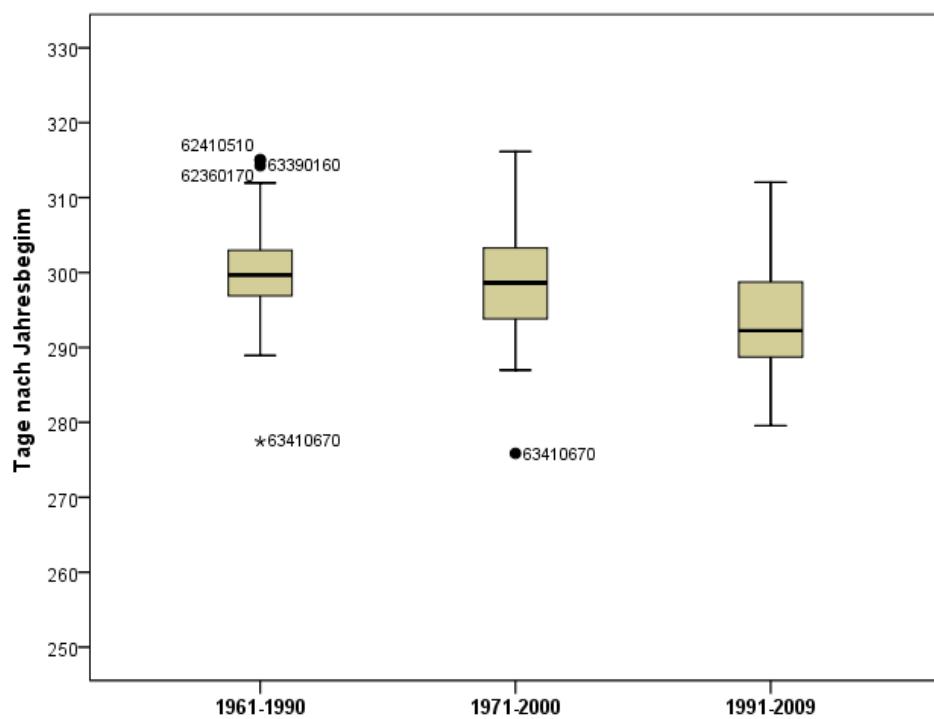
Phase 73 – Stiel-Eiche, Blattverfärbung (Deutschland)



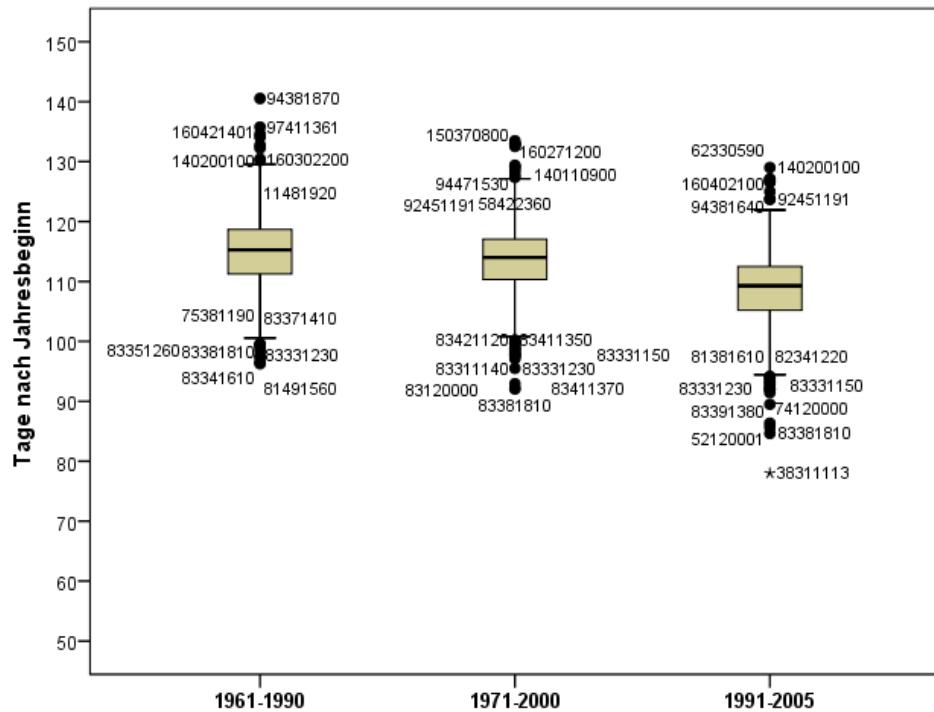
Phase 73 – Stiel-Eiche, Blattverfärbung (Hessen)



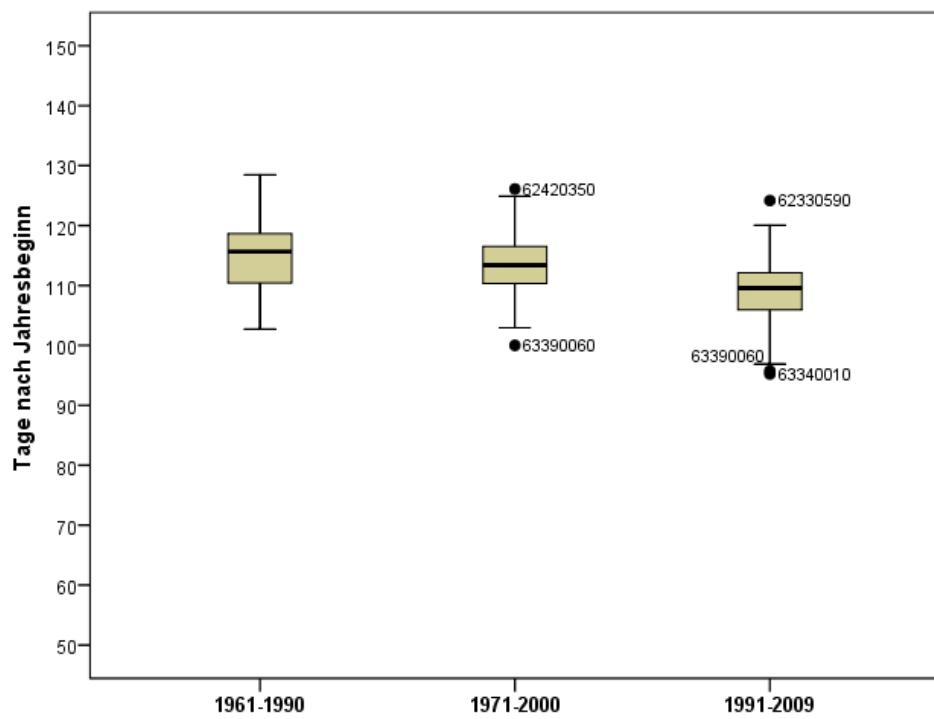
Phase 94 – Winterweizen, Beginn des Auflaufens (Deutschland)



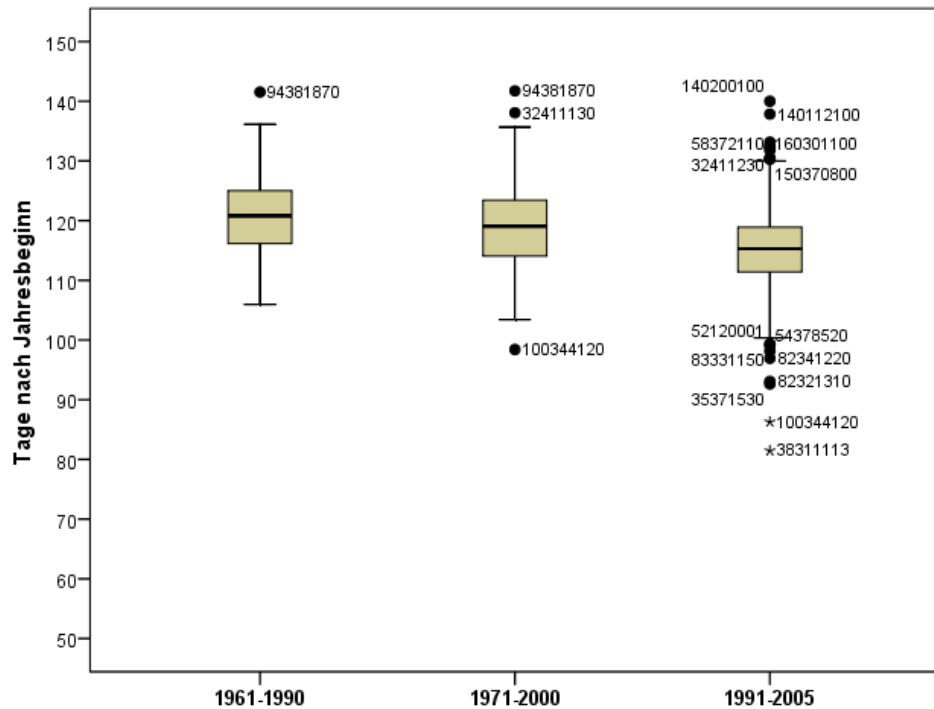
Phase 94 – Winterweizen, Beginn des Auflaufens (Hessen)



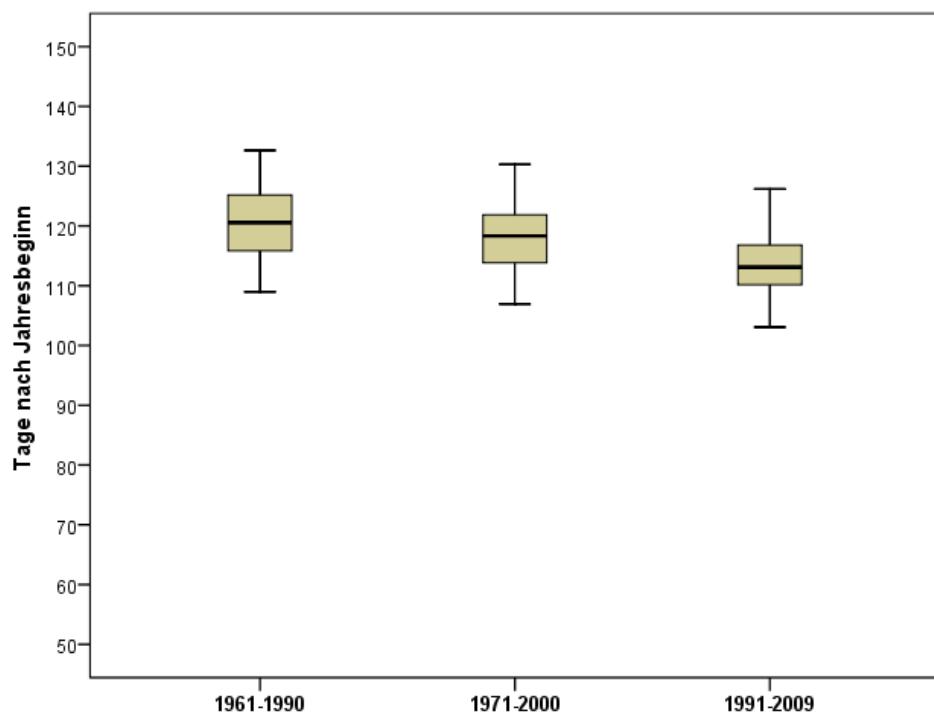
Phase 54 – Süßkirsche, Beginn der Blüte (Deutschland)



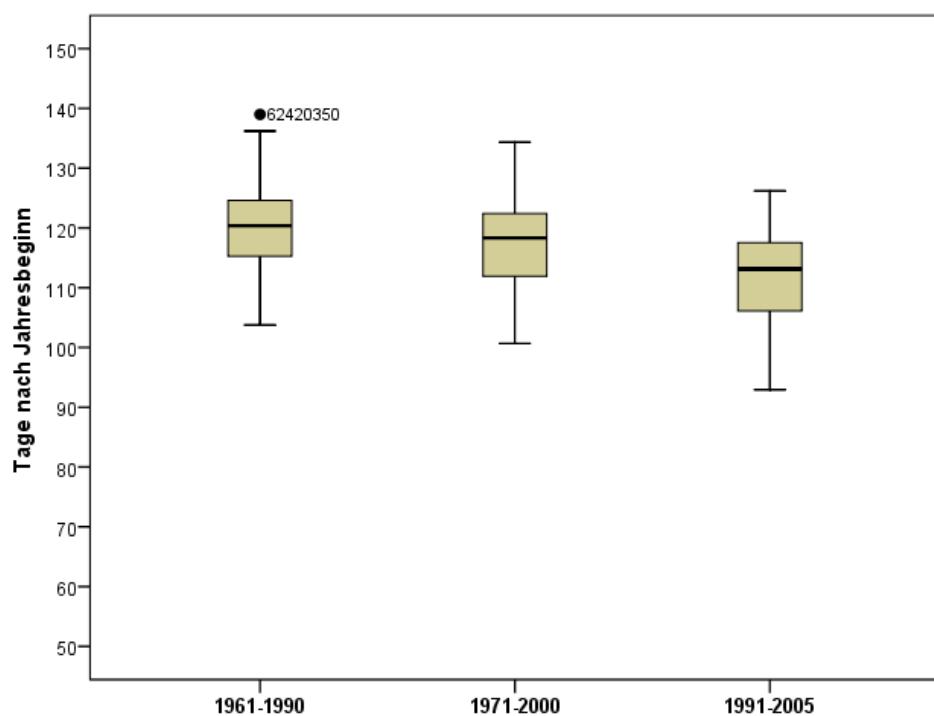
Phase 54 – Süßkirsche, Beginn der Blüte (Hessen)



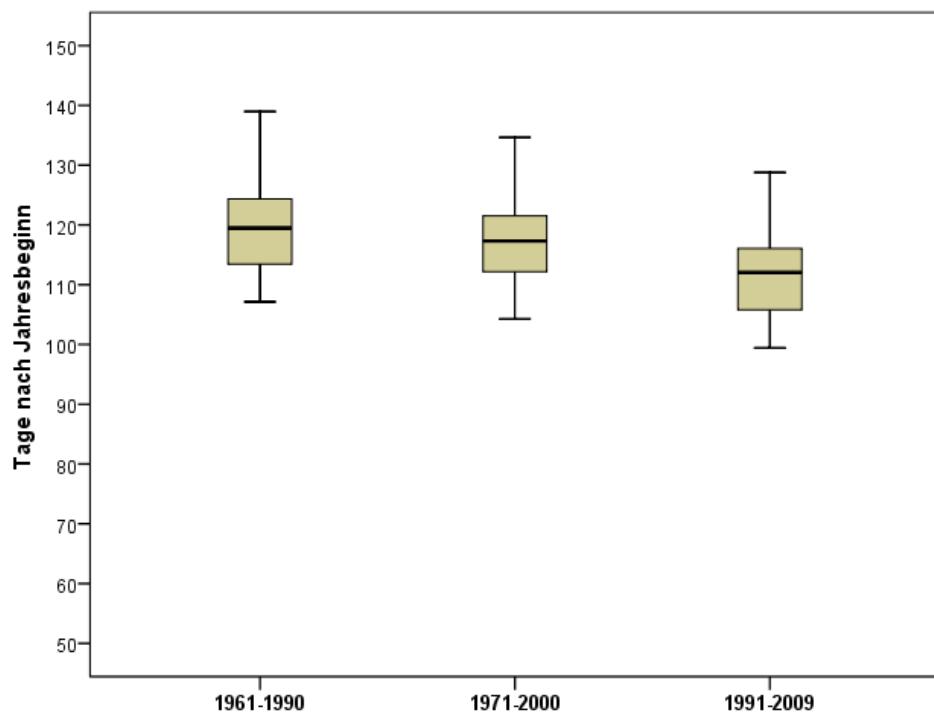
Phase 56 – Sauerkirsche, Beginn der Blüte (Deutschland)



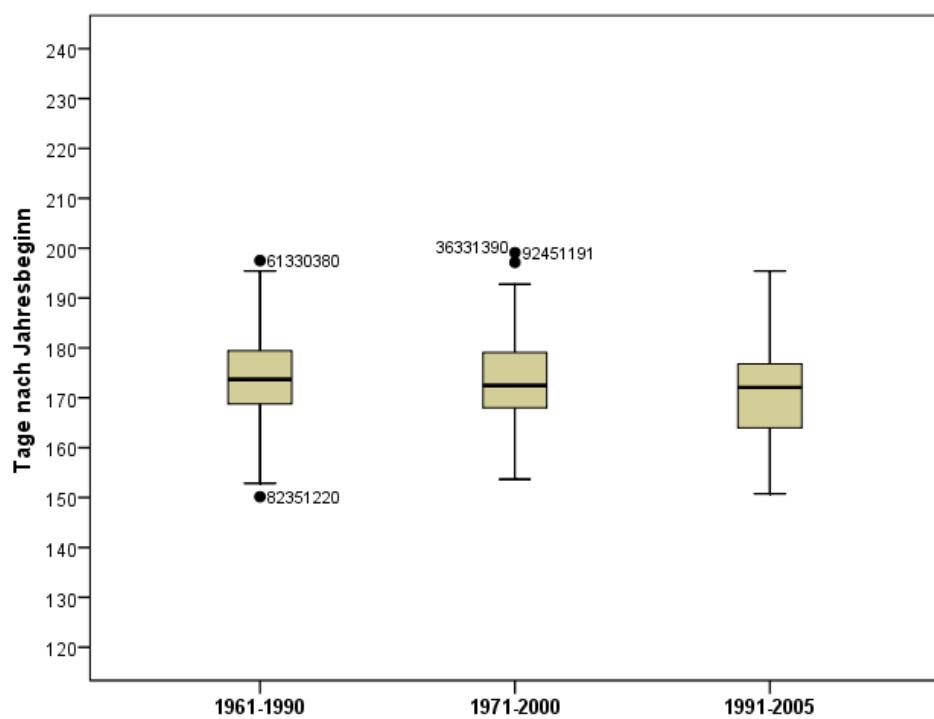
Phase 56 – Sauerkirsche, Beginn der Blüte (Hessen)



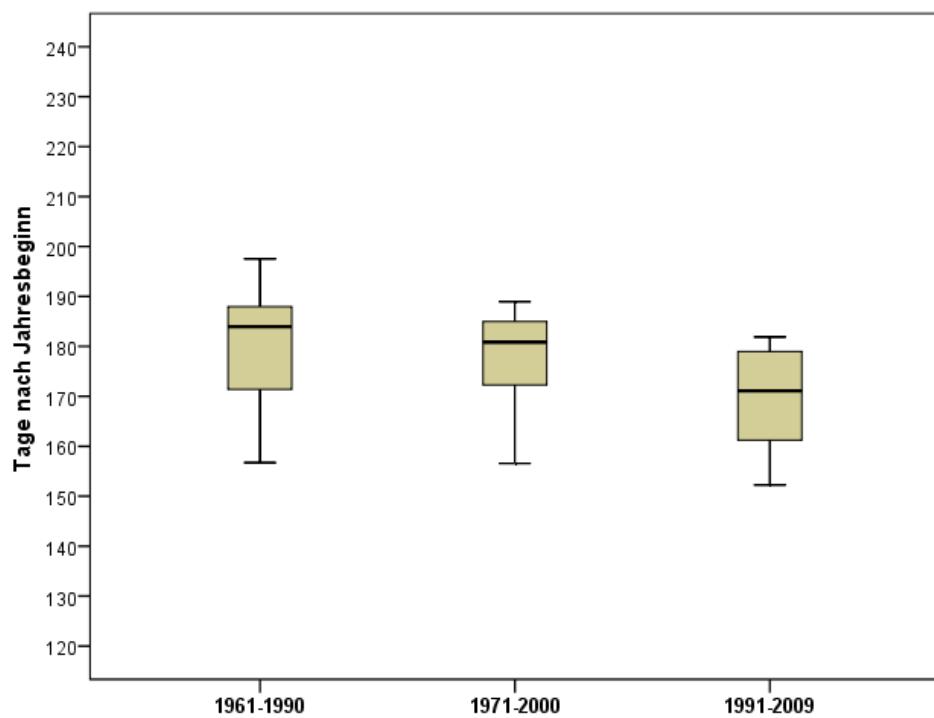
Phase 60 – Birne, Beginn der Blüte (Deutschland)



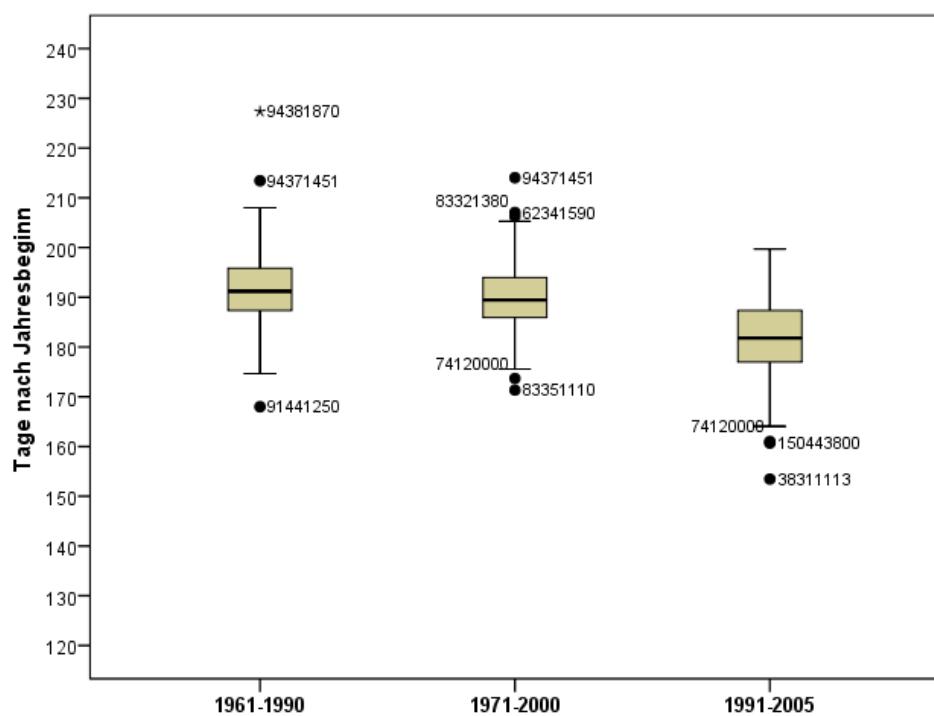
Phase 60 – Birne, Beginn der Blüte (Hessen)



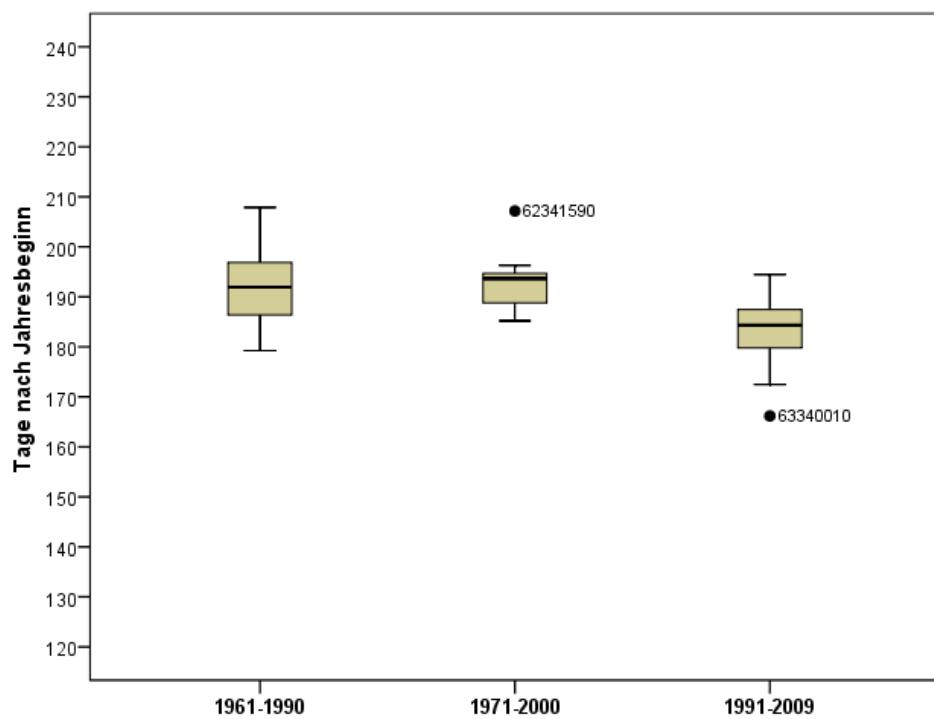
Phase 102 – Süßkirsche (frühreifend), Beginn der Pflückkreife (Deutschland)



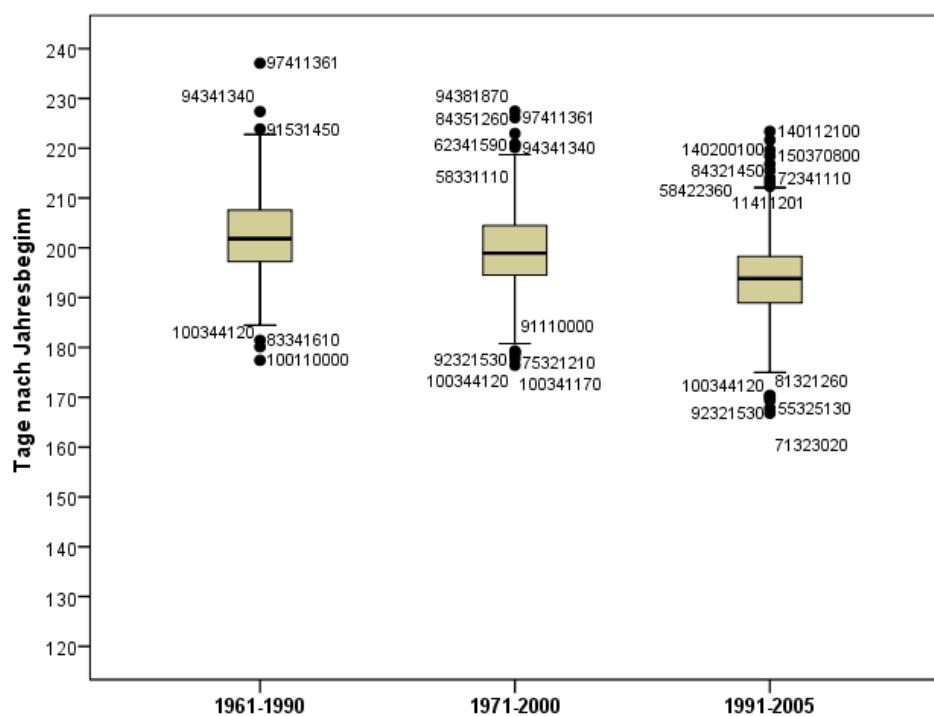
Phase 102 – Süßkirsche (frühreifend), Beginn der Pflückkreife (Hessen)



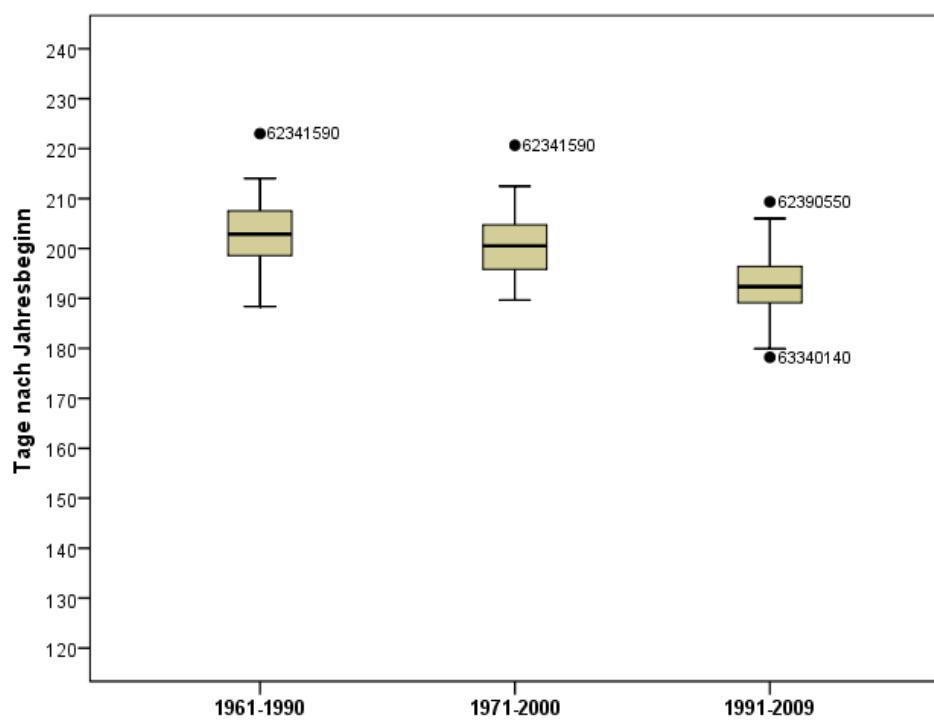
Phase 103 – Süßkirsche (spätreifend), Beginn der Pflückreife (Deutschland)



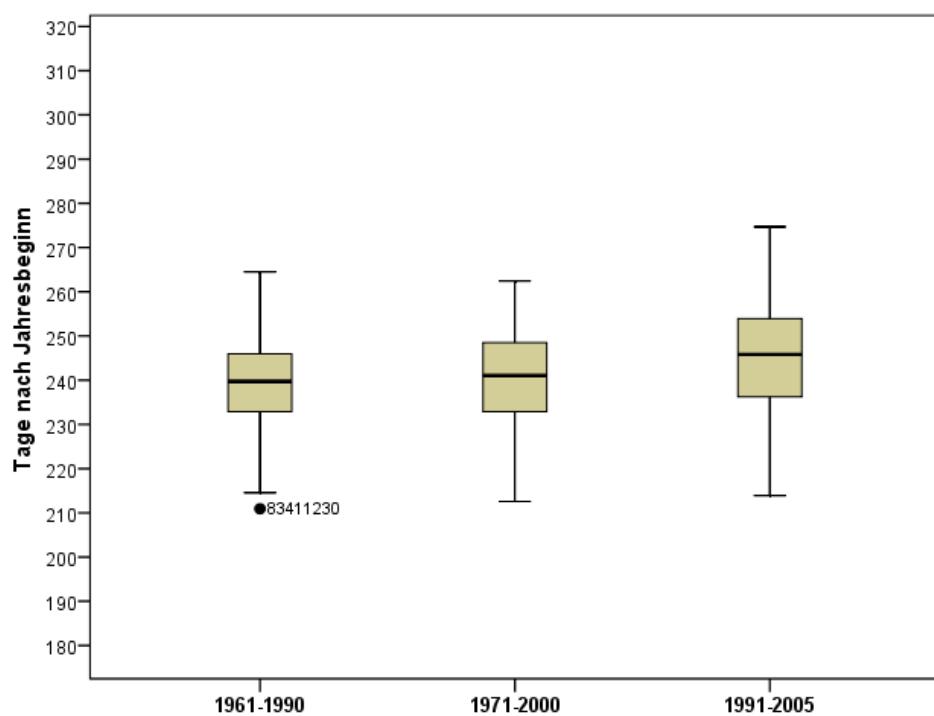
Phase 103 – Süßkirsche (spätreifend), Beginn der Pflückreife (Hessen)



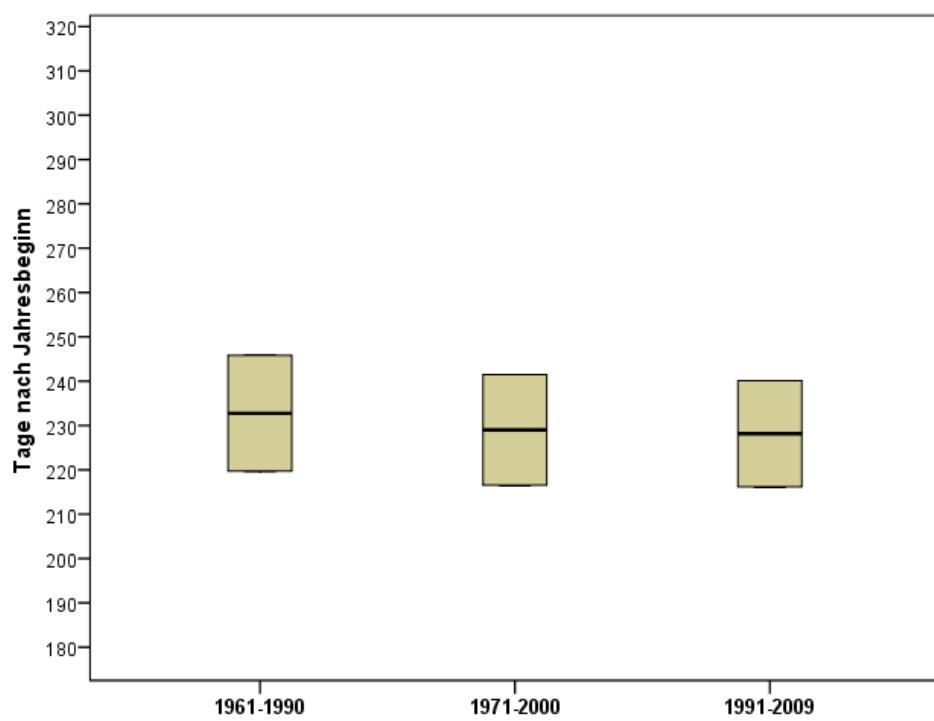
Phase 104 – Sauerkirsche, Beginn der Pflückreife (Deutschland)



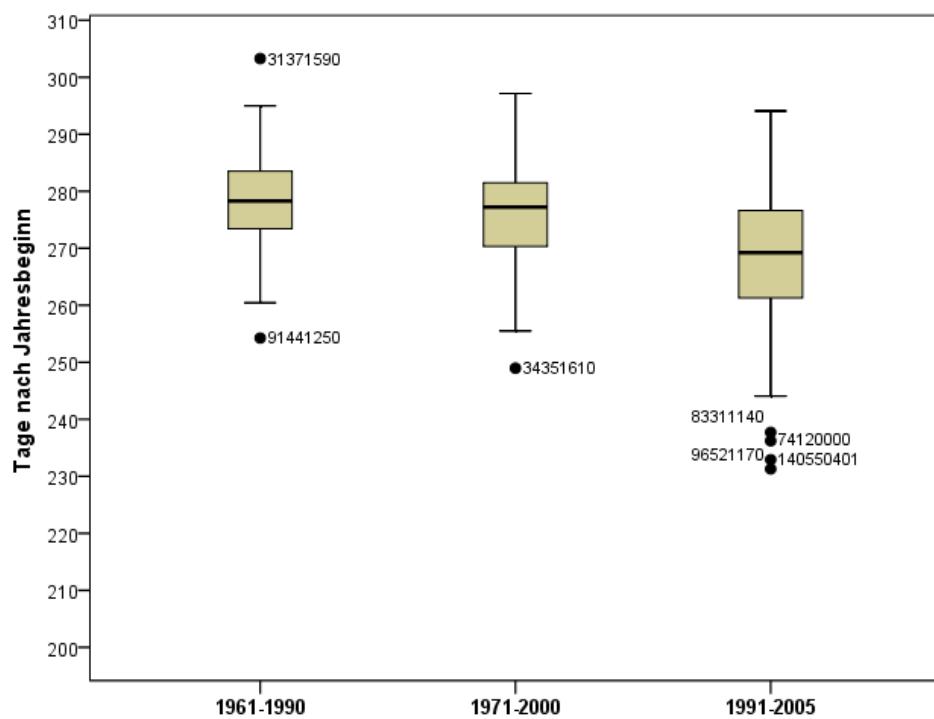
Phase 104 – Sauerkirsche, Beginn der Pflückreife (Hessen)



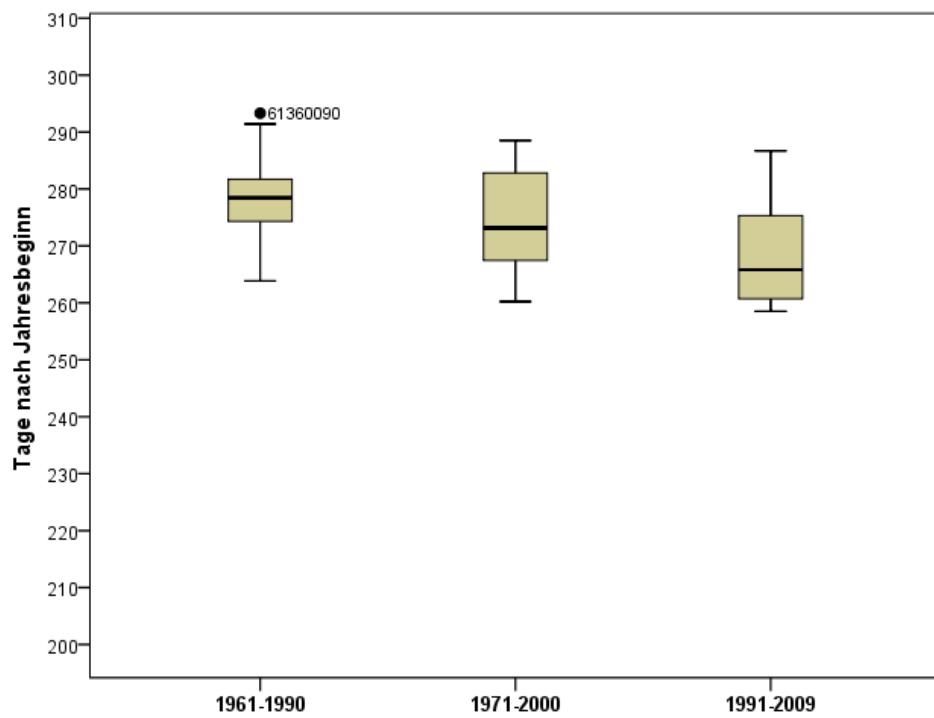
Phase 107 – Birne (frühreifend), Beginn der Pflückreife (Deutschland)



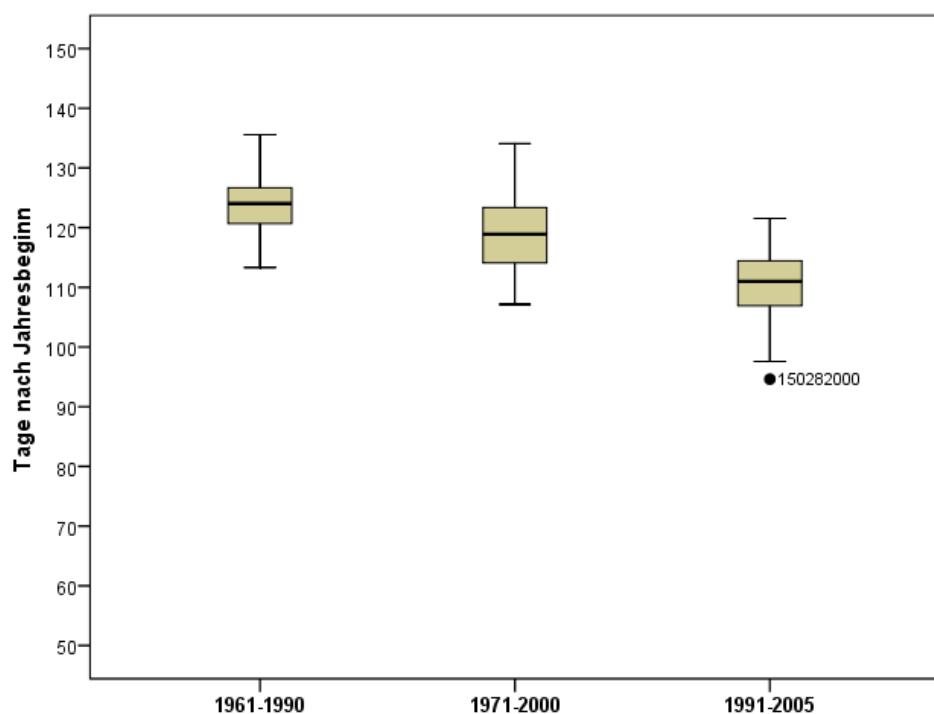
Phase 107 – Birne (frühreifend), Beginn der Pflückreife (Hessen)



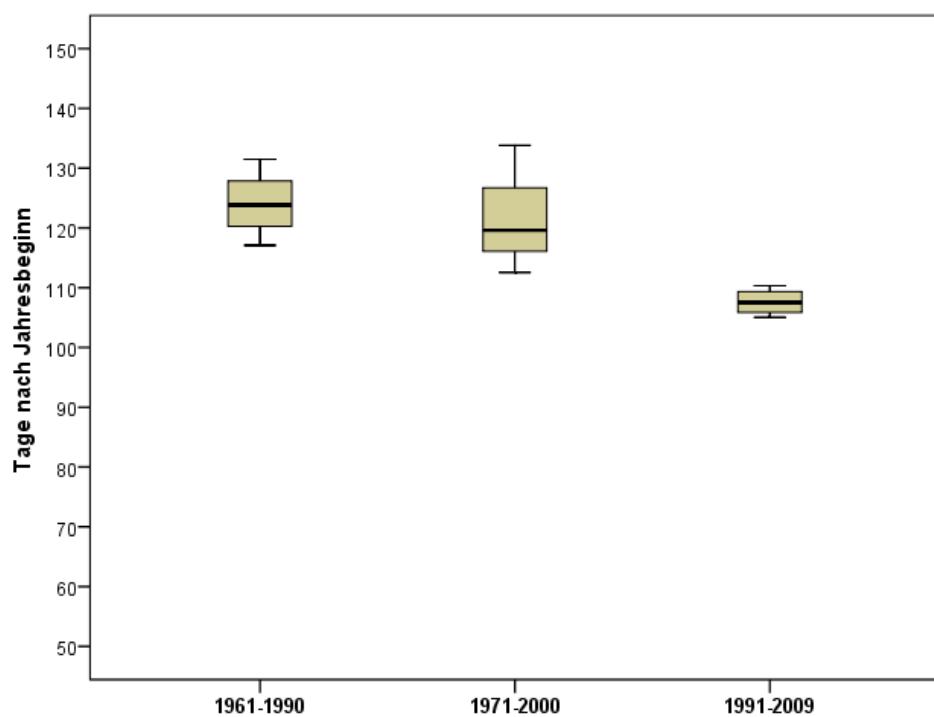
Phase 108 – Birne (spätreifend), Beginn der Pflückreife (Deutschland)



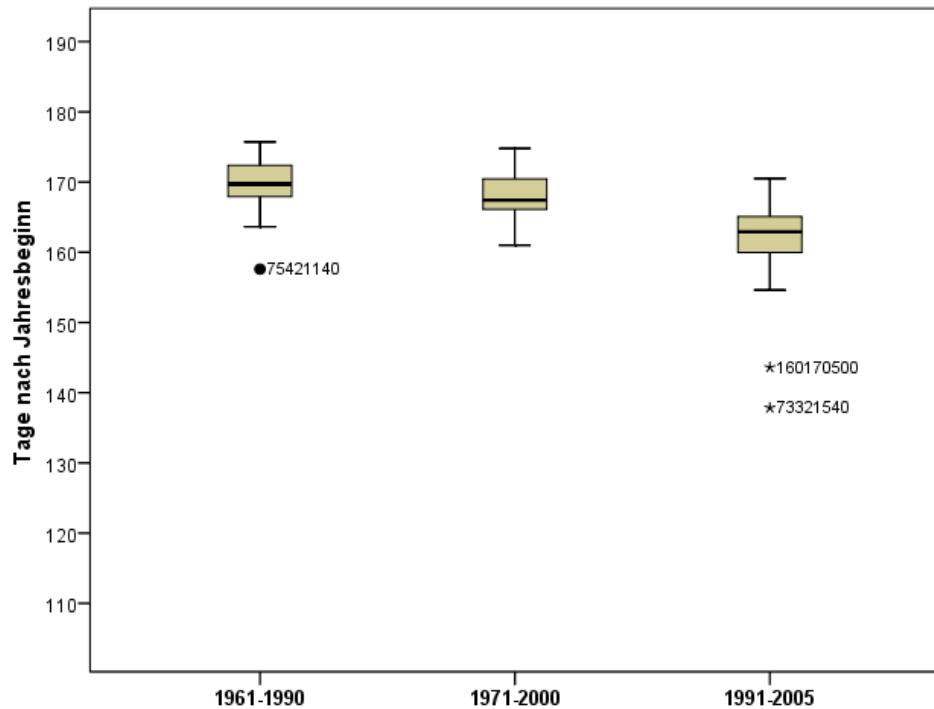
Phase 108 – Birne (spätreifend), Beginn der Pflückreife (Hessen)



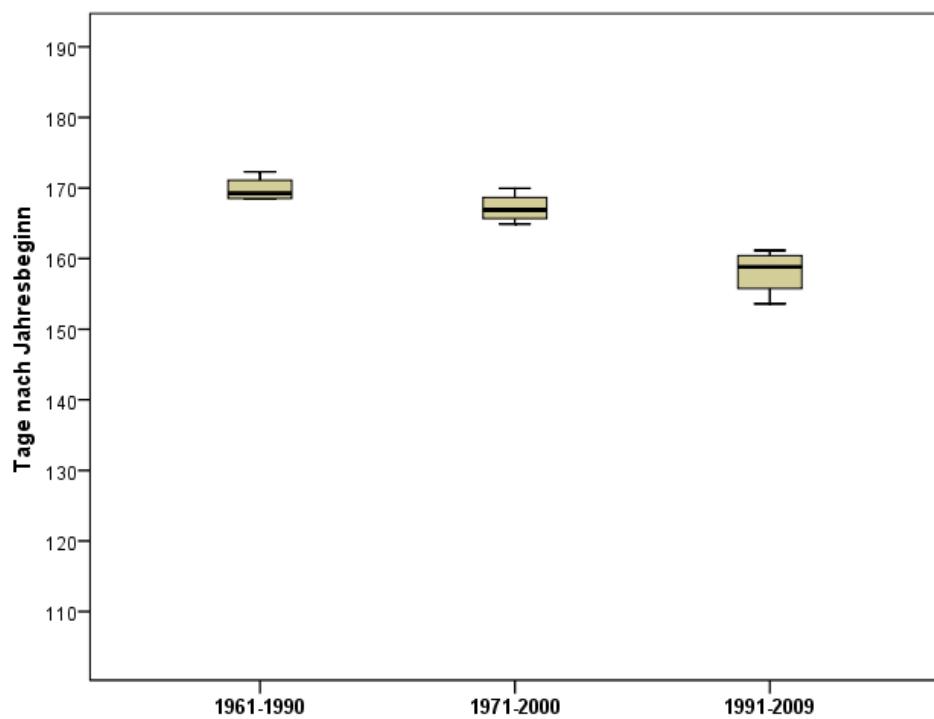
Phase 171 – Weinrebe (Müller-Thurgau), Beginn des Austriebs (Deutschland)



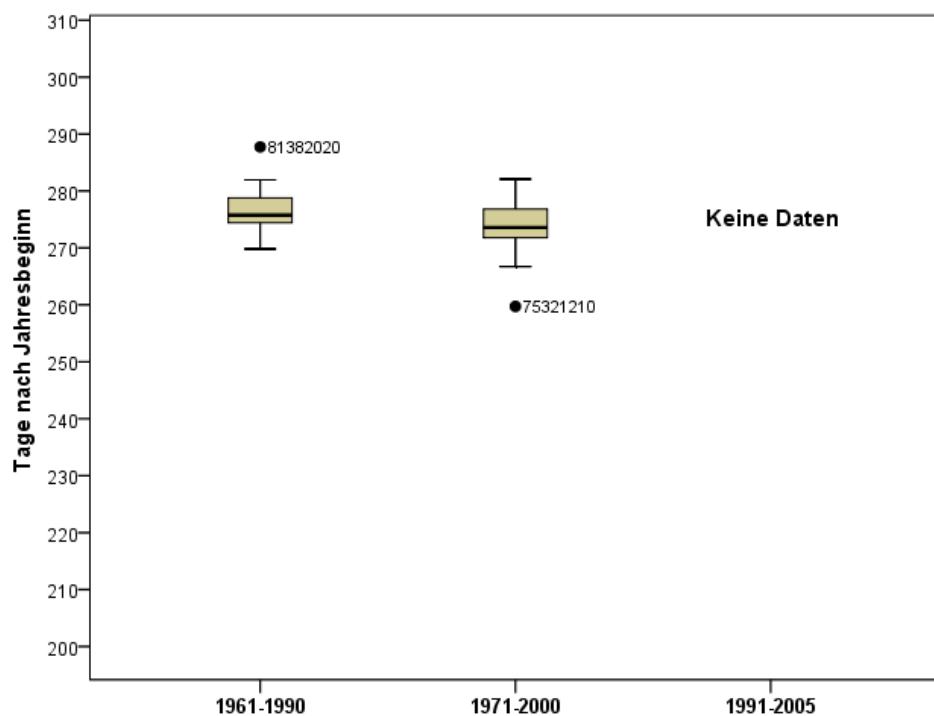
Phase 171 – Weinrebe (Müller-Thurgau), Beginn des Austriebs (Hessen)



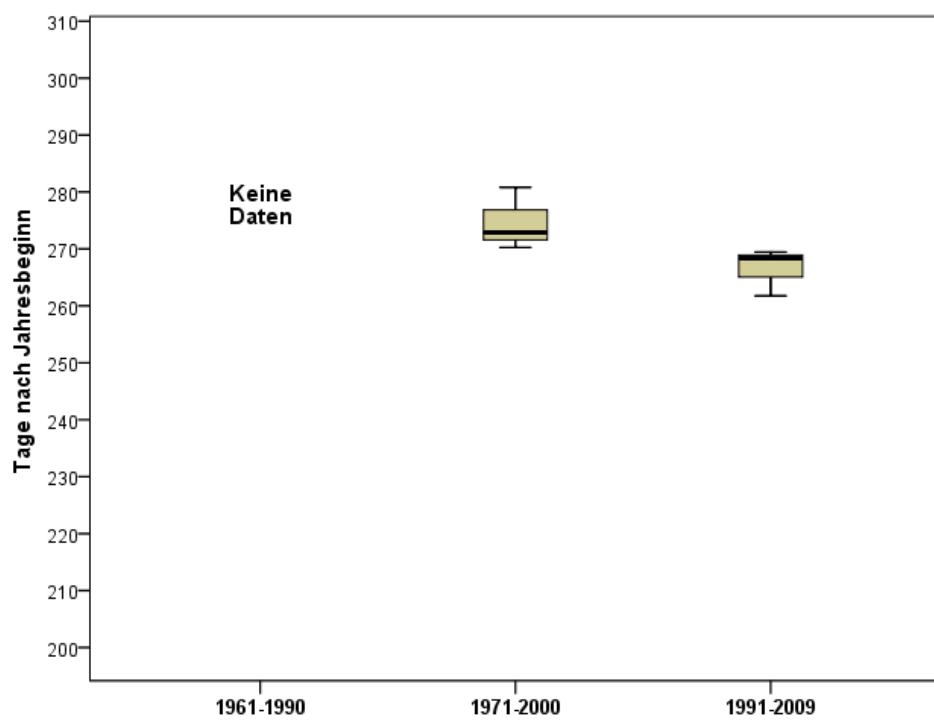
Phase 172 – Weinrebe (Müller-Thurgau), Beginn der Blüte (Deutschland)



Phase 172 – Weinrebe (Müller-Thurgau), Beginn der Blüte (Hessen)



Phase 205 – Weinrebe (Müller-Thurgau), Lese (Deutschland)

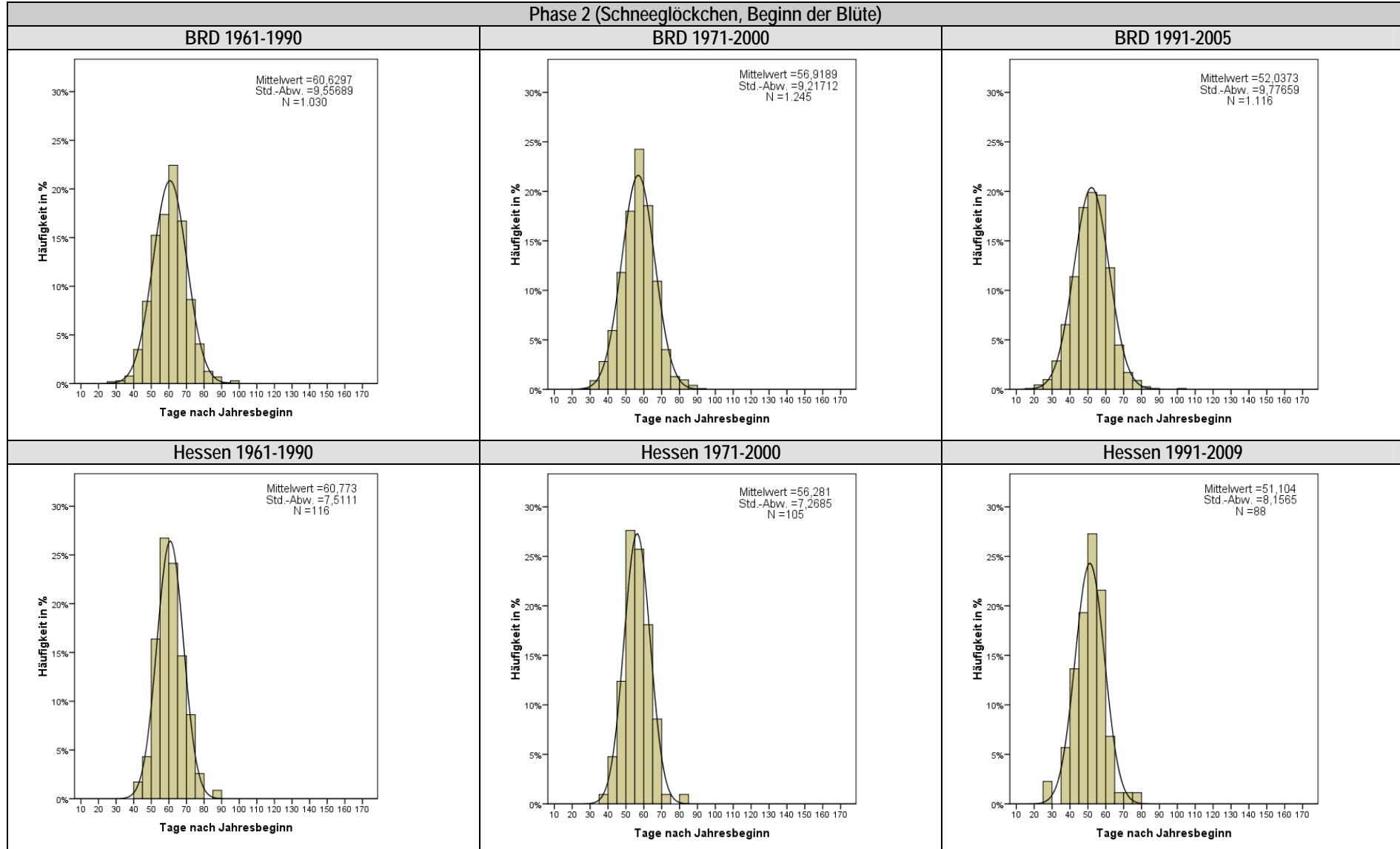


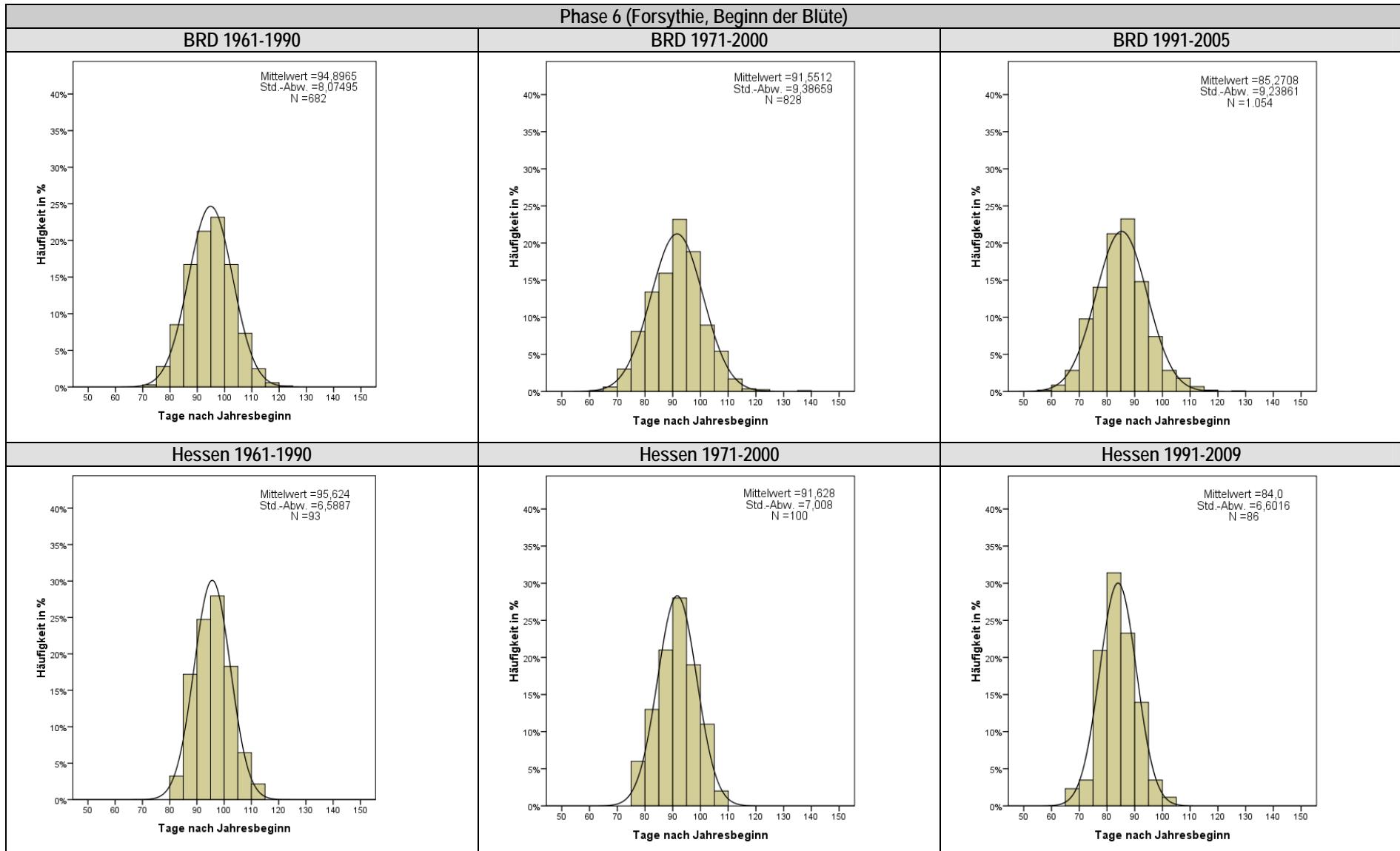
Phase 205 – Weinrebe (Müller-Thurgau), Lese (Hessen)

Anhang 2

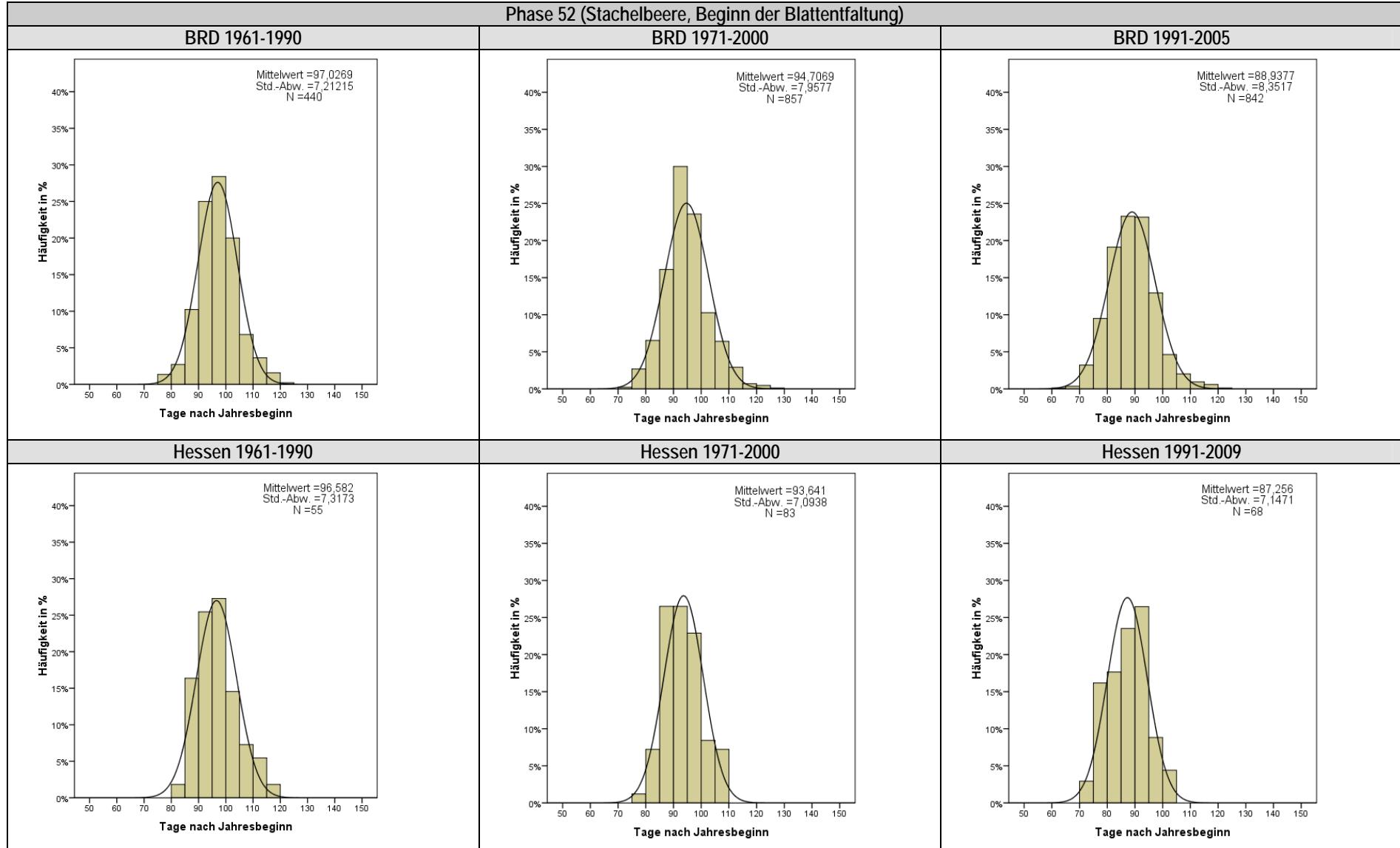
Deskriptive Statistik I:
Histogramme pro Phänophase für Deutschland und Hessen
der Zeiträume 1961-1990, 1971-2000 und 1991-2005 bzw. 1991-2009

Phase 2 (Schneeglöckchen, Beginn der Blüte)

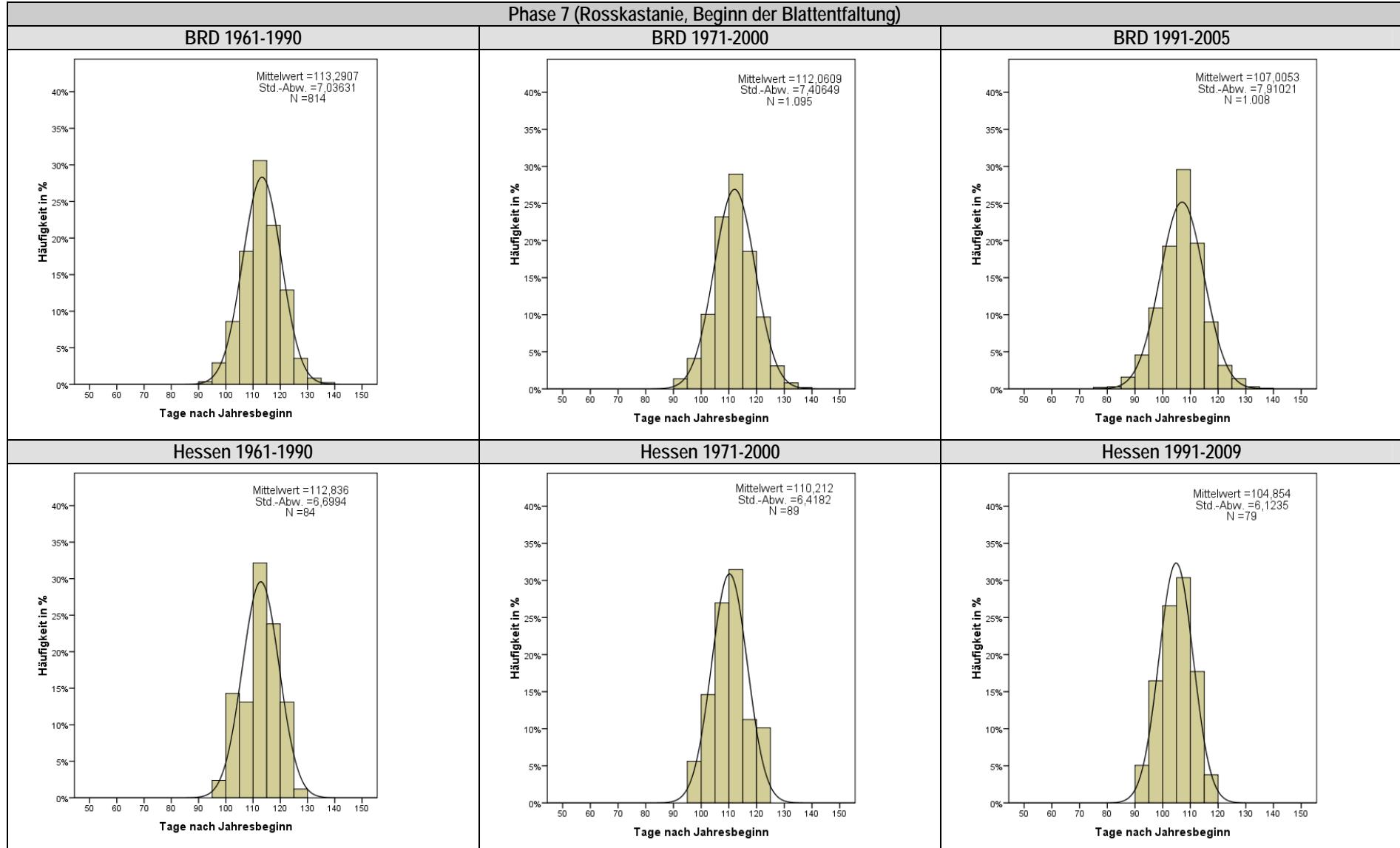




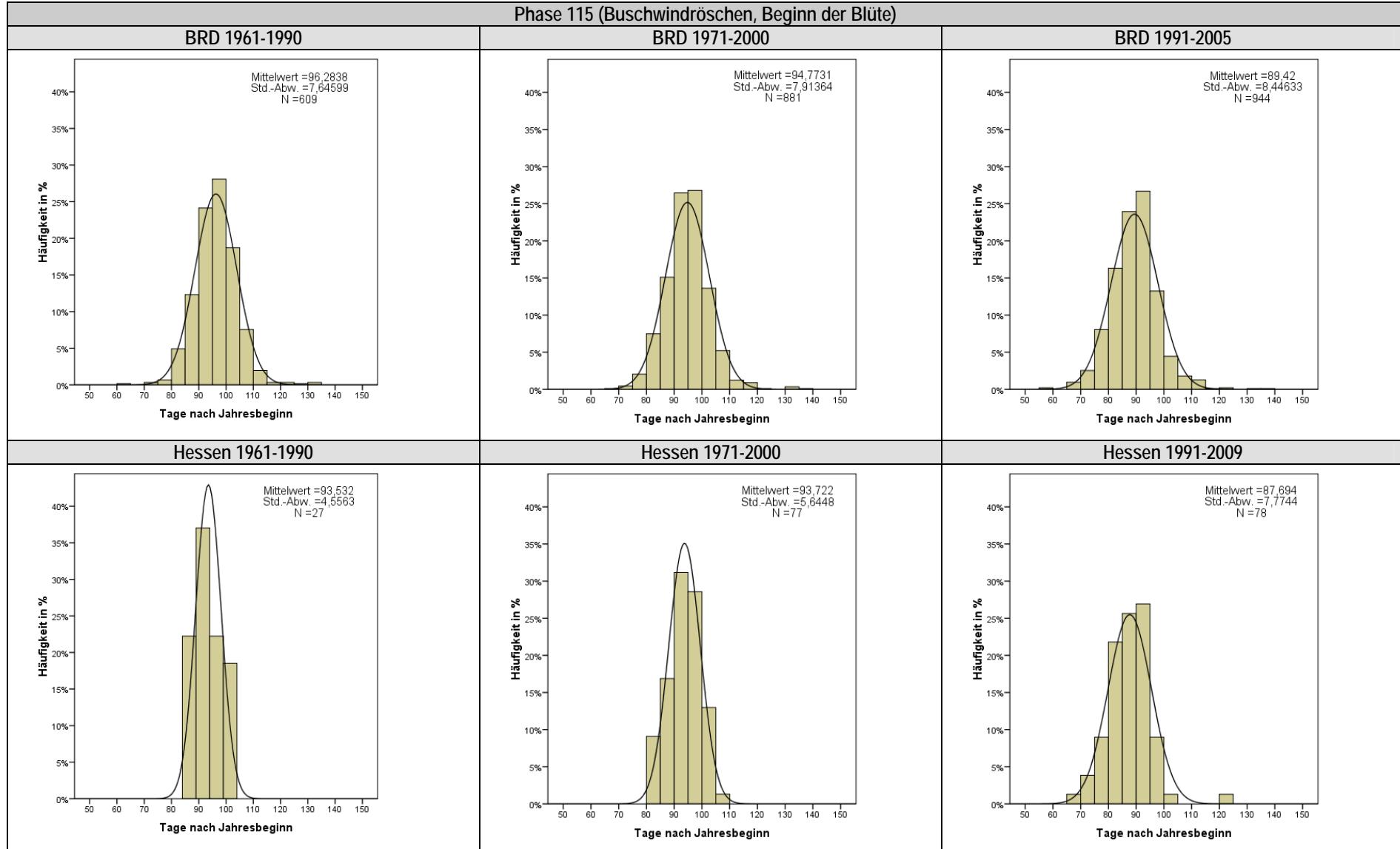
Phase 52 (Stachelbeere, Beginn der Blattentfaltung)

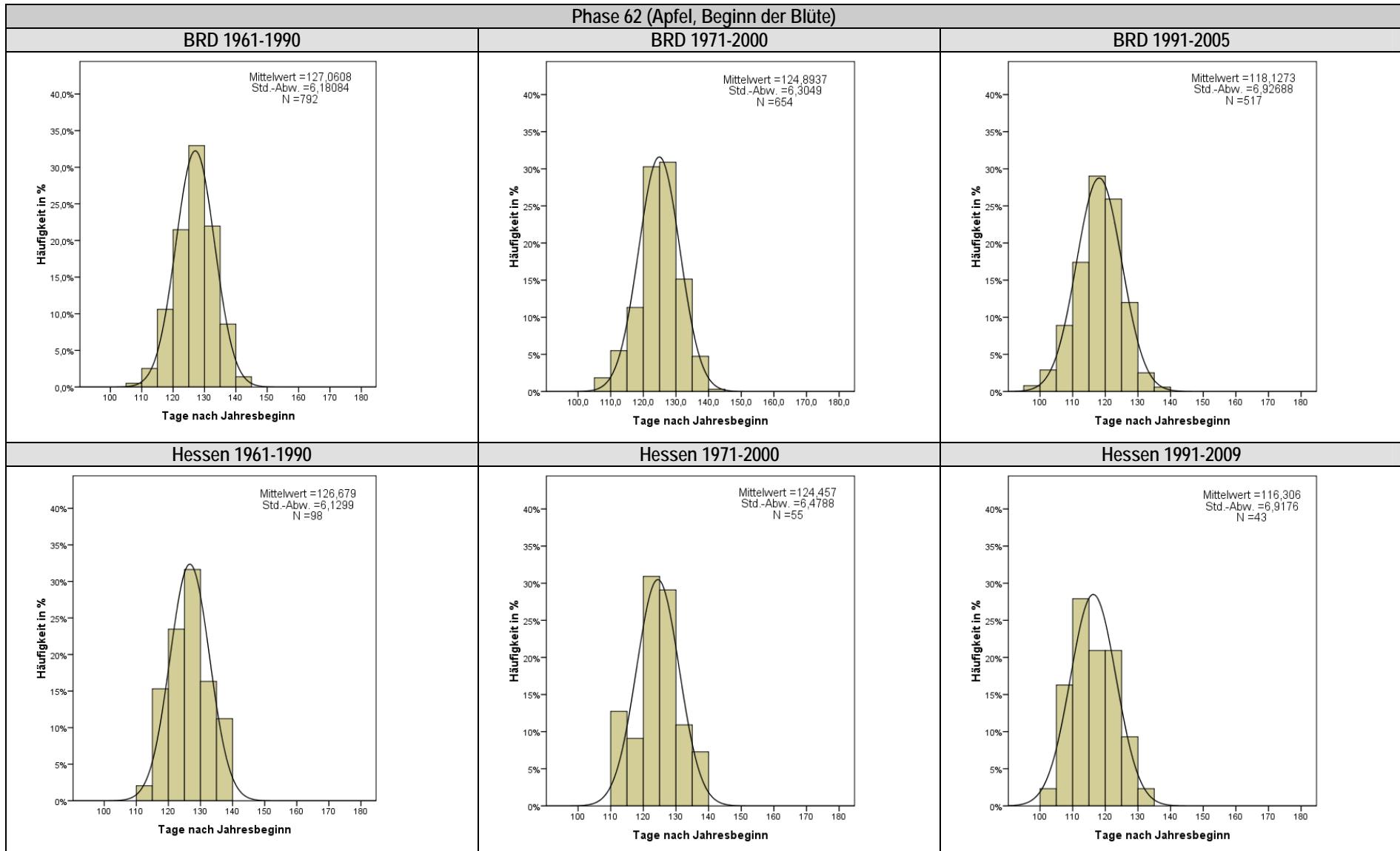


Phase 7 (Rosskastanie, Beginn der Blattentfaltung)

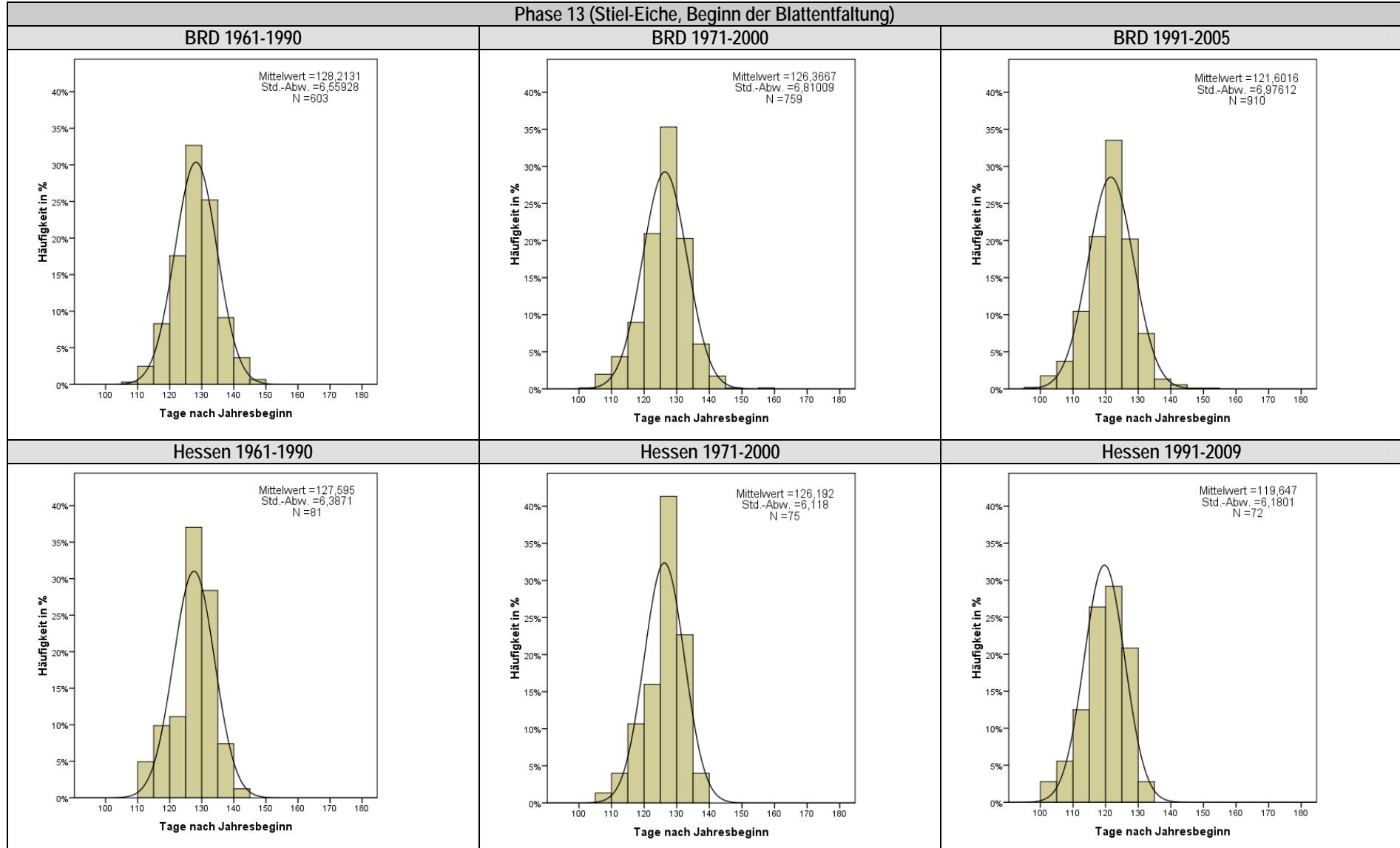


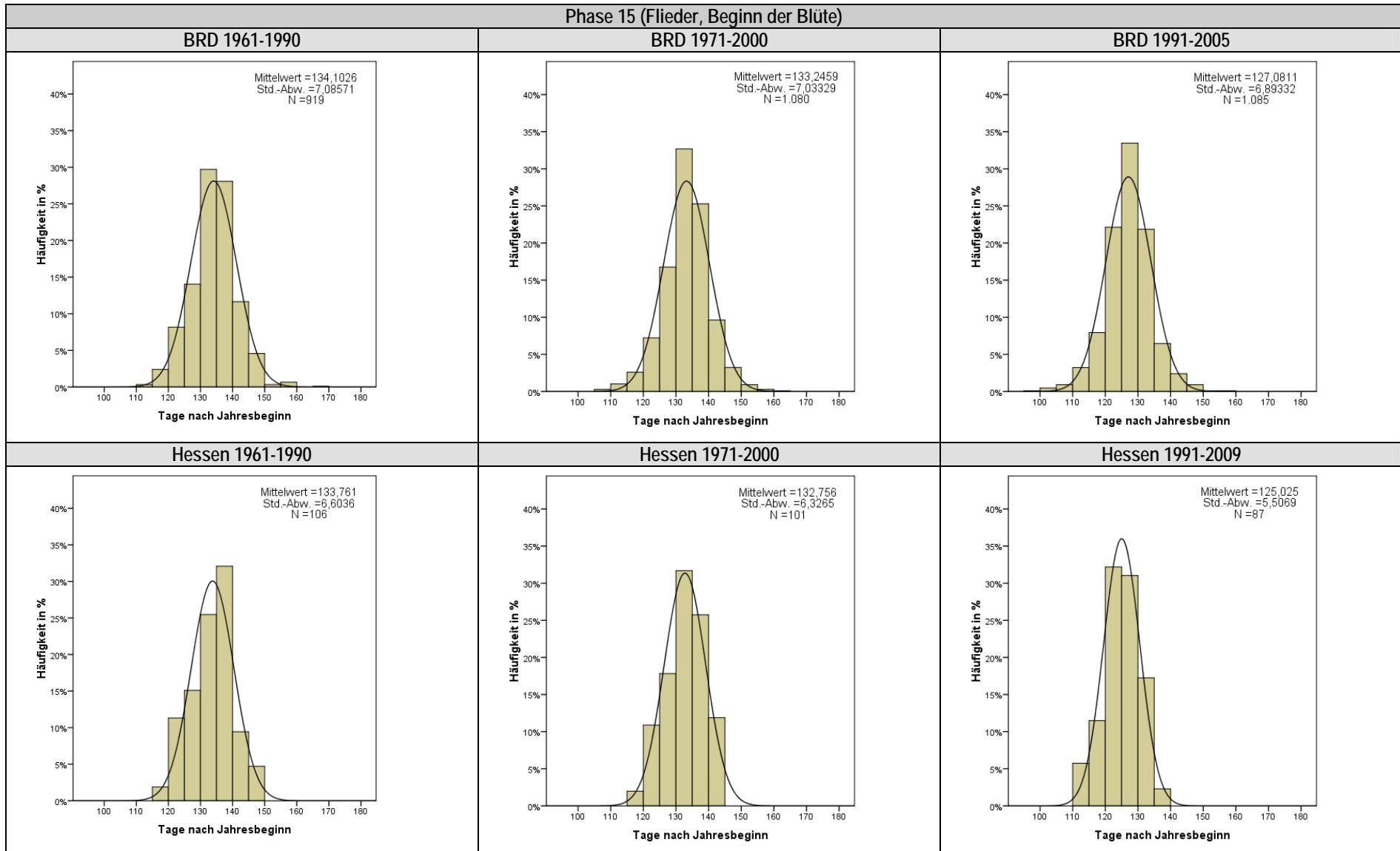
Phase 115 (Buschwindröschen, Beginn der Blüte)



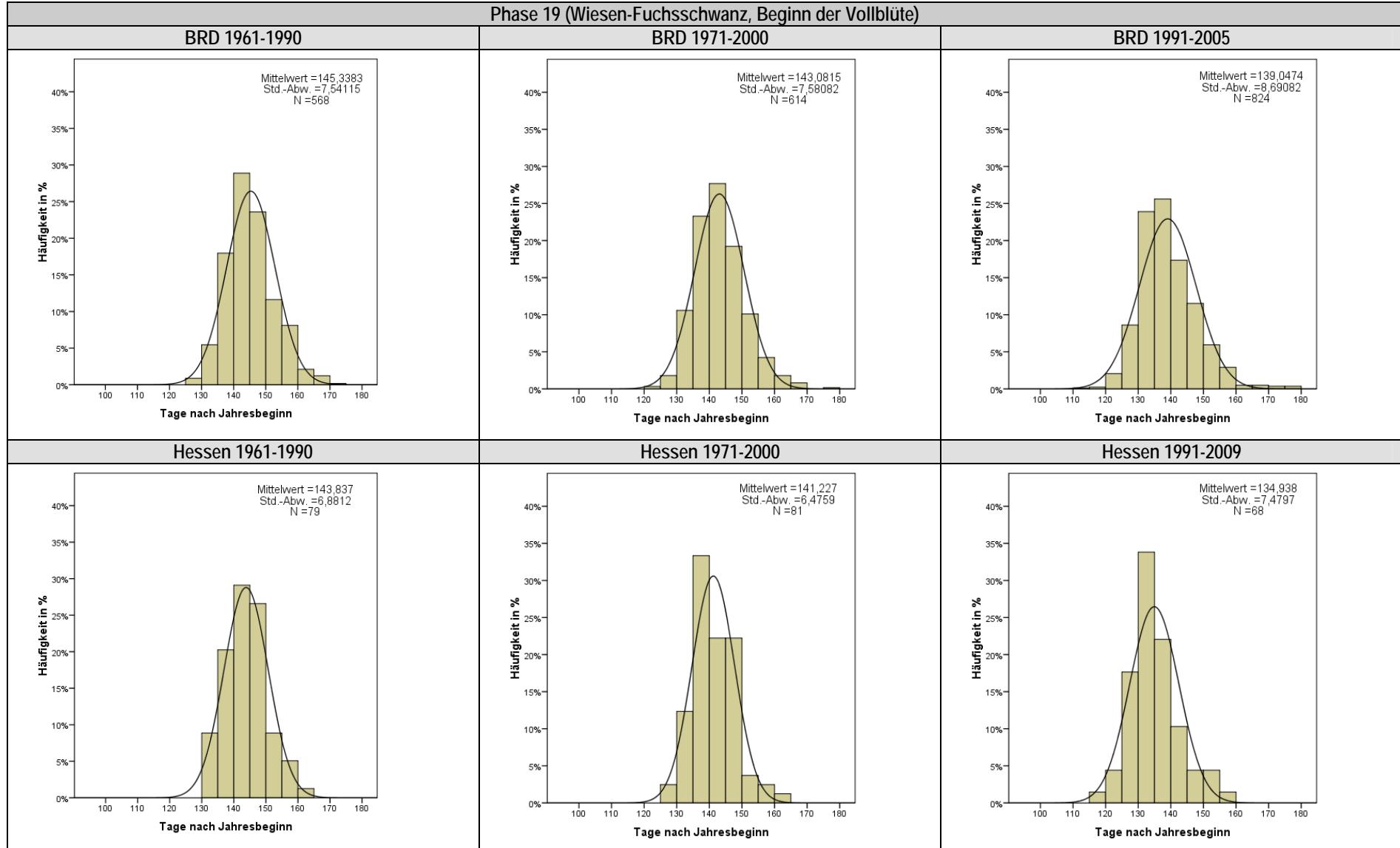


Phase 13 (Stiel-Eiche, Beginn der Blattentfaltung)

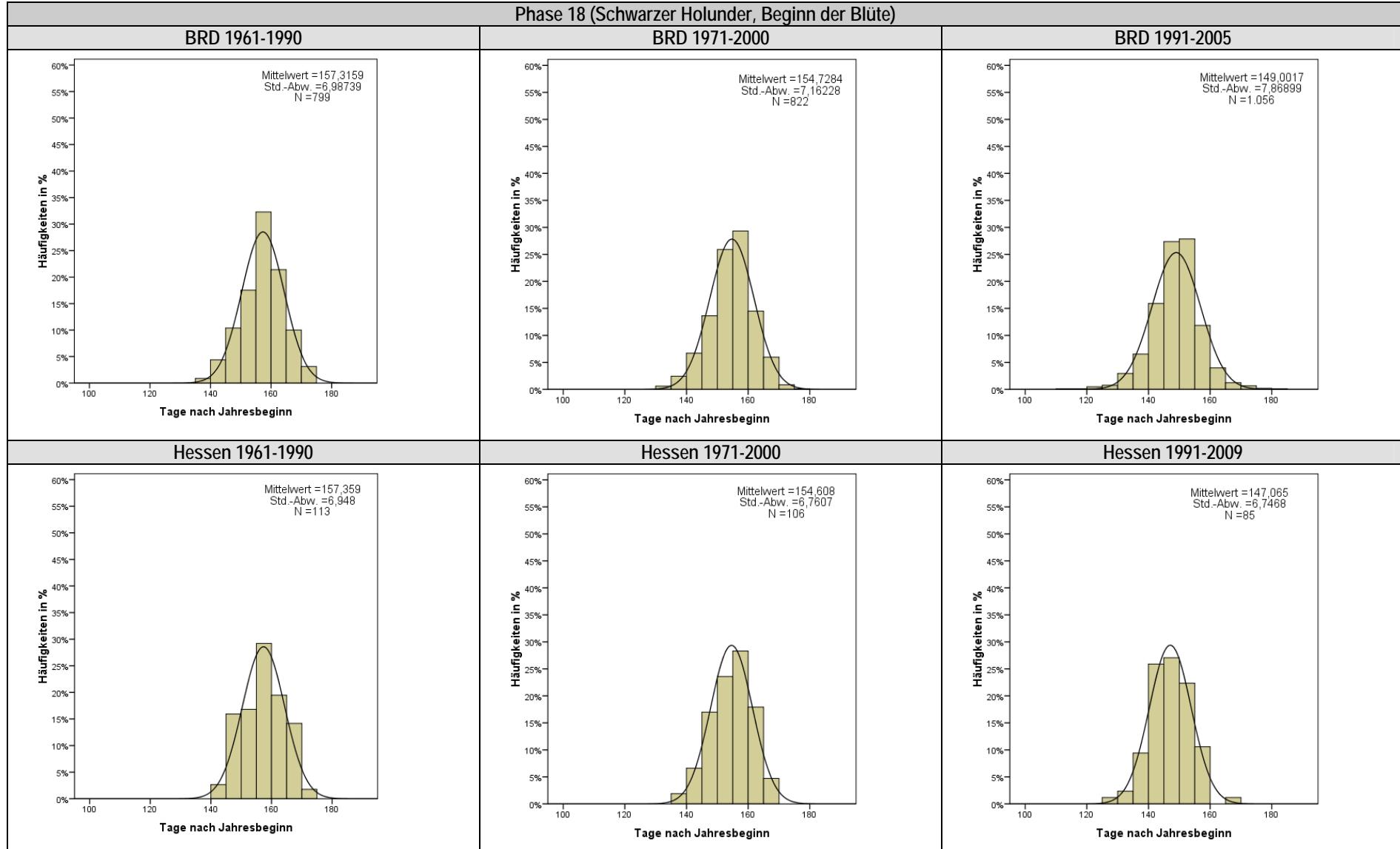


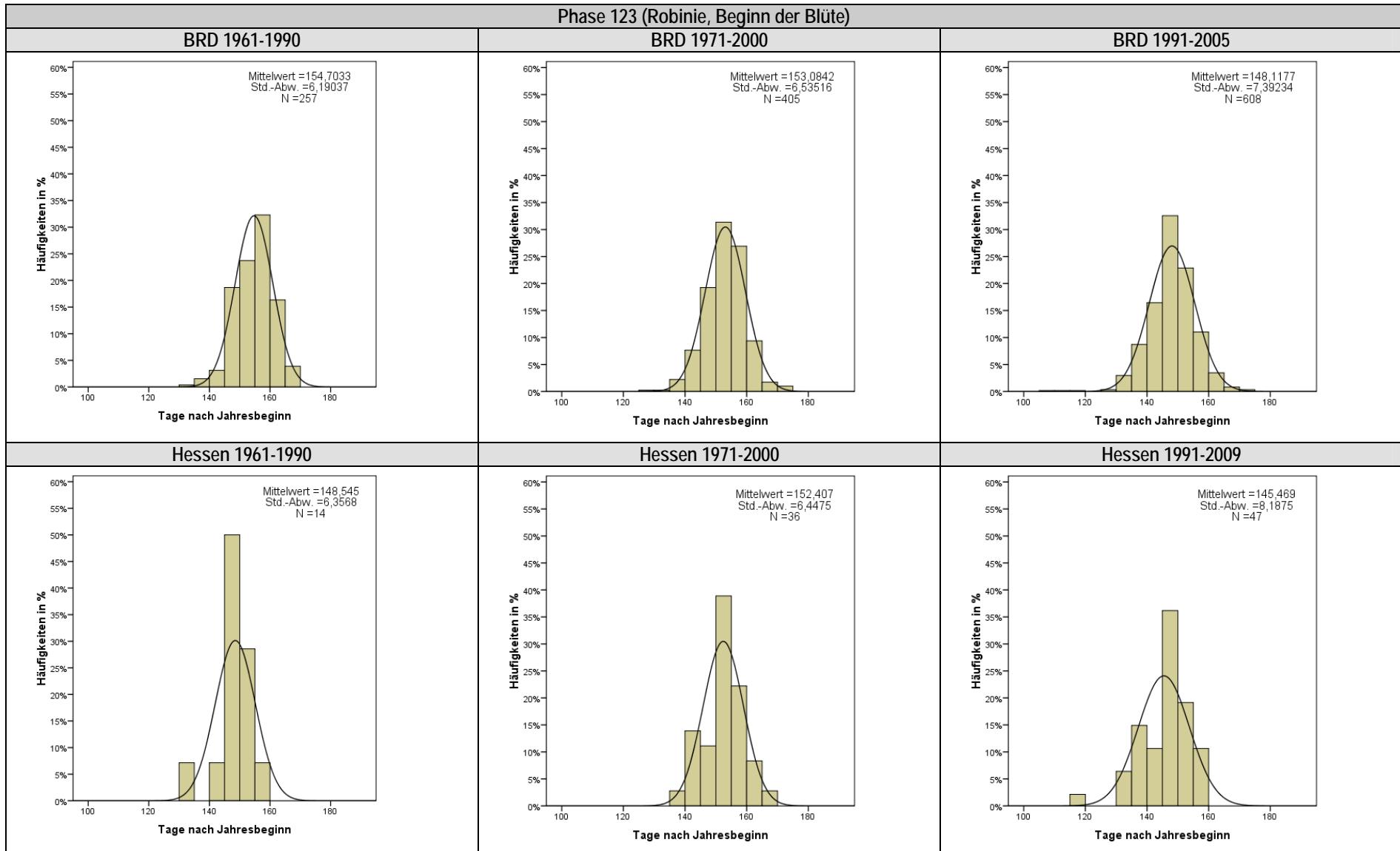


Phase 19 (Wiesen-Fuchsschwanz, Beginn der Vollblüte)

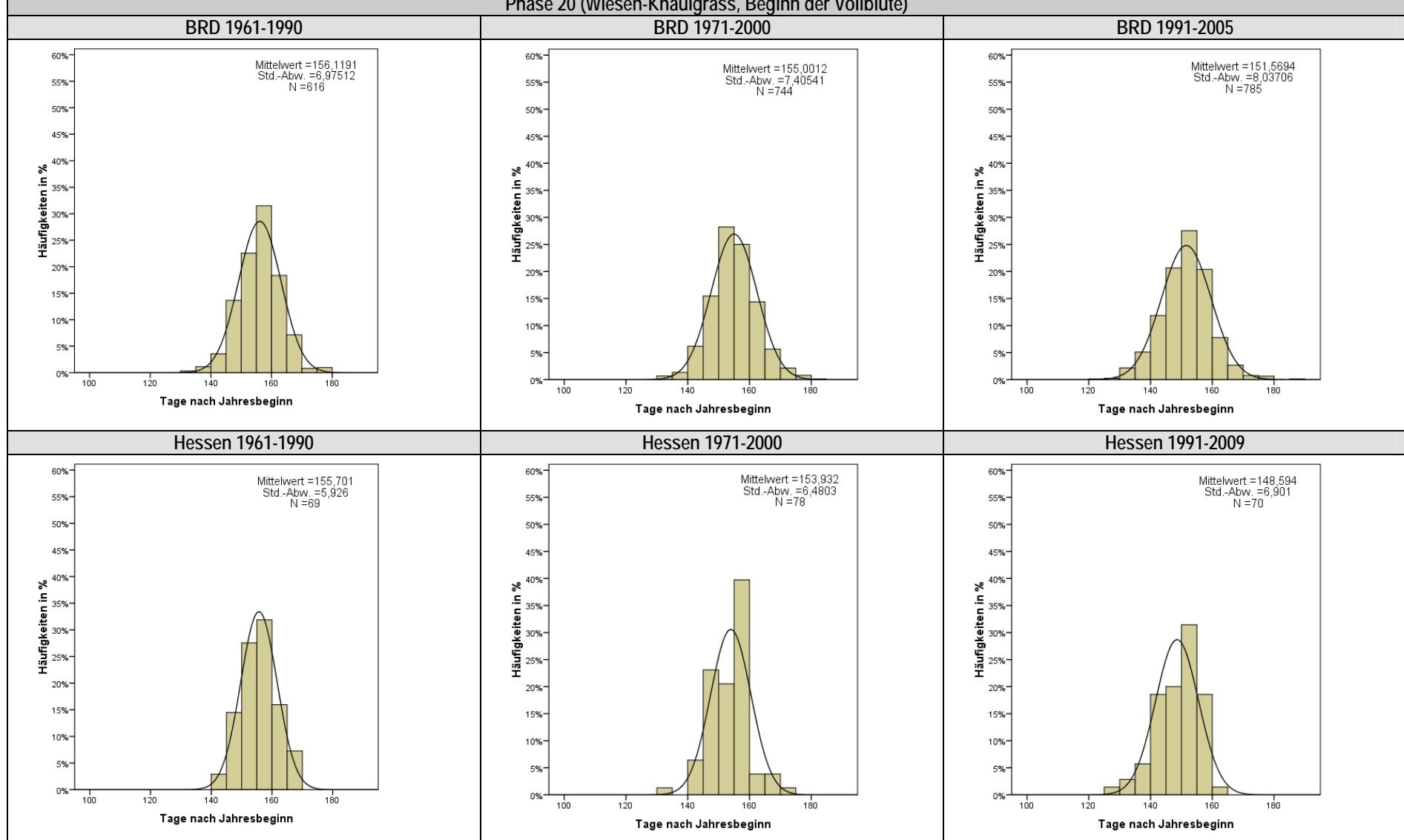


Phase 18 (Schwarzer Holunder, Beginn der Blüte)

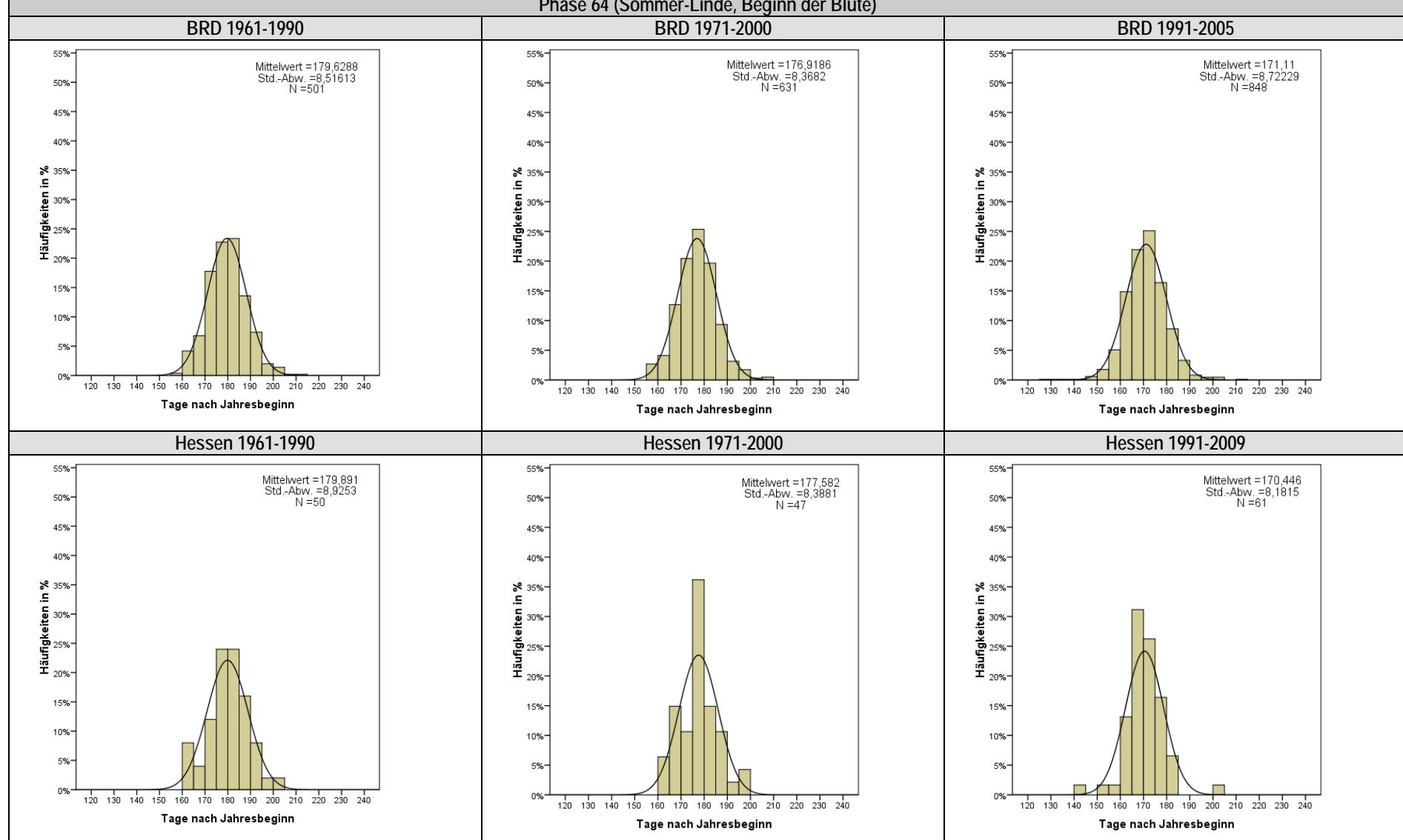




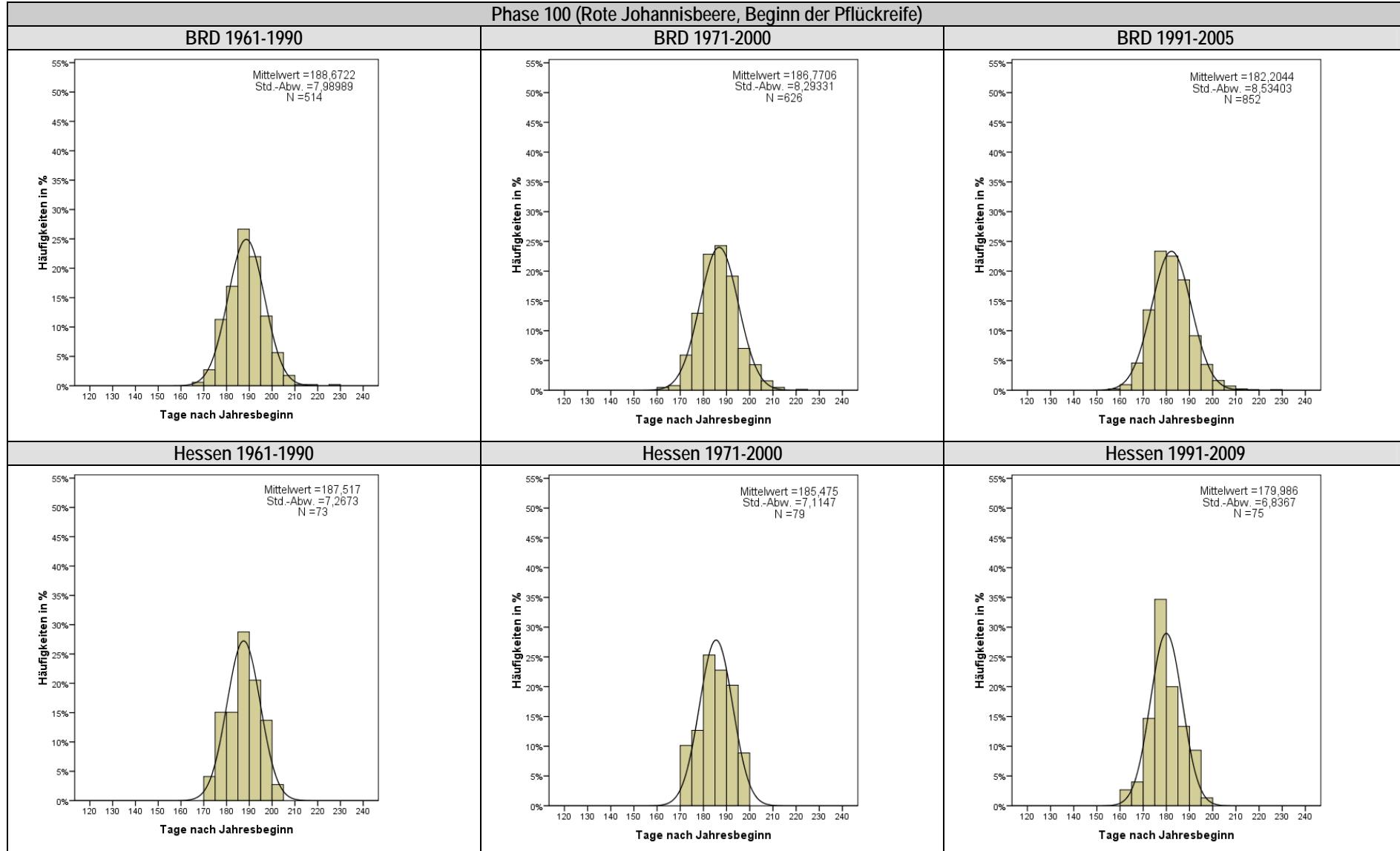
Phase 20 (Wiesen-Knäulgrass, Beginn der Vollblüte)



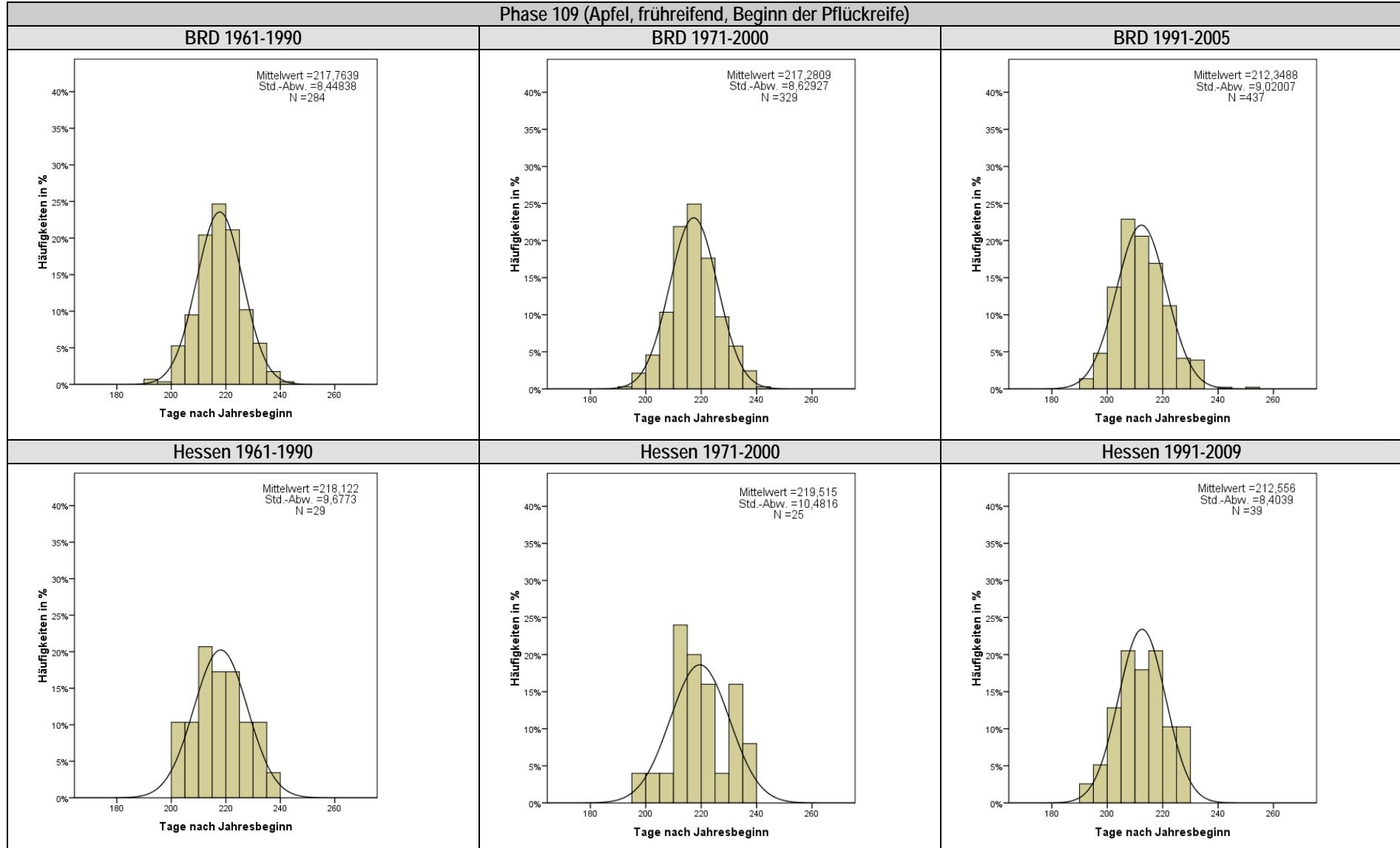
Phase 64 (Sommer-Linde, Beginn der Blüte)

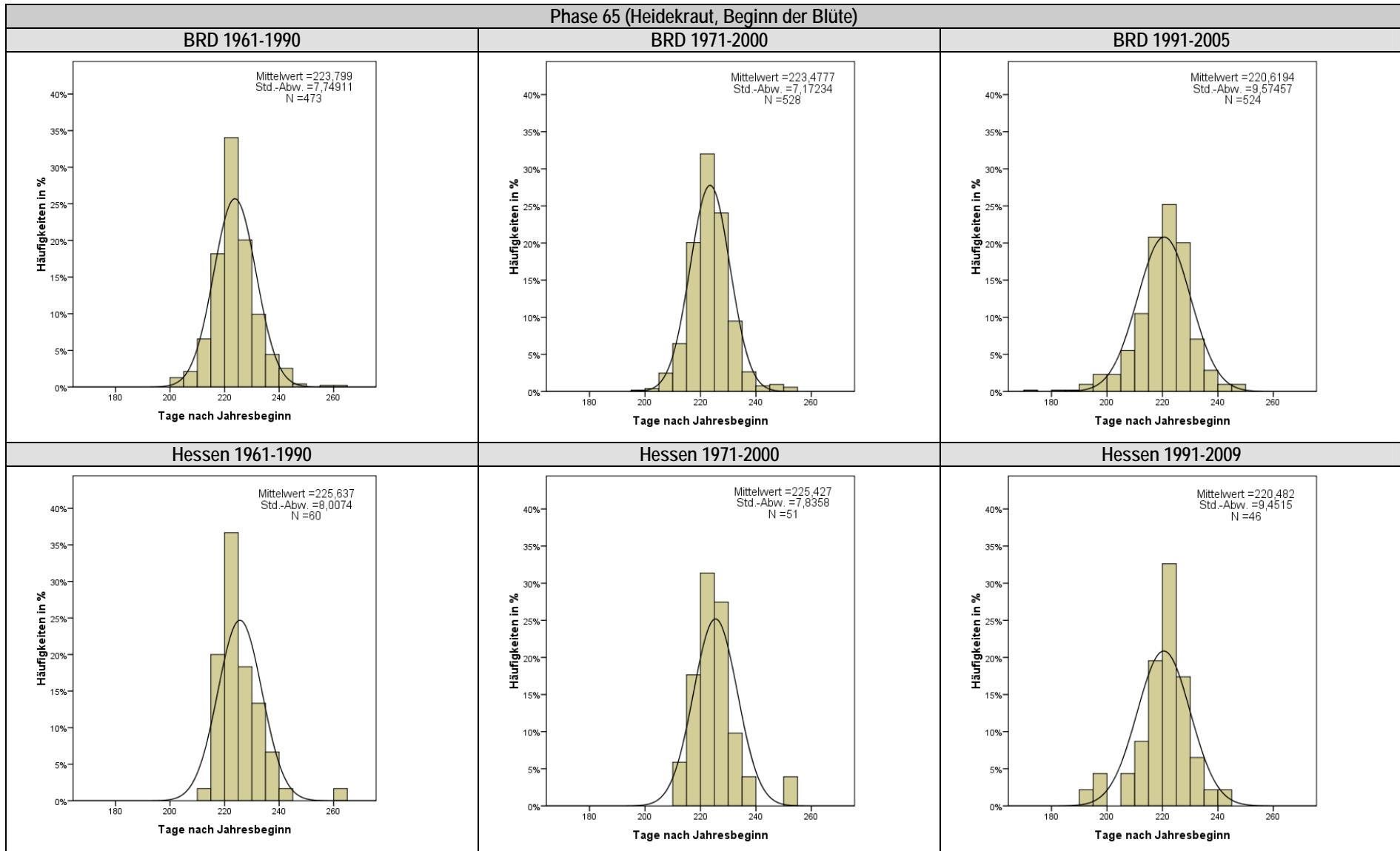


Phase 100 (Rote Johannisbeere, Beginn der Pflückreife)

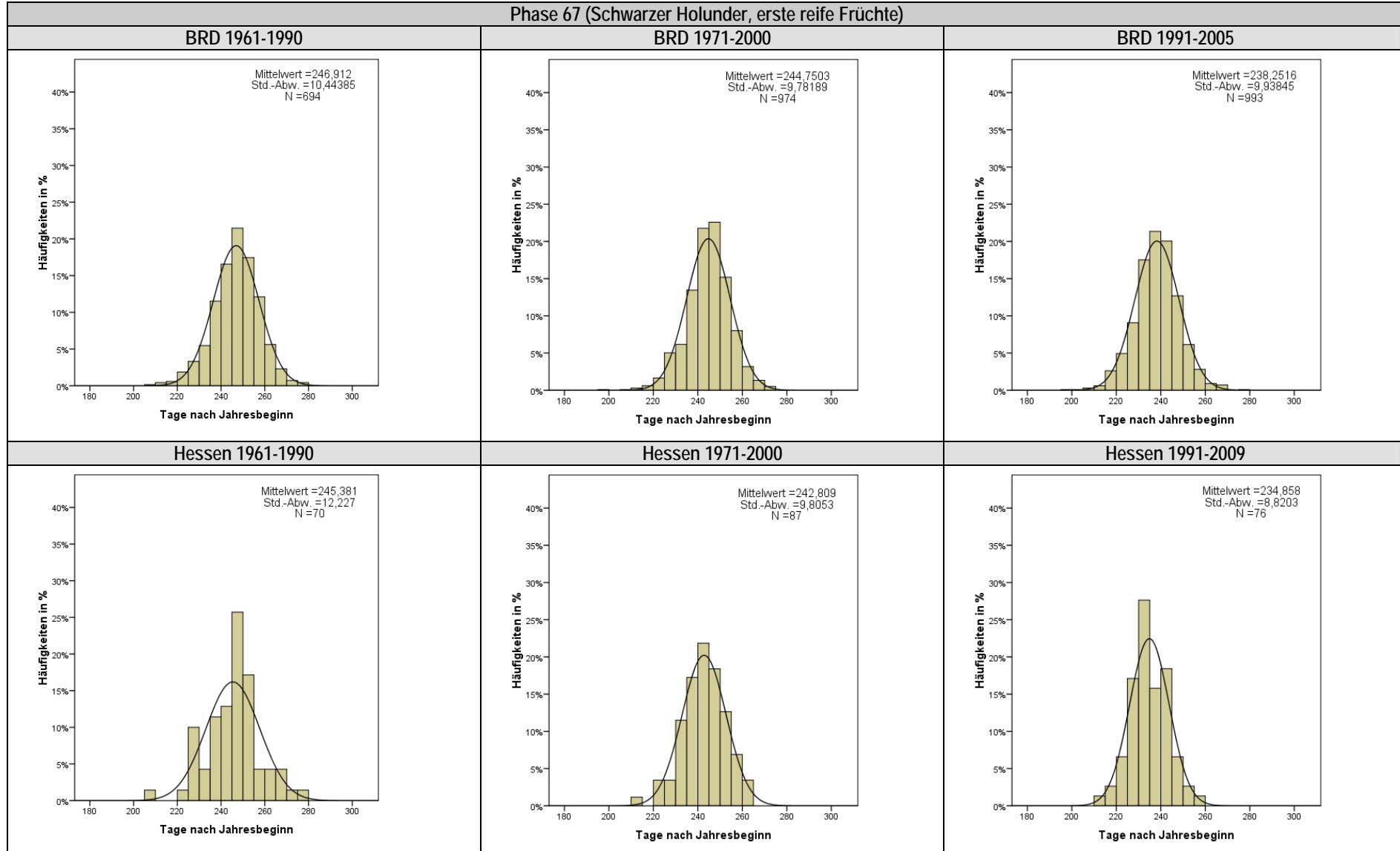


Phase 109 (Apfel, frühreifend, Beginn der Pflückreife)

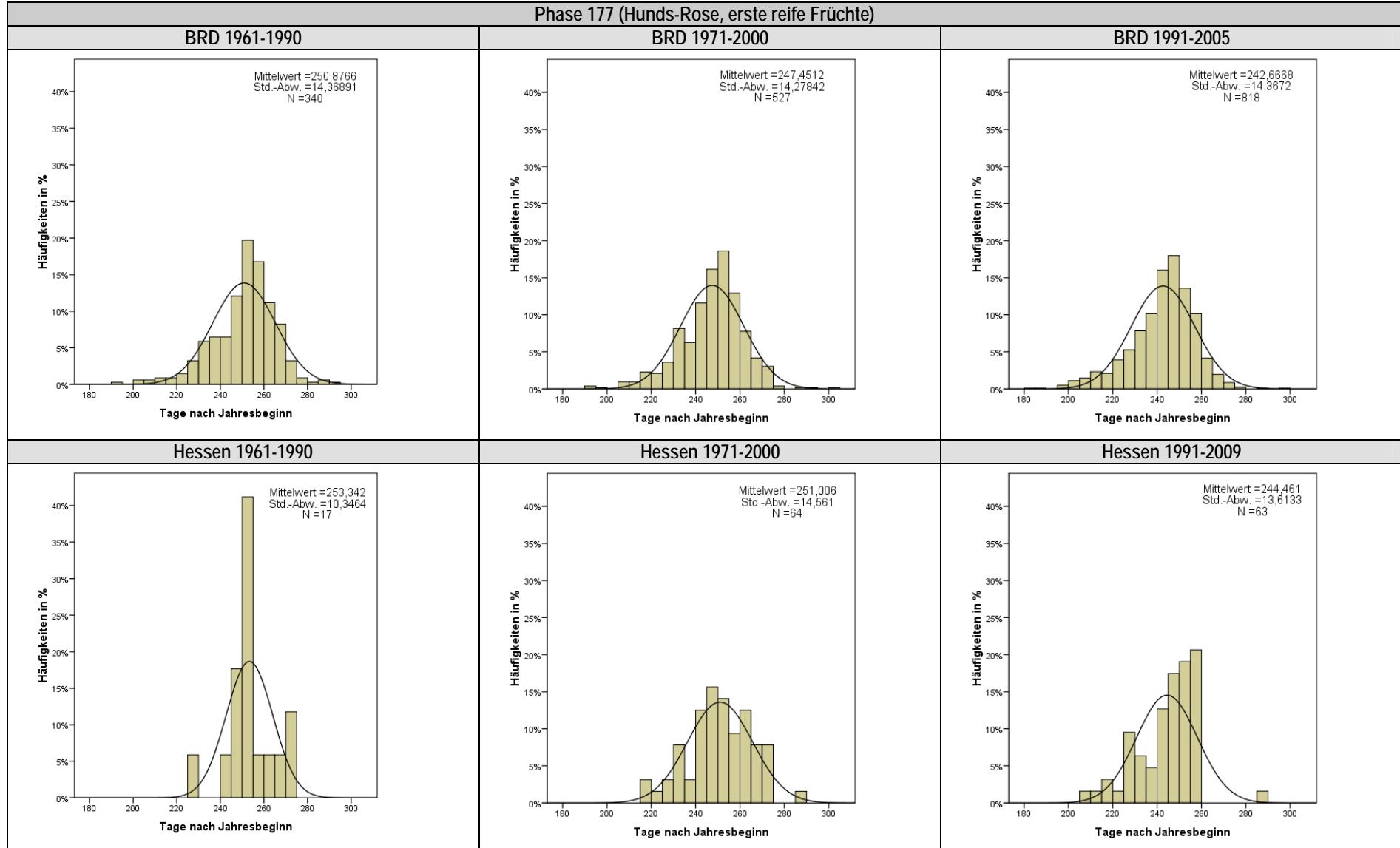




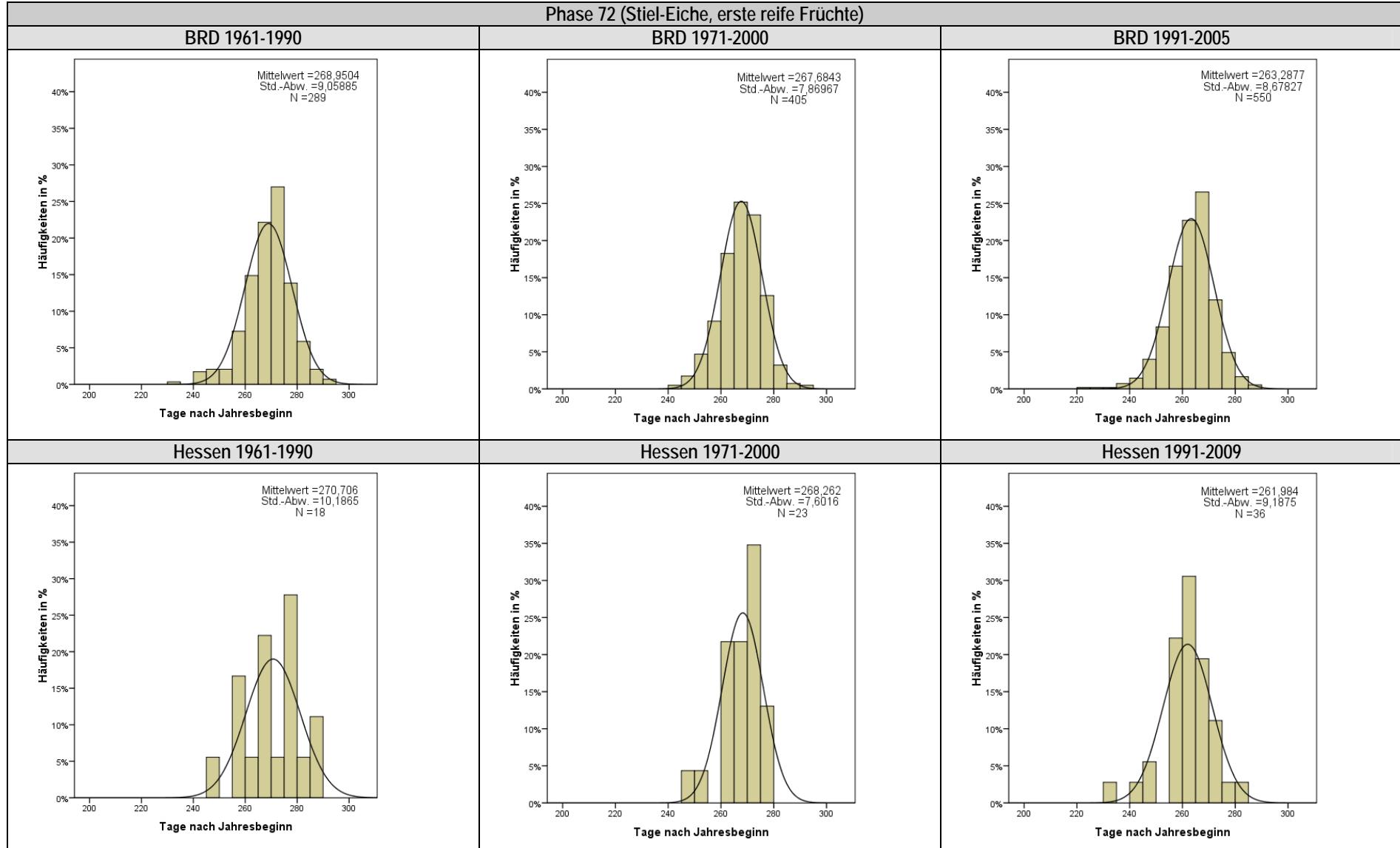
Phase 67 (Schwarzer Holunder, erste reife Früchte)

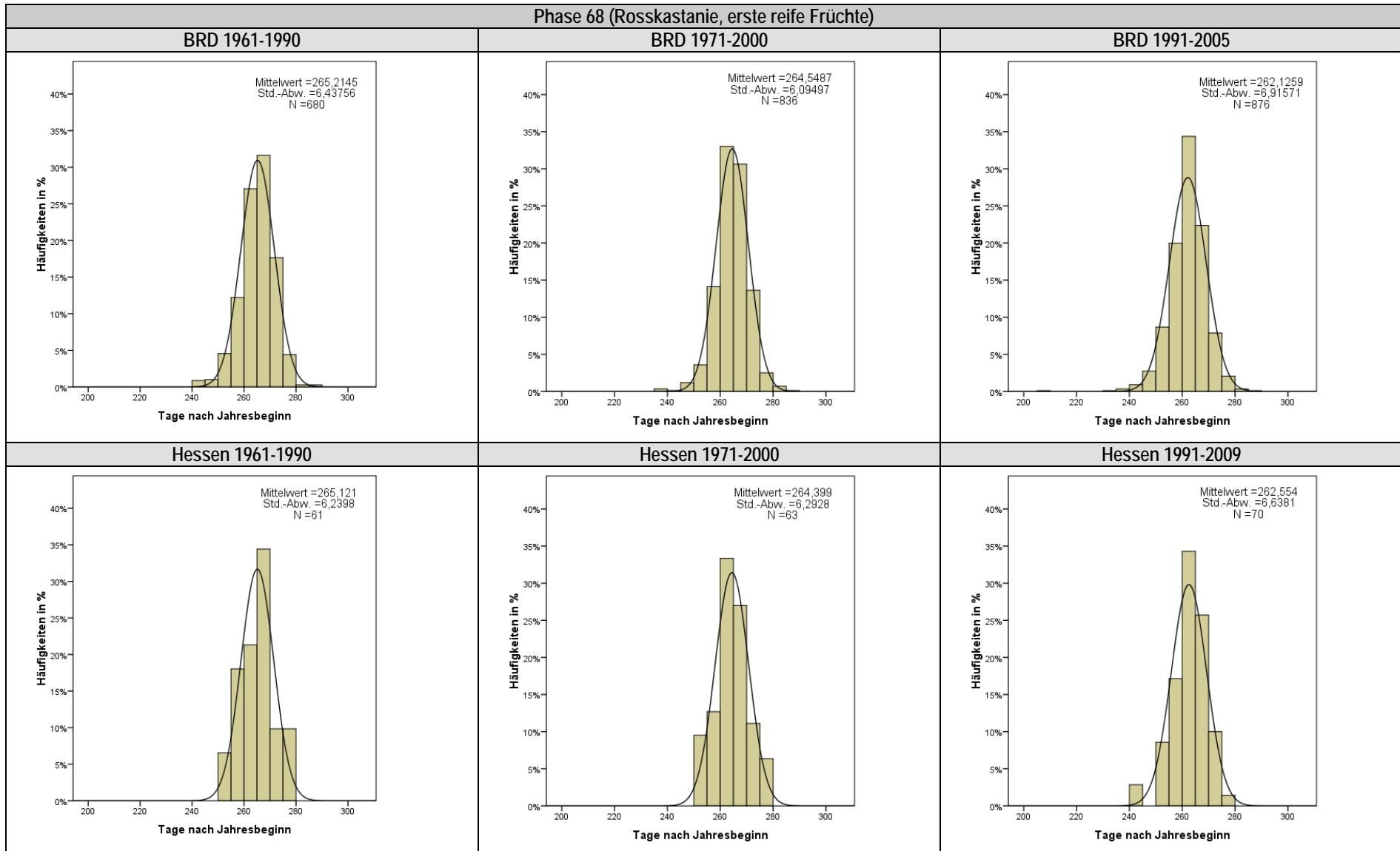


Phase 177 (Hunds-Rose, erste reife Früchte)

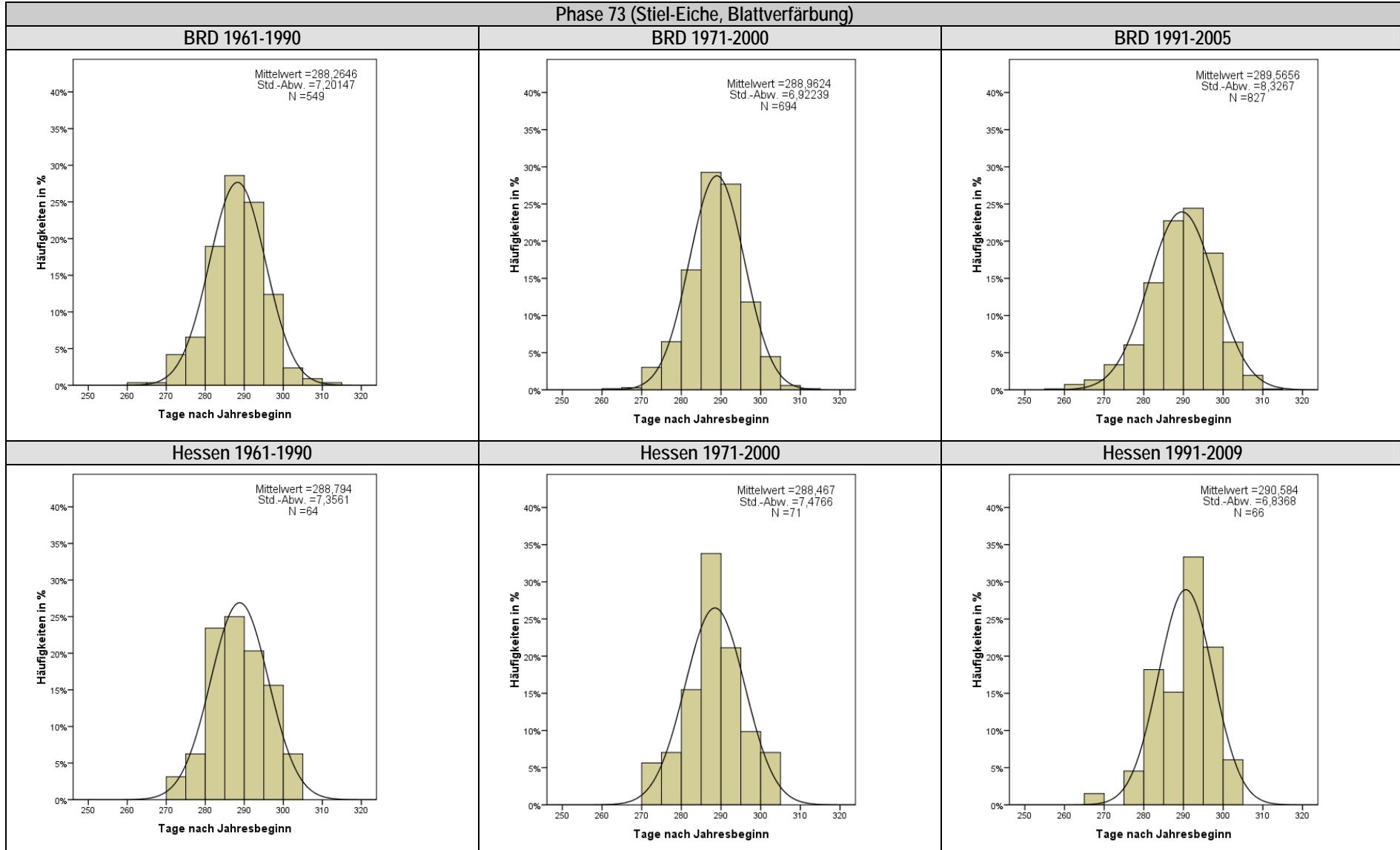


Phase 72 (Stiel-Eiche, erste reife Früchte)

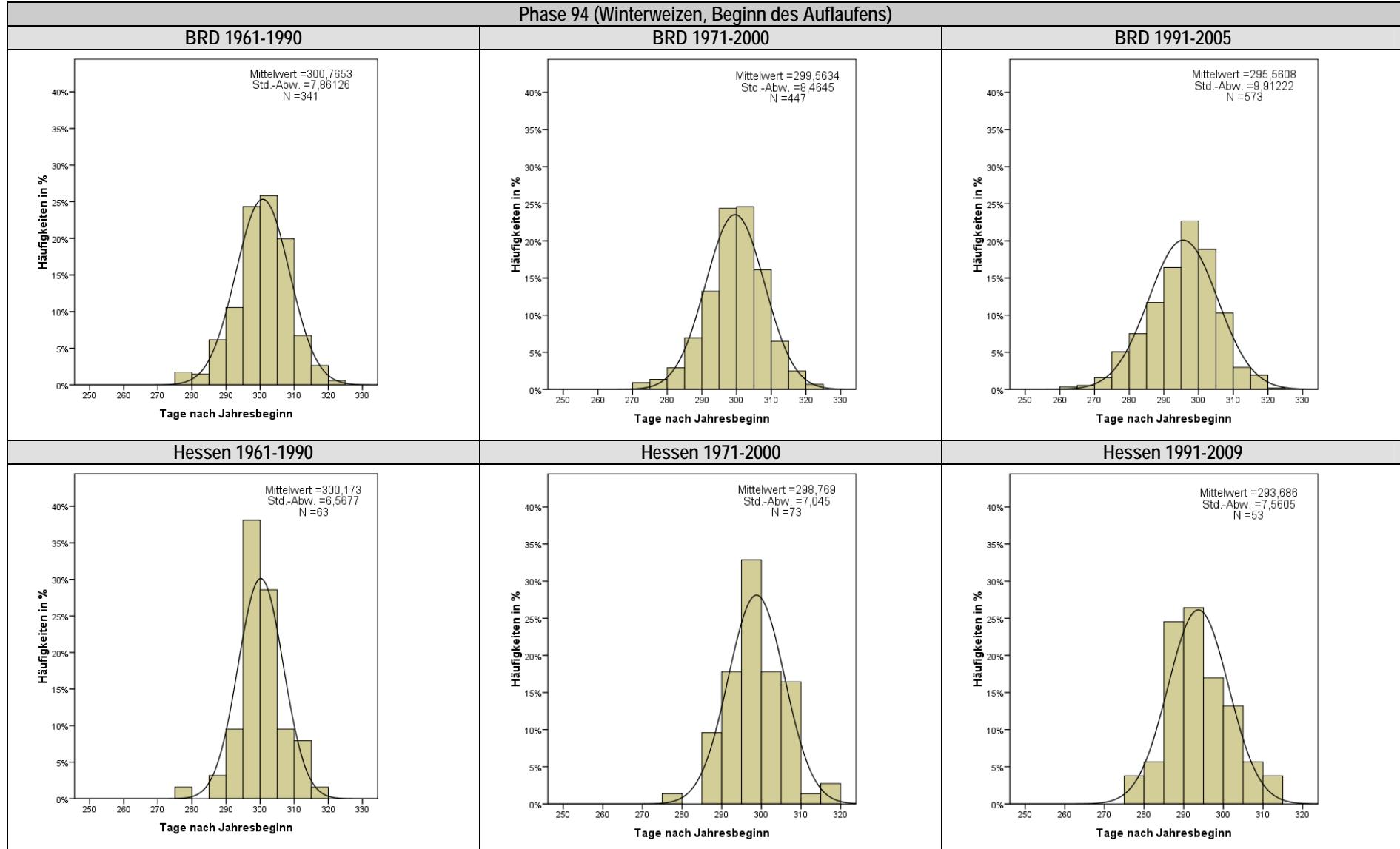




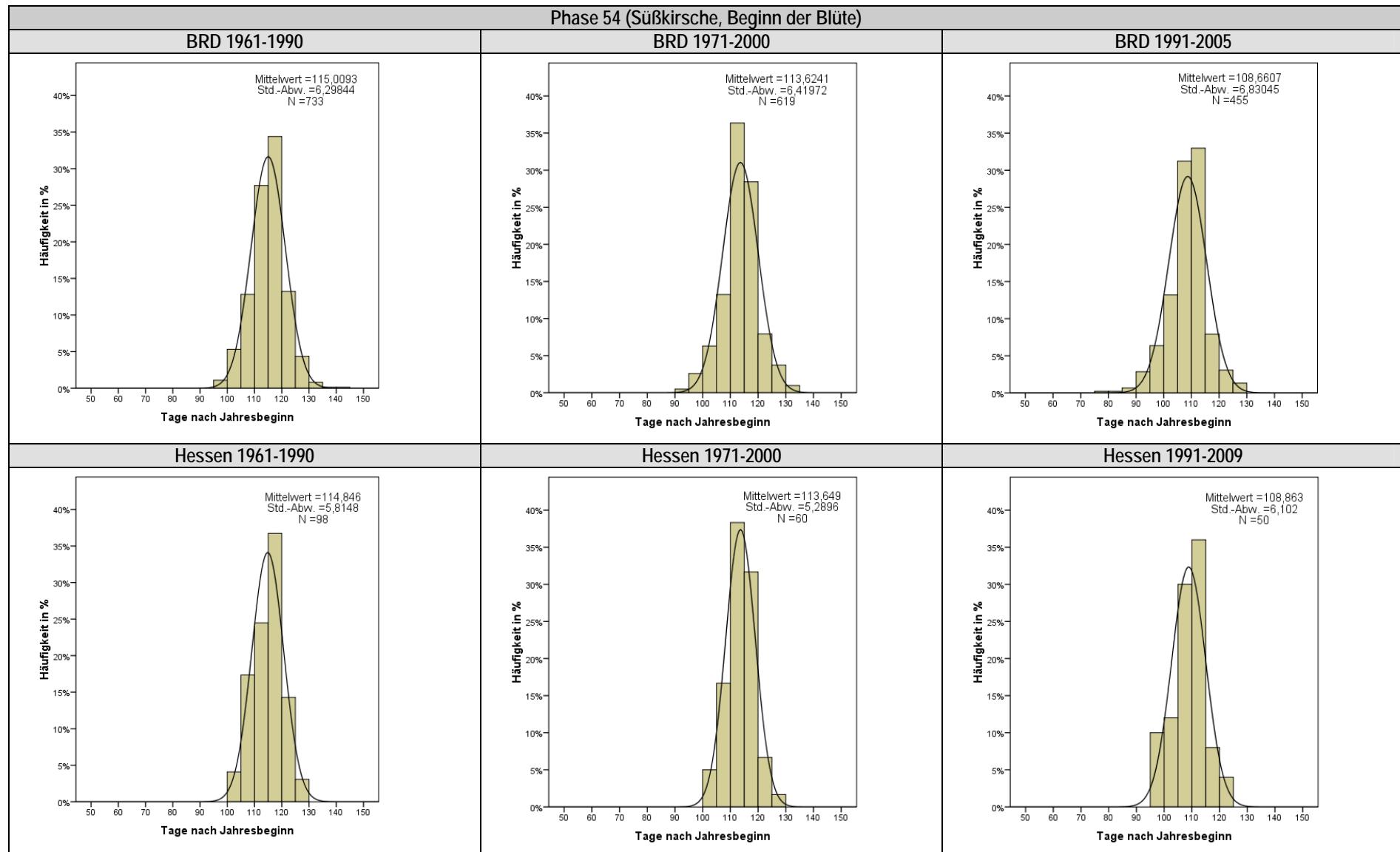
Phase 73 (Stiel-Eiche, Blattverfärbung)



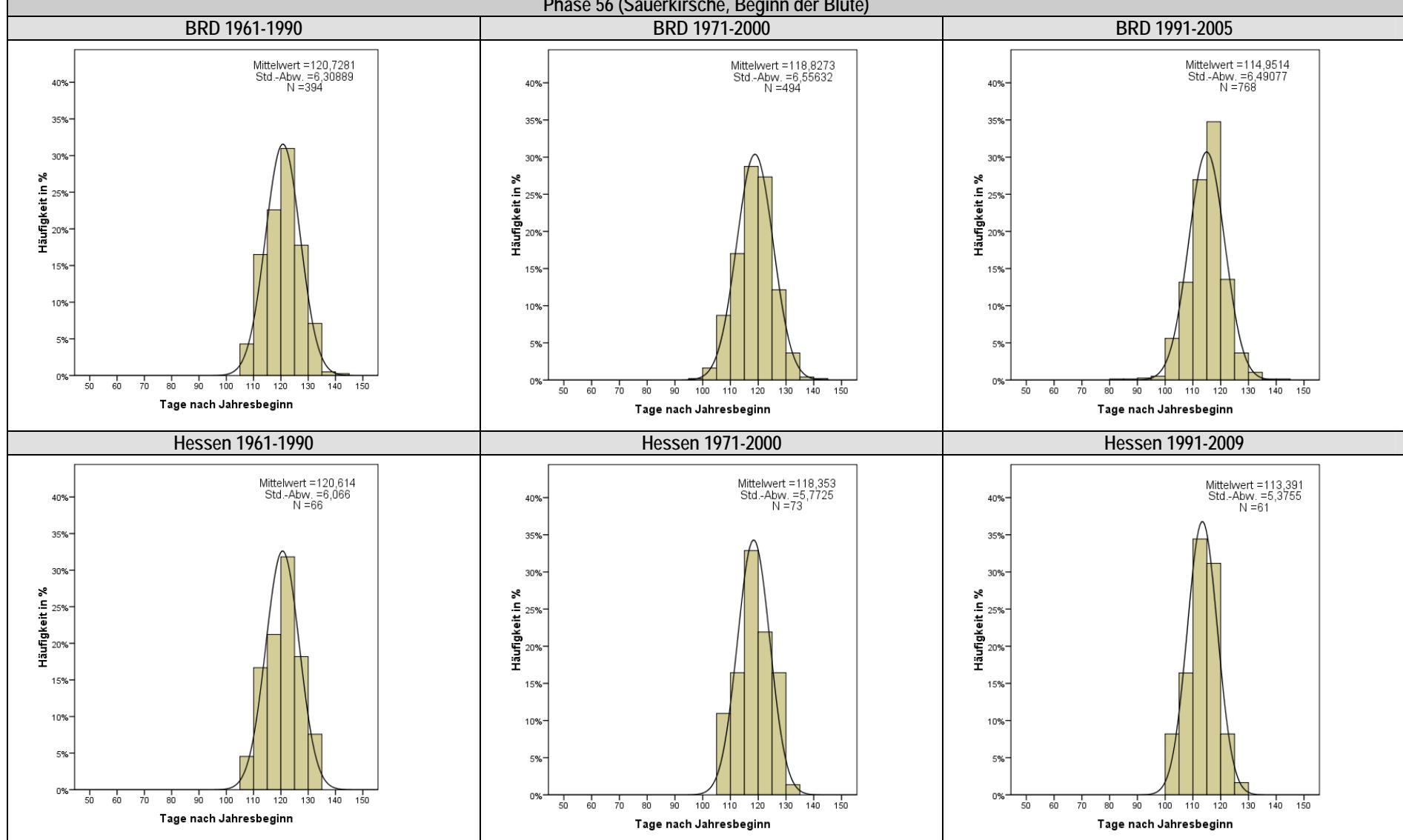
Phase 94 (Winterweizen, Beginn des Auflaufens)

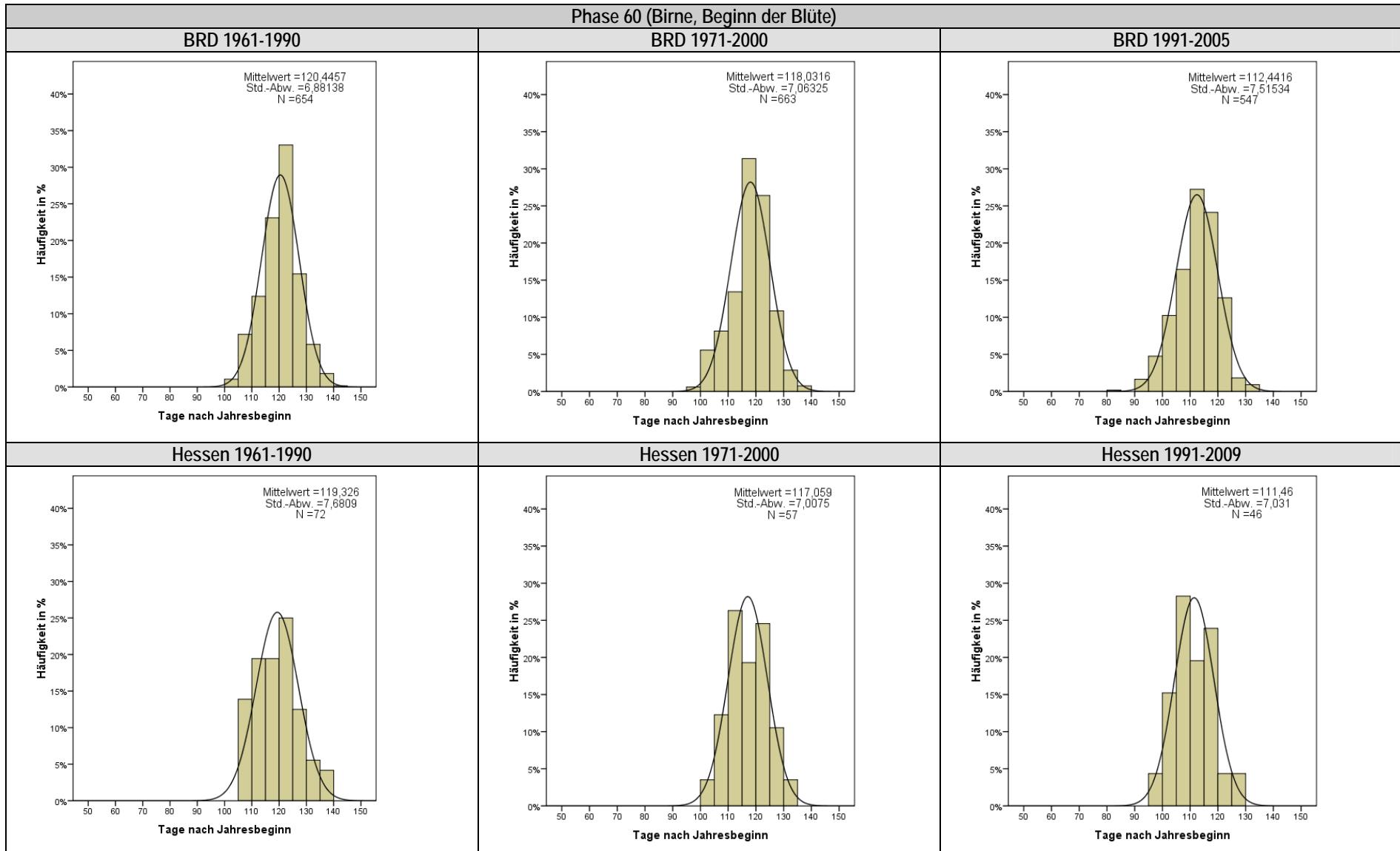


Phase 54 (Süßkirsche, Beginn der Blüte)

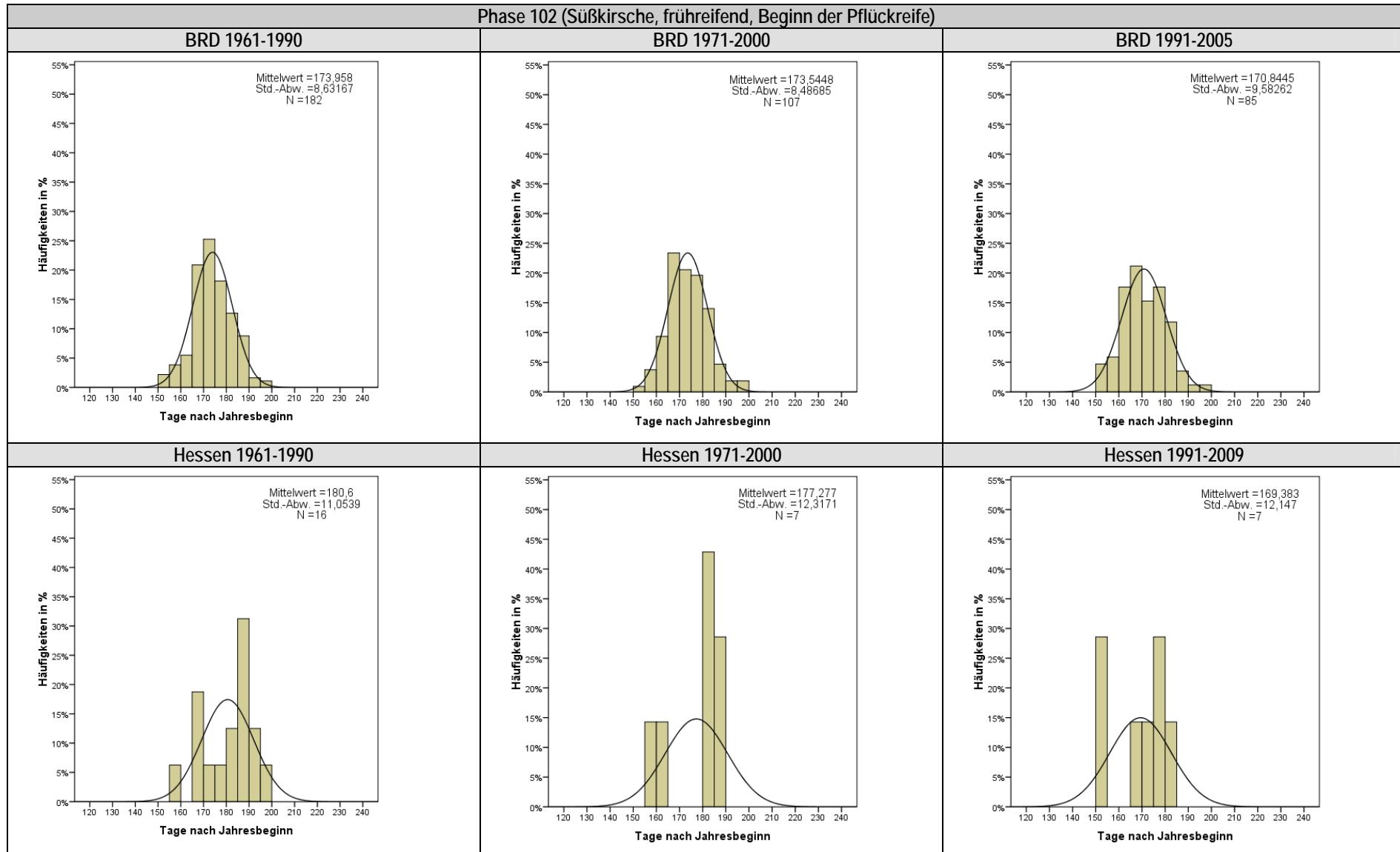


Phase 56 (Sauerkirsche, Beginn der Blüte)

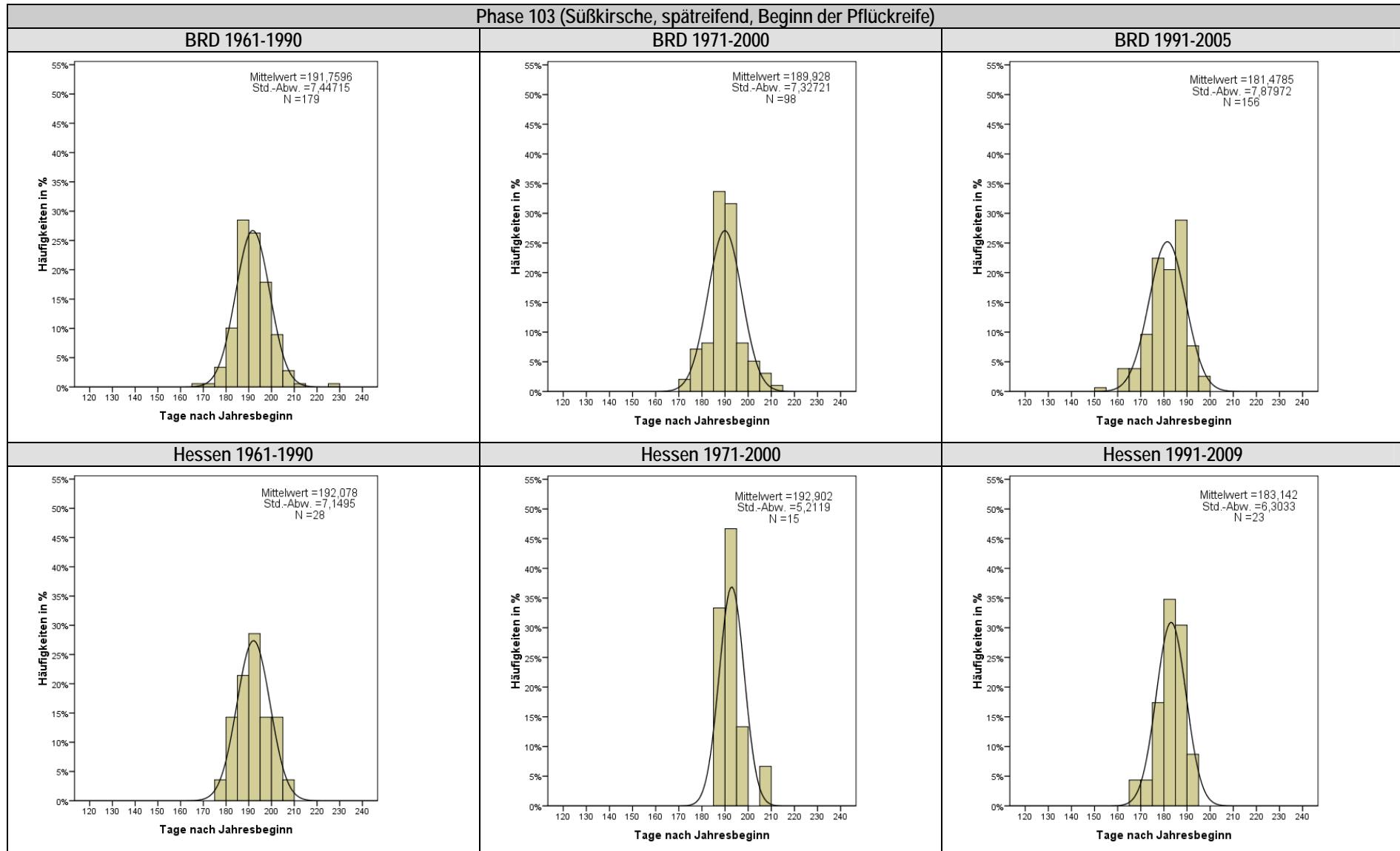




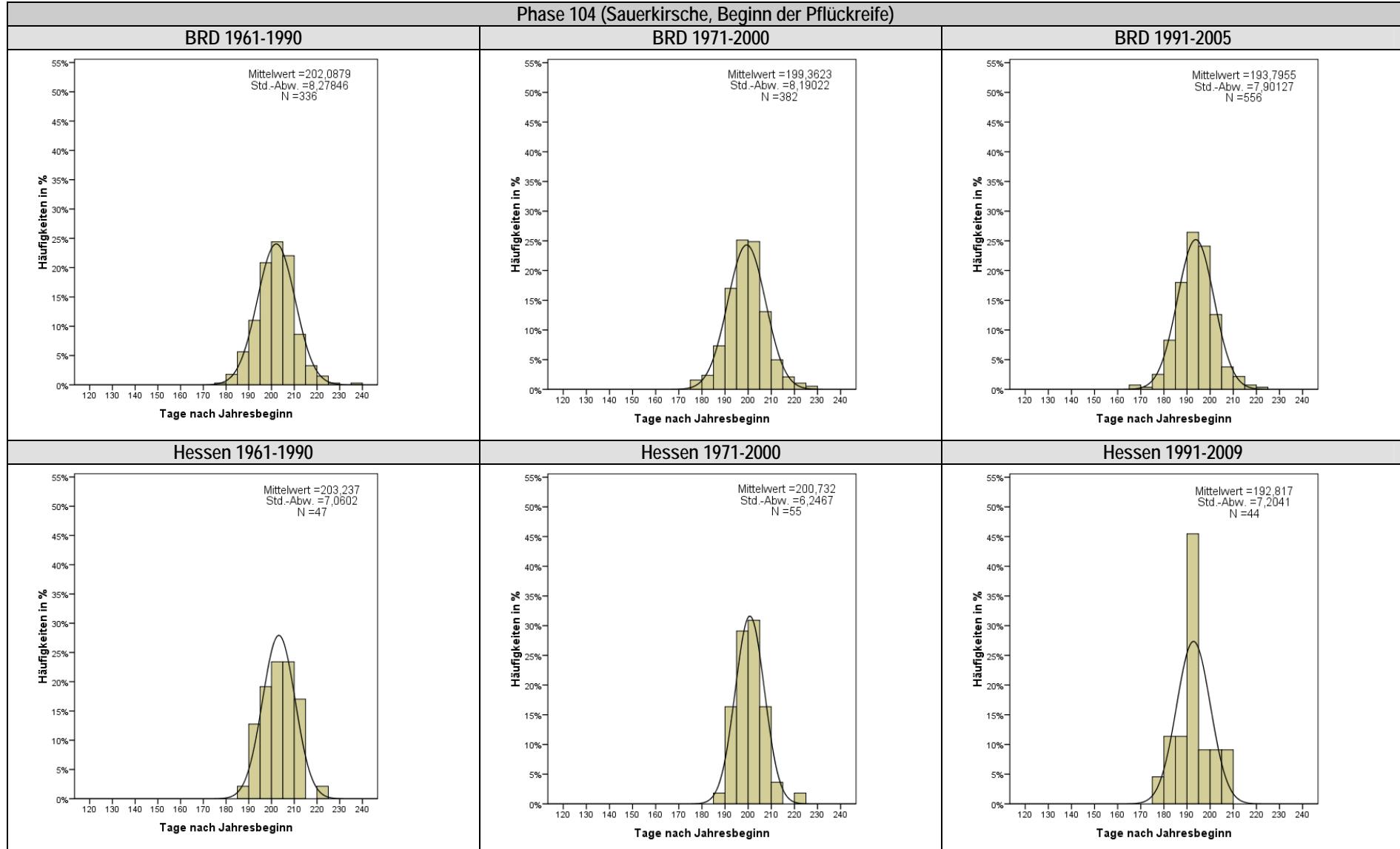
Phase 102 (Süßkirsche, frühreifend, Beginn der Pflückreife)



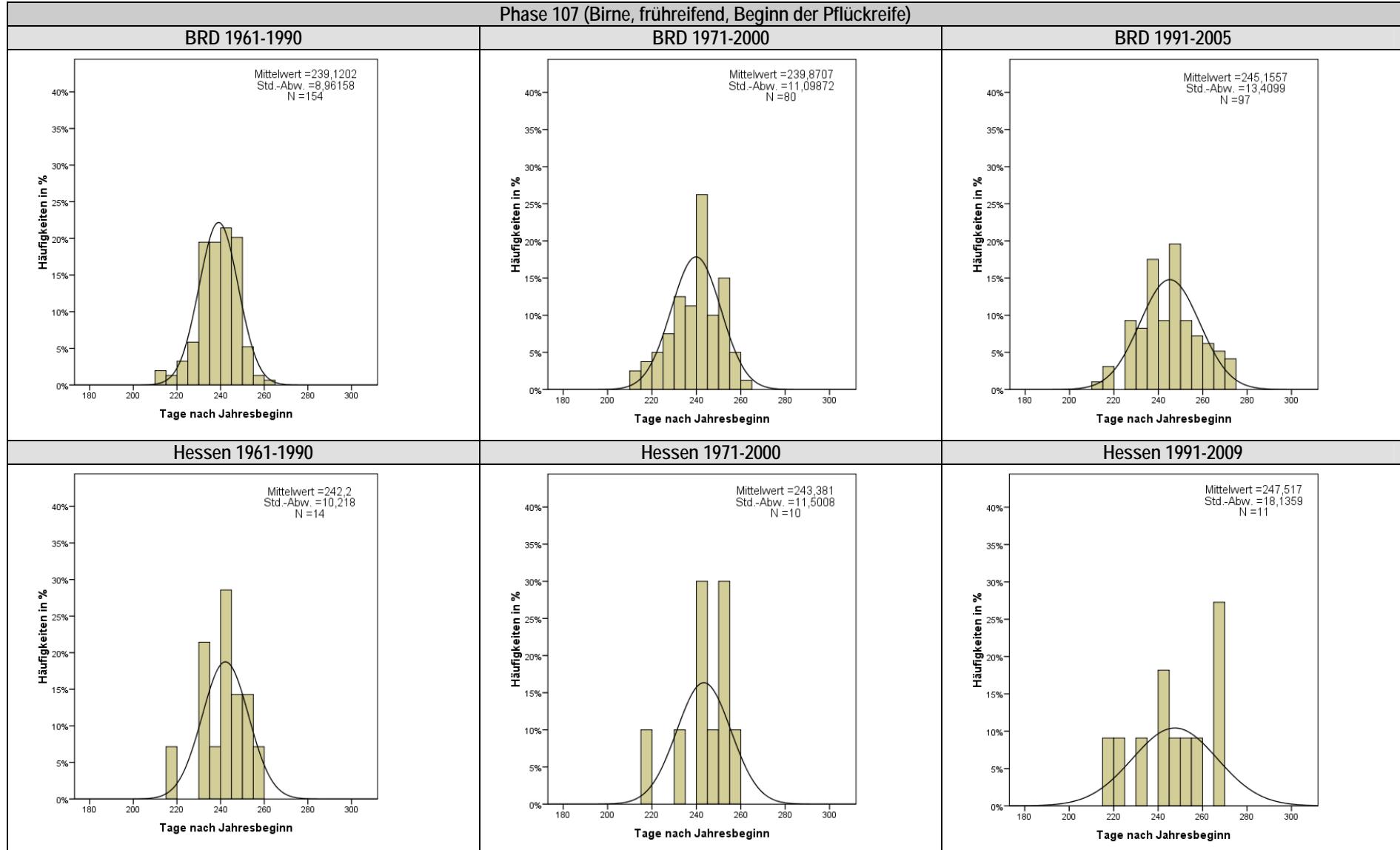
Phase 103 (Süßkirsche, spätreifend, Beginn der Pflückreife)



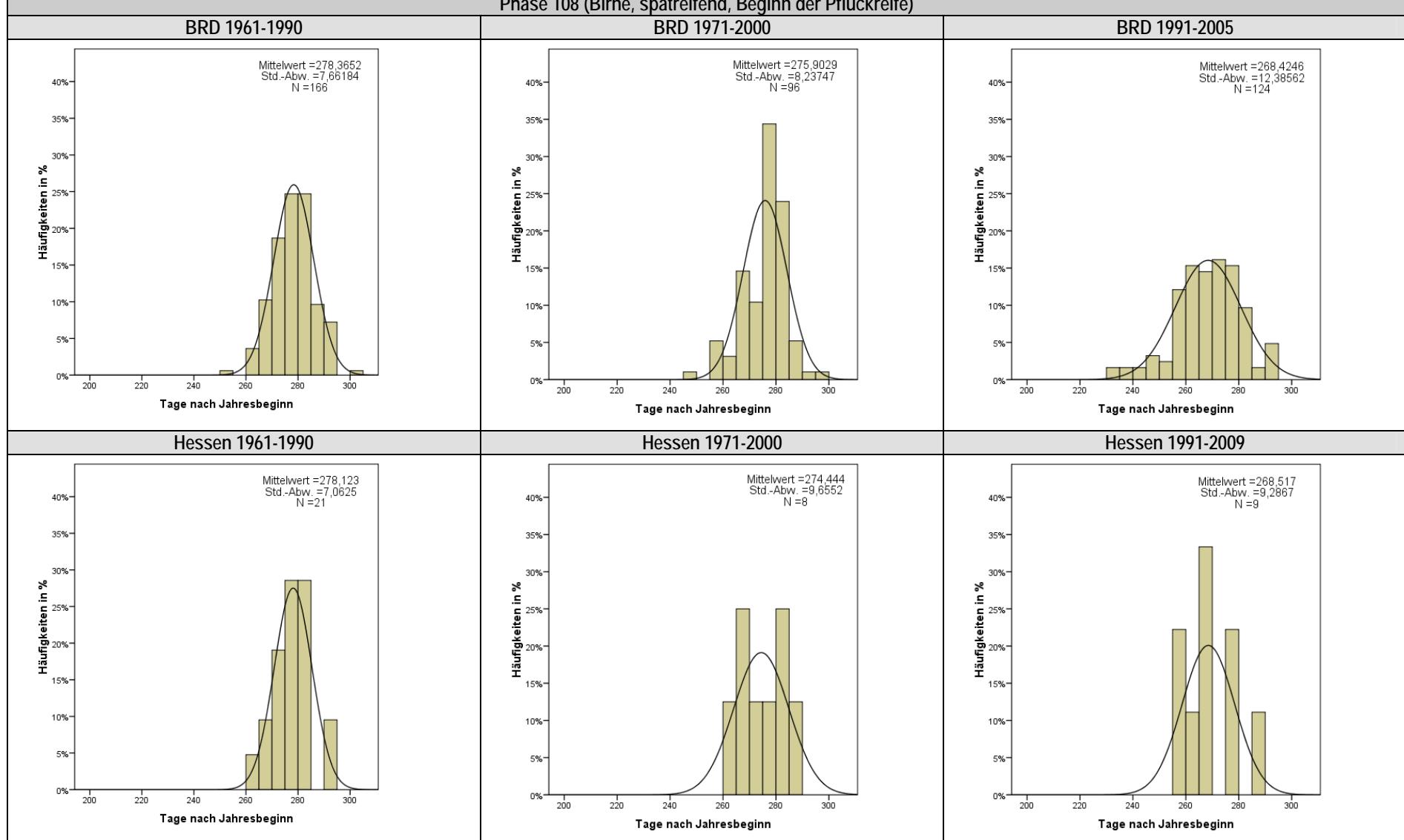
Phase 104 (Sauerkirsche, Beginn der Pflückreife)



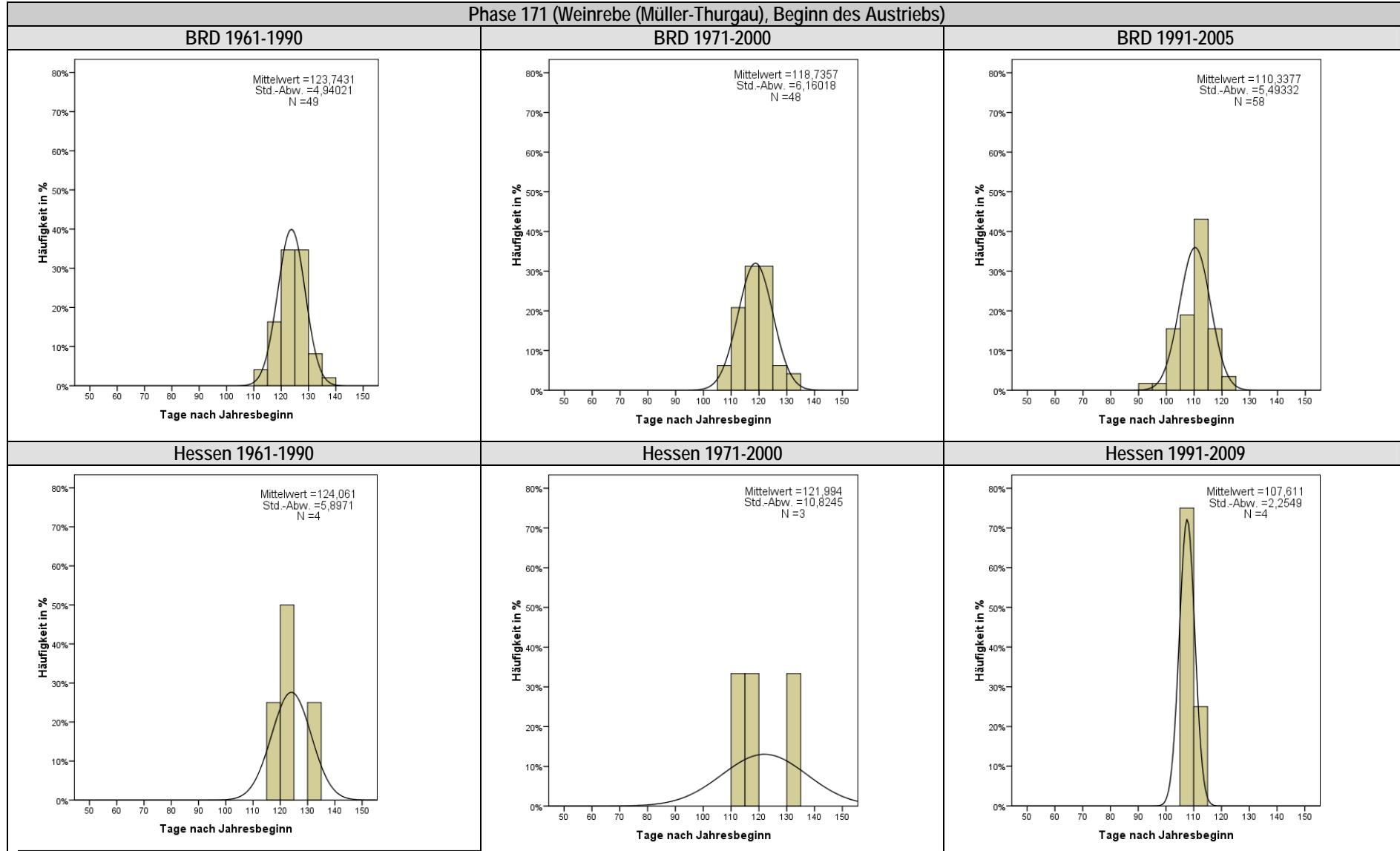
Phase 107 (Birne, frühreifend, Beginn der Pflückkreife)



Phase 108 (Birne, spätreifend, Beginn der Pflückkreife)

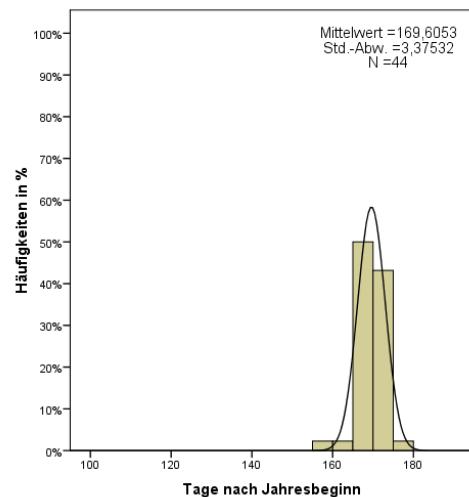


Phase 171 (Weinrebe (Müller-Thurgau), Beginn des Austriebs)

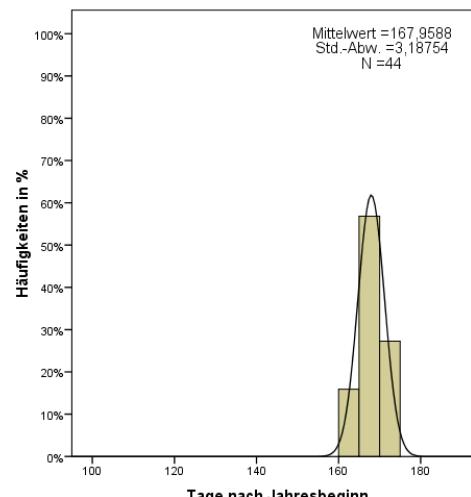


Phase 172 (Weinrebe (Müller-Thurgau), Beginn der Blüte)

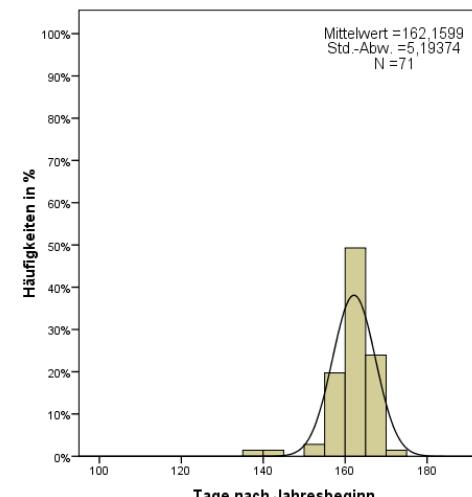
BRD 1961-1990



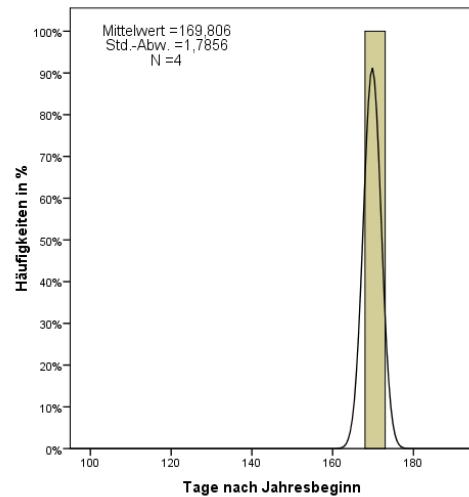
BRD 1971-2000



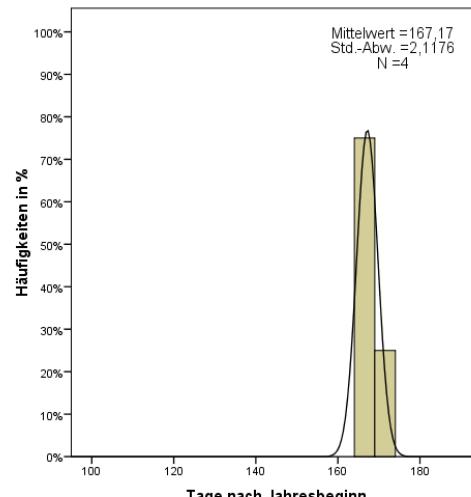
BRD 1991-2005



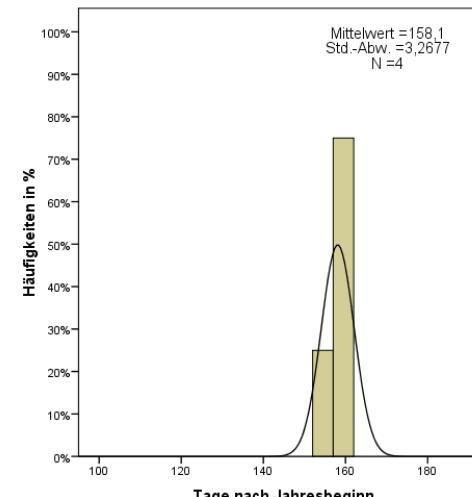
Hessen 1961-1990

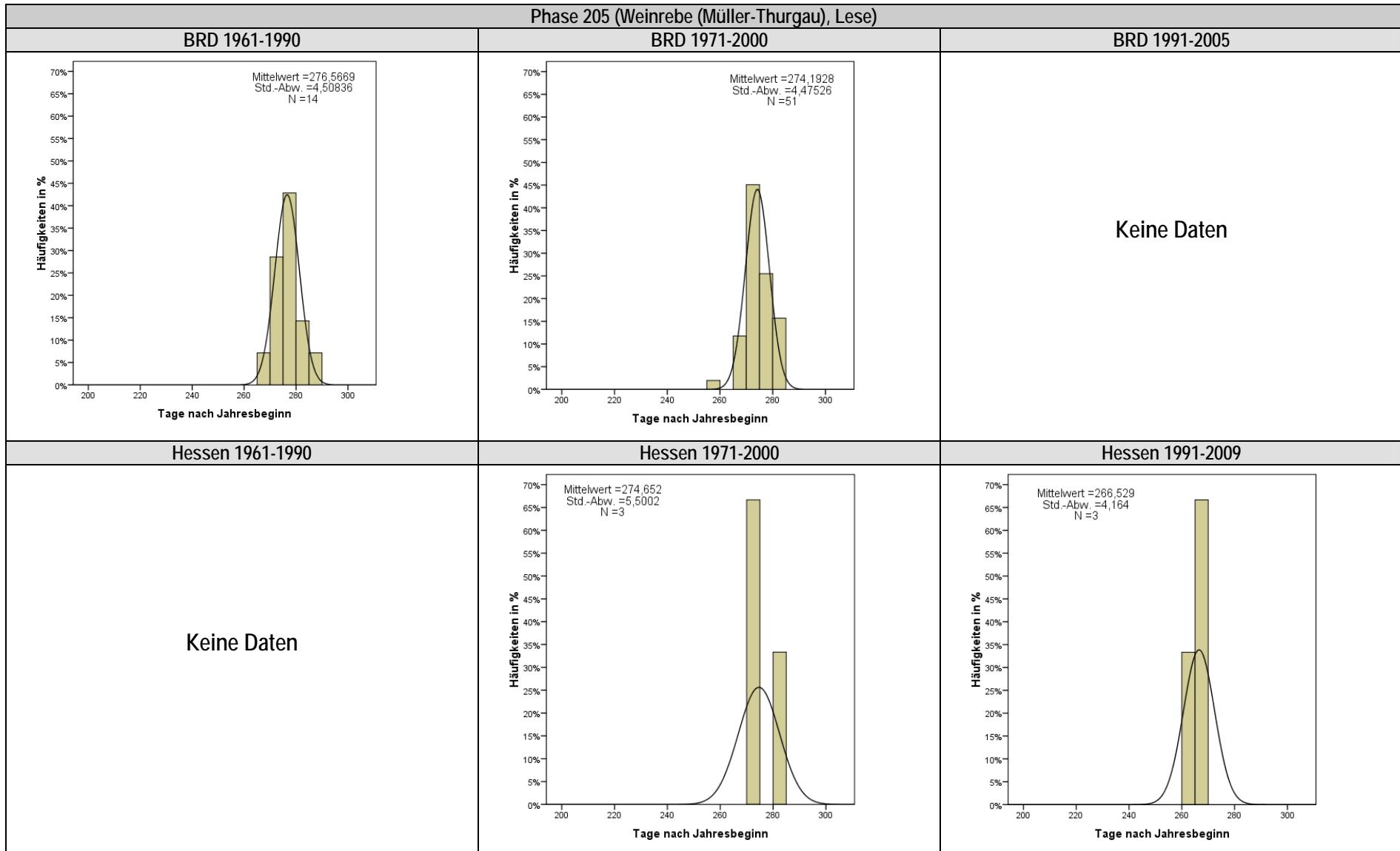


Hessen 1971-2000



Hessen 1991-2009





Anhang 3

Deskriptive Statistik II:
Kennwerte der 35 ausgewählten Phänophasen langjährig gemittelt
über verschiedene Zeiträume für Deutschland und Hessen

Datensatz Deutschland

Phasen ID	Anzahl												Minimum			Maximum		
	51-05 gesamt	51-05 (100%)	61-05 gesamt	61-05 (100%)	61-05 (90%)	61-90 (100%)	61-90 (90%)	71-00 (100%)	71-00 (90%)	91-05 (100%)	91-05 (90%)	61-90 (90%)	71-00 (90%)	91-05 (90%)	61-90 (90%)	71-00 (90%)	91-05 (90%)	
Wildwachsende Pflanzen												Wildwachsende Pflanzen						
1	5741	66	4796	75	317	233	656	333	734	642	999	26,2	21,3	6,2	95,7	96,1	102,6	
2	6316	112	5870	151	498	493	1030	582	1245	793	1116	28,8	29,0	17,5	97,4	90,2	102,4	
6	5043	46	4710	90	336	287	682	397	826	613	1053	73,3	63,8	55,2	120,5	121,8	117,6	
52	5932	40	5426	41	193	133	440	326	857	575	842	77,9	71,6	61,9	123,7	126,5	122,3	
7	6187	87	5716	91	393	316	814	422	1095	681	1008	91,2	90,2	76,3	136,2	136,3	136,0	
115	5817	56	5349	68	297	248	606	365	872	655	938	64,1	68,9	59,1	121,0	119,6	119,7	
62	6146	60	5654	48	240	247	788	183	649	327	511	108,7	104,8	98,1	142,6	140,5	139,0	
13	5863	66	5380	68	274	246	603	318	759	621	909	108,1	101,6	98,5	147,1	156,4	144,9	
15	6296	119	5844	124	454	416	919	462	1080	755	1083	113,3	107,7	100,7	165,4	162,0	152,0	
19	5750	67	5242	81	273	249	568	285	613	515	819	126,7	123,5	117,3	174,8	167,3	176,4	
18	6249	90	5777	111	392	346	799	382	822	665	1055	137,4	130,0	117,8	174,1	176,7	181,8	
123	5103	19	4669	12	111	48	256	88	405	341	605	138,6	127,7	125,5	168,6	173,1	171,7	
20	5786	62	5266	57	270	250	616	301	743	488	784	133,1	130,1	121,0	178,1	180,8	180,1	
64	5918	54	5387	32	220	138	501	169	627	521	843	158,1	154,7	140,3	214,9	209,7	201,9	
100	6045	53	5526	36	236	152	513	227	625	531	851	168,8	163,3	157,5	219,7	211,8	215,5	
109	5634	23	5156	13	91	61	284	82	329	241	437	193,3	193,4	189,7	244,8	241,1	248,8	
65	5393	41	4801	38	180	184	471	204	525	352	521	202,5	199,1	188,1	247,6	250,8	248,1	
67	6179	70	5674	61	330	238	692	367	971	660	992	213,2	210,4	198,6	278,3	272,1	275,7	
177	5084	36	4364	30	163	101	337	178	525	482	817	205,1	194,7	188,9	293,3	302,5	297,0	
72	5678	20	5142	12	107	66	289	112	405	313	549	233,7	243,0	228,9	292,6	293,0	288,8	
68	6105	53	5587	64	305	240	678	258	831	573	873	243,5	245,3	206,7	287,0	285,2	286,1	
73	5858	61	5335	40	247	177	549	226	694	541	827	260,3	263,1	259,5	313,9	310,9	313,6	
226	.	.	.	.	.	.	717	.	717	.	723	278,9	279,4	271,8	340,4	340,8	341,1
94	5294	30	4774	19	159	75	340	120	446	308	573	276,4	271,1	261,3	321,1	324,3	320,9	
Obst												Obst						
54	5996	52	5527	40	221	270	733	191	619	262	454	96,3	92,0	84,6	140,5	133,9	129,1	
56	5968	33	5471	34	187	115	394	165	493	513	766	106,0	103,1	92,1	141,5	141,8	139,8	
60	6011	53	5526	37	230	238	654	219	663	318	547	100,3	95,8	83,8	144,0	137,7	132,1	
102	5339	5	4874	1	21	32	182	18	107	35	85	150,2	153,5	150,8	197,5	198,9	196,3	
103	5340	6	4870	0	29	21	178	17	98	65	148	168,0	171,1	161,9	213,4	214,3	199,9	
104	5798	24	5282	22	114	81	336	97	382	304	554	177,4	176,3	168,4	237,1	227,2	223,0	
107	5261	7	4759	0	11	36	153	5	79	43	97	210,9	215,0	215,5	258,0	262,4	273,3	
108	5413	6	4948	1	15	37	166	11	96	56	124	254,3	249,0	230,3	303,3	297,4	294,5	
Weinreben												Weinreben						
171	1018	5	945	8	19	20	49	19	48	45	58	113,3	106,9	94,4	135,6	133,8	121,6	
172	891	3	811	7	19	14	44	20	44	50	69	157,6	160,7	154,2	175,7	174,6	171,0	
205	673	0	645	0	5	5	14	16	51	0	0	269,8	259,5	.	287,7	281,9	.	

Datensatz Deutschland

Phasen ID	Mittelwert									Median									Standardabweichung		
	61-05 gesamt (90%)	61-05 (100%)	61-90 (90%)	61-90 (100%)	71-00 (90%)	71-00 (100%)	91-05 (90%)	91-05 (90%)	61-05 gesamt (90%)	61-05 (100%)	61-90 (90%)	61-90 (100%)	71-00 (90%)	71-00 (100%)	91-05 (90%)	91-05 (90%)	61-90 (90%)	71-00 (90%)	91-05 (90%)		
Wildwachsende Pflanzen															Wildwachsende Pflanzen						
1	58,0	58,0	61,9	61,3	55,5	55,9	47,7	48,7	57,5	58,4	62,7	61,5	55,7	55,7	47,1	47,9	11,9	11,8	13,0		
2	58,9	58,1	60,7	60,6	57,0	57,2	51,1	51,3	58,8	57,9	61,0	60,7	56,9	57,4	51,5	51,7	9,6	9,1	9,7		
6	92,9	92,1	94,5	94,9	90,7	91,4	84,4	85,5	92,8	92,4	94,5	95,0	91,4	91,9	84,3	85,4	8,1	9,1	9,0		
52	97,0	94,8	96,2	97,0	93,7	94,5	88,9	89,0	96,5	94,4	95,8	96,6	93,7	93,9	88,9	89,0	7,2	7,9	8,3		
7	112,6	111,7	112,9	113,3	110,9	111,7	106,9	107,2	112,6	111,6	113,1	113,1	111,0	111,6	106,9	107,3	7,0	7,4	8,0		
115	96,2	94,1	95,9	96,1	93,4	94,3	89,0	89,3	96,0	93,8	96,1	96,0	93,9	94,4	89,5	89,6	7,3	7,3	8,0		
62	126,1	124,5	127,0	127,0	124,4	124,8	118,0	118,4	126,3	125,1	127,3	127,0	125,3	125,0	118,6	118,9	6,2	6,3	6,8		
13	126,6	126,3	128,1	128,2	126,2	126,2	121,7	121,7	126,8	126,4	128,1	128,3	126,8	126,8	122,4	122,1	6,6	6,9	6,9		
15	132,6	132,1	133,9	134,1	132,6	133,1	127,3	127,2	132,8	132,3	134,3	134,3	132,9	133,4	127,5	127,3	7,1	7,1	6,7		
19	145,6	143,4	145,2	145,3	142,7	143,0	137,9	138,9	145,0	142,5	144,3	144,3	141,4	142,1	136,7	137,5	7,5	7,5	8,3		
18	156,3	154,8	157,1	157,3	154,6	154,6	148,7	149,0	156,5	155,1	157,7	157,8	155,1	155,0	149,2	149,2	7,0	7,2	7,7		
123	154,7	151,8	153,5	154,8	151,6	153,1	148,0	148,3	155,0	152,4	152,9	155,4	152,4	153,6	148,4	148,4	6,0	6,6	6,9		
20	155,1	154,6	155,6	156,1	154,5	154,9	151,0	151,5	155,3	154,7	155,9	156,5	154,8	154,6	151,4	151,7	7,0	7,3	8,0		
64	177,1	176,8	178,0	179,6	176,5	176,9	171,5	171,3	176,7	177,2	177,8	179,6	177,2	177,0	171,5	171,3	8,5	8,3	8,3		
100	188,8	186,5	188,9	188,6	186,8	186,6	182,2	182,3	188,2	186,3	187,9	188,1	186,4	186,4	182,0	181,6	7,8	8,2	8,4		
109	220,8	215,3	217,4	217,8	213,9	217,2	211,1	212,5	219,8	214,4	216,9	217,8	214,7	216,6	210,7	212,0	8,4	8,6	9,0		
65	223,1	222,8	223,6	223,6	223,3	223,3	220,6	220,7	223,5	222,7	223,4	223,4	223,4	223,3	221,3	221,3	7,4	7,0	9,1		
67	245,3	243,7	246,9	247,0	244,3	244,8	238,0	238,4	245,6	243,8	247,8	247,4	245,0	245,1	238,0	238,2	10,3	9,5	10,0		
177	246,2	249,7	251,7	251,3	249,2	247,5	241,5	242,8	247,8	251,0	254,5	252,3	250,2	249,1	244,3	244,9	13,6	14,0	14,3		
72	268,1	266,7	268,3	269,0	267,5	267,7	263,0	263,5	268,5	266,9	270,4	269,9	268,8	268,1	263,9	264,2	9,1	7,9	8,5		
68	264,3	264,6	264,9	265,3	264,5	264,6	262,4	262,3	264,7	264,6	264,9	265,7	264,5	264,6	262,4	262,5	6,4	5,9	6,8		
73	287,9	288,2	289,2	288,3	288,3	288,9	289,8	289,8	288,3	288,6	289,4	288,6	288,8	289,2	290,5	290,5	7,2	6,9	8,4		
226	.	.	.	307,6	.	307,8	.	308,0	.	.	308,3	.	308,6	.	309,0	8,9	8,9	9,2			
94	301,8	298,9	299,5	300,8	299,4	299,7	295,8	295,5	302,0	299,8	300,9	301,4	300,1	300,1	297,3	296,7	7,8	8,5	9,7		
Obst															Obst						
54	115,0	113,0	114,7	115,0	112,3	113,3	108,3	109,1	115,2	113,3	115,3	115,3	113,3	113,6	109,3	109,8	6,3	6,4	6,7		
56	120,5	118,6	120,2	120,7	118,1	118,6	115,0	115,4	120,7	118,6	120,1	120,8	118,5	118,7	115,9	115,7	6,3	6,6	6,3		
60	120,0	117,8	119,6	120,4	117,2	117,7	112,2	112,8	120,3	118,5	120,3	120,9	118,1	118,3	113,3	113,4	6,9	7,1	7,5		
102	177,9	170,6	169,9	174,0	172,2	173,4	170,6	171,1	177,0	172,1	168,0	173,7	171,4	172,1	166,1	171,6	8,6	8,5	9,6		
103	191,0	188,1	192,9	191,6	188,2	189,9	182,3	182,1	190,7	188,1	190,4	191,2	187,2	189,5	181,0	182,4	7,0	7,4	7,15		
104	201,4	199,4	202,8	202,1	199,4	199,3	193,9	193,9	201,2	199,2	202,5	201,8	199,1	198,8	194,2	194,0	8,3	8,2	7,8		
107	242,0	239,6	239,1	239,0	236,9	240,1	246,5	245,3	241,6	241,6	241,8	239,7	240,6	241,4	247,1	245,9	8,8	10,7	13,4		
108	275,4	273,2	280,1	278,4	270,3	276,0	267,5	268,5	275,9	274,7	280,3	278,3	269,6	277,4	269,8	269,4	7,7	8,2	12,5		
Weinreben															Weinreben						
171	124,6	118,0	123,8	123,7	117,4	118,3	110,0	110,5	124,0	117,0	123,9	124,0	117,2	118,5	110,6	110,9	4,9	6,2	5,6		
172	166,7	166,9	168,6	169,6	166,7	167,8	162,7	162,9	168,5	166,8	168,4	169,7	166,6	167,2	163,0	163,2	3,4	3,2	3,8		
205	276,1	271,6	276,8	276,6	272,9	274,1	.	.	276,5	271,2	275,1	275,8	272,8	273,6	.	.	4,5	4,5	.		

Datensatz Hessen

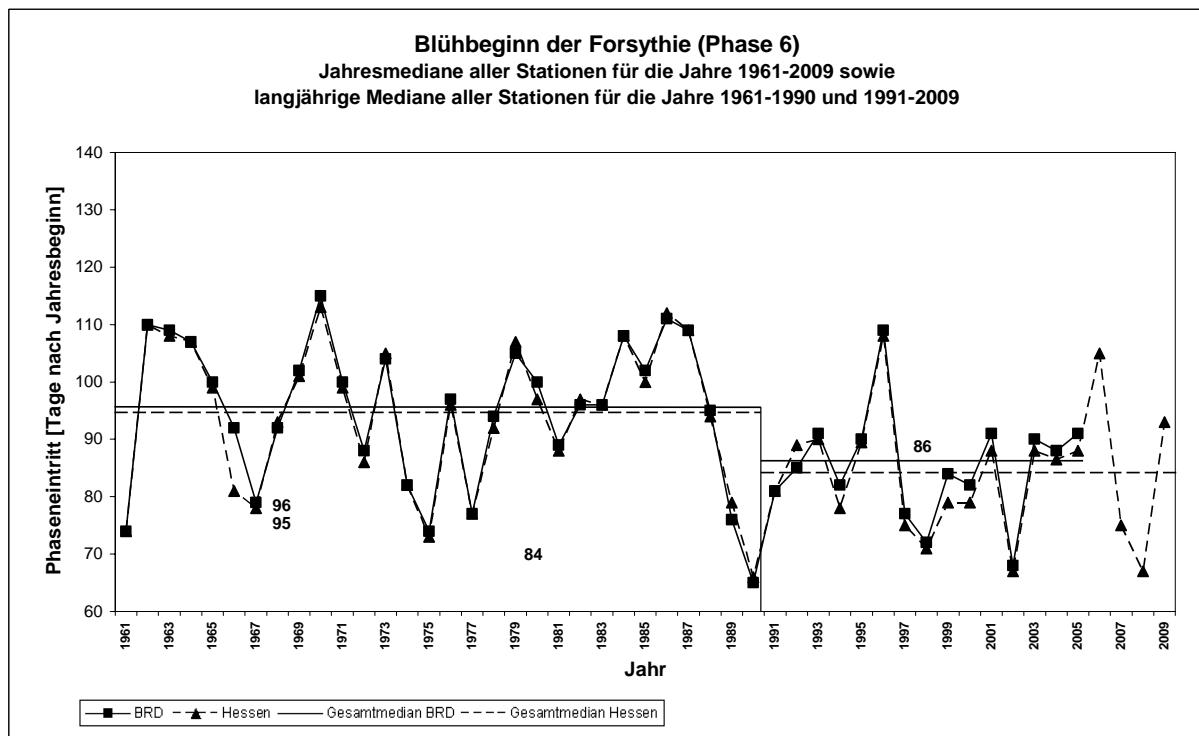
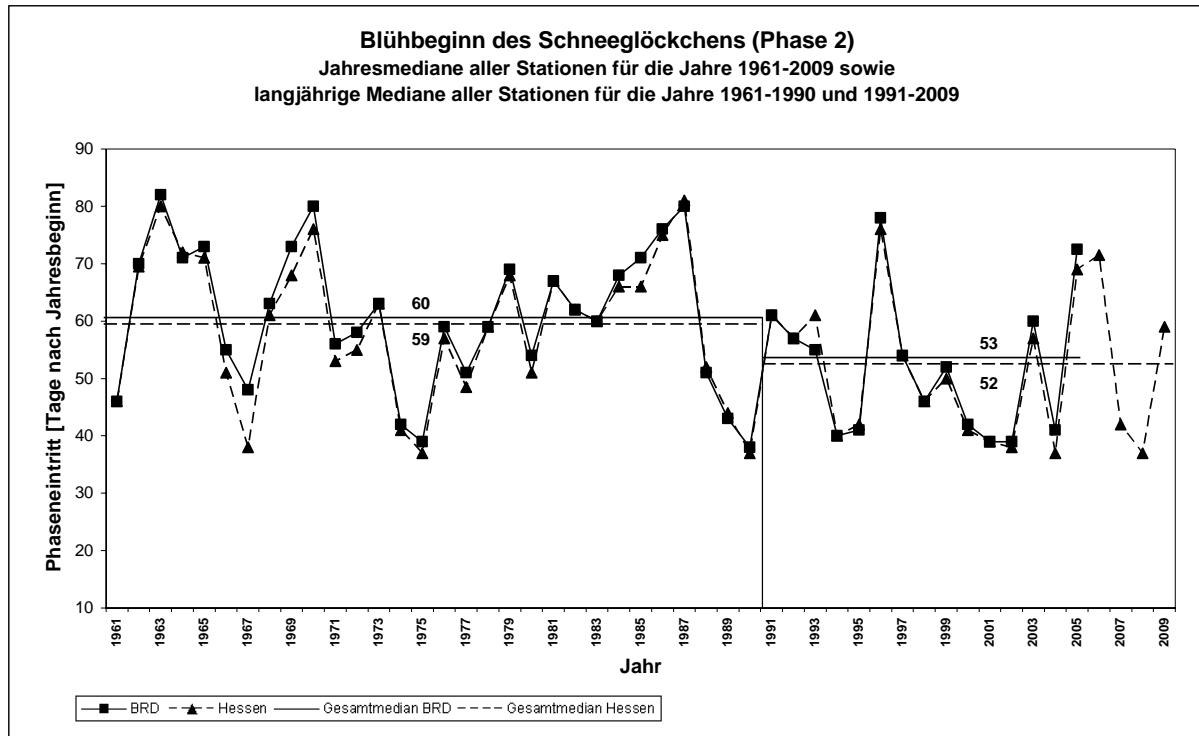
Phasen ID	Anzahl												Minimum			Maximum		
	51-09 gesamt	51-09 (100%)	61-09 gesamt	61-09 (100%)	61-09 (90%)	61-90 (100%)	61-90 (90%)	71-00 (100%)	71-00 (90%)	91-09 (100%)	91-09 (90%)	61-90 (90%)	71-00 (90%)	91-09 (90%)	61-90 (90%)	71-00 (90%)	91-09 (90%)	
Wildwachsende Pflanzen												Wildwachsende Pflanzen						
1	537	3	456	6	40	33	87	41	88	43	84	32,5	32,9	24,3	89,8	84,2	75,8	
2	540	7	462	13	58	58	116	57	105	44	88	39,4	38,8	28,1	89,6	84,3	77,9	
6	513	0	452	9	42	36	93	50	100	44	86	82,3	76,7	67,1	113,5	106,4	100,1	
52	510	1	430	3	29	15	55	32	83	33	68	84,5	77,2	73,2	115,3	109,8	104,7	
7	525	1	446	7	48	25	84	37	89	38	79	97,7	95,8	90,7	128,0	123,3	119,9	
115	428	1	409	2	11	13	27	36	76	39	77	83,8	81,8	66,5	100,7	108,4	101,7	
62	525	2	445	4	30	29	98	20	55	19	42	114,7	112,9	102,3	139,5	138,3	130,1	
13	520	3	441	8	40	31	81	38	75	38	72	112,3	108,7	102,5	141,0	137,2	131,6	
15	540	8	460	12	52	46	106	49	101	49	87	115,4	116,1	111,3	146,3	144,4	137,7	
19	522	2	444	7	40	36	79	36	81	37	68	131,0	128,3	118,6	162,6	160,1	157,5	
18	541	3	462	7	55	36	113	43	106	42	85	142,4	138,1	125,5	172,6	167,4	166,7	
123	380	0	359	0	6	1	13	8	36	17	47	144,5	137,7	115,0	157,5	165,3	157,1	
20	515	0	434	4	33	30	69	32	78	33	70	140,9	132,0	129,6	169,3	173,6	160,7	
64	503	2	413	3	24	15	50	13	45	24	59	163,0	160,3	154,7	201,6	196,3	184,9	
100	515	0	438	2	40	21	73	32	79	38	75	174,1	170,5	163,9	203,6	199,7	195,8	
109	475	1	407	1	8	3	29	5	25	12	39	200,4	199,4	193,1	239,2	239,3	227,9	
65	500	1	408	3	23	20	59	21	49	19	46	214,3	212,5	194,9	241,8	239,2	243,4	
67	537	2	452	3	38	25	69	31	86	33	76	223,2	223,3	213,1	277,8	265,0	258,0	
177	425	0	404	1	6	5	17	20	64	30	63	229,2	215,0	206,9	273,1	286,8	288,5	
72	499	0	413	0	8	4	18	6	23	10	36	250,3	247,5	232,6	286,2	279,3	280,7	
68	521	3	441	4	31	22	61	24	63	32	70	253,7	251,5	242,0	278,7	278,2	275,5	
73	511	2	430	3	31	22	64	24	71	32	66	271,7	271,1	268,8	304,9	304,7	302,6	
226	.	.	.	.	.	.	.	66	.	66	.	294,0	294,6	278,2	331,0	331,6	321,6
94	503	0	415	3	25	19	62	23	72	31	53	288,8	287,0	279,6	315,1	316,1	312,1	
Obst												Obst						
54	526	2	455	4	34	38	98	22	60	19	50	102,8	100,0	95,2	128,6	126,1	124,2	
56	517	2	440	3	37	19	66	25	73	39	61	109,0	106,9	103,1	132,8	130,3	126,2	
60	514	2	443	5	27	27	72	22	57	21	46	107,1	104,3	99,4	139,0	134,7	128,8	
102	475	0	400	0	1	2	16	0	7	3	7	157,0	156,6	152,3	197,5	189,0	181,9	
103	483	0	418	0	6	3	28	2	15	10	21	179,3	185,2	166,3	207,7	207,2	194,7	
104	497	2	419	3	19	14	47	15	55	21	44	188,4	189,7	178,2	222,8	220,7	209,4	
107	456	0	388	0	4	4	14	0	10	4	11	219,9	216,5	216,2	258,0	255,9	268,9	
108	475	0	401	0	2	4	21	1	8	2	9	263,9	260,2	258,5	293,2	288,5	286,7	
Weinreben												Weinreben						
171	84	1	78	1	2	2	4	2	3	3	4	116,8	112,6	105,1	131,6	133,8	110,3	
172	76	1	66	2	3	2	4	2	4	3	4	168,4	164,9	153,6	172,3	170,0	161,2	
205	54	0	52	0	0	0	0	1	3	0	3	.	270,2	261,8	.	280,8	269,5	

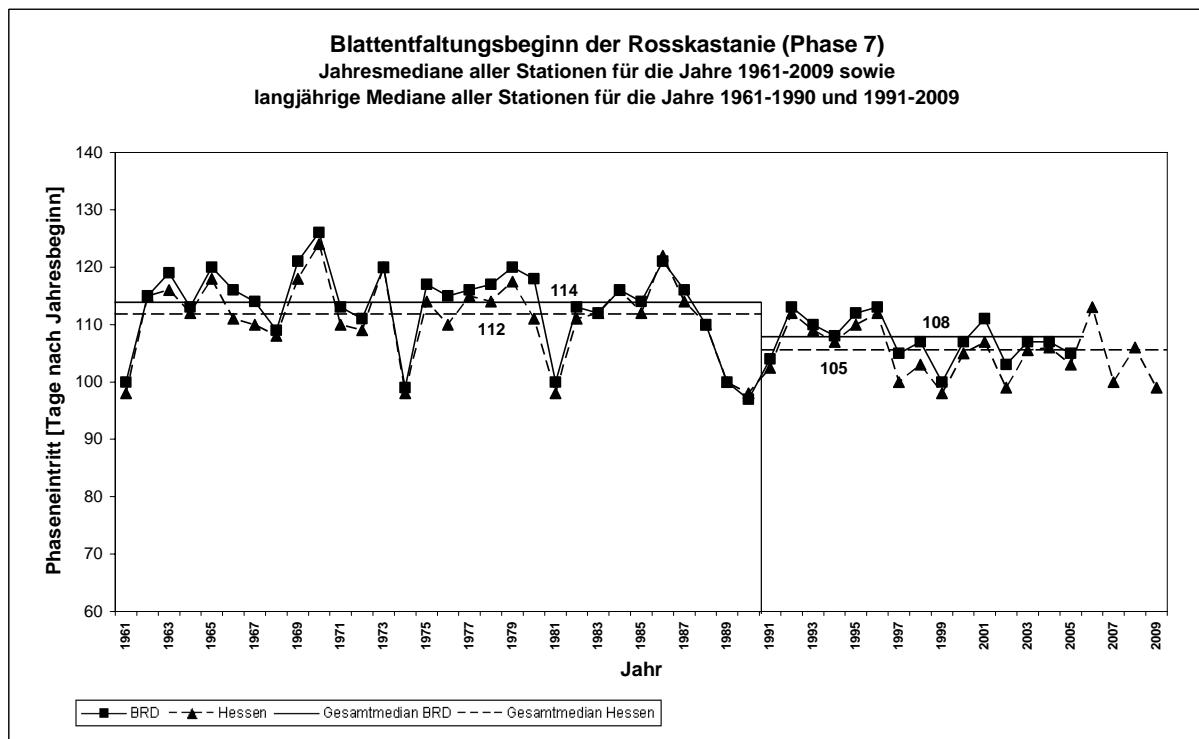
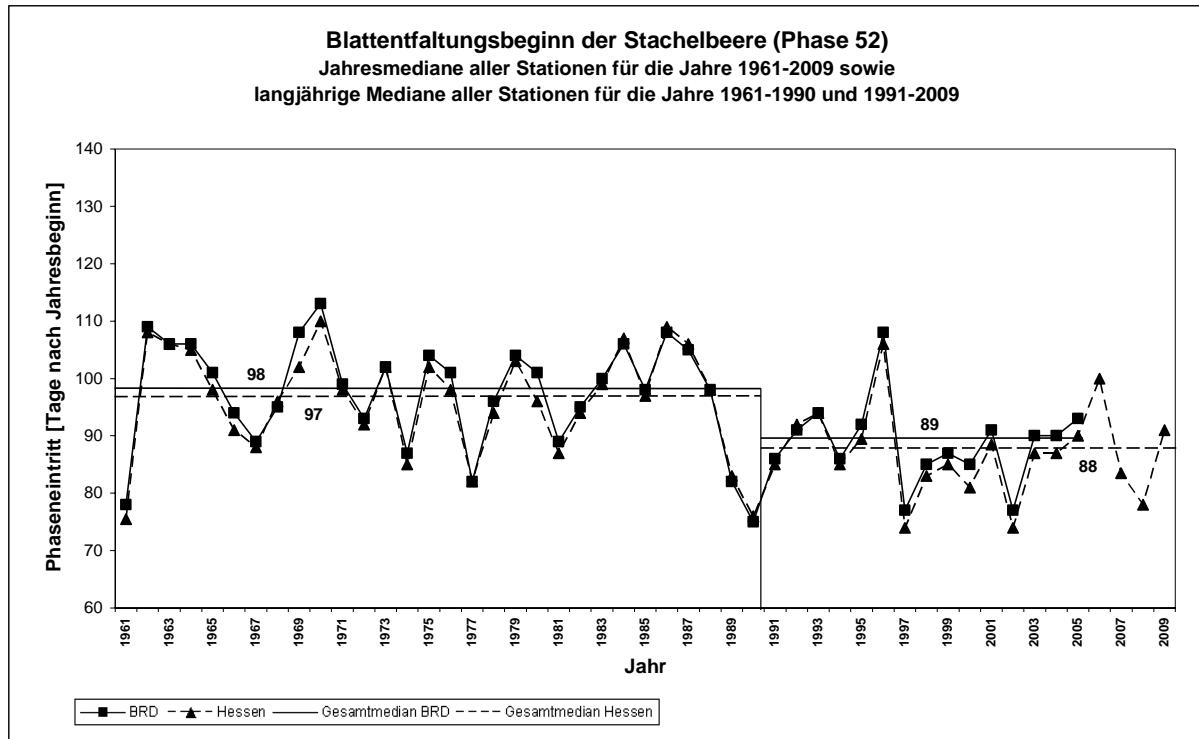
Datensatz Hessen

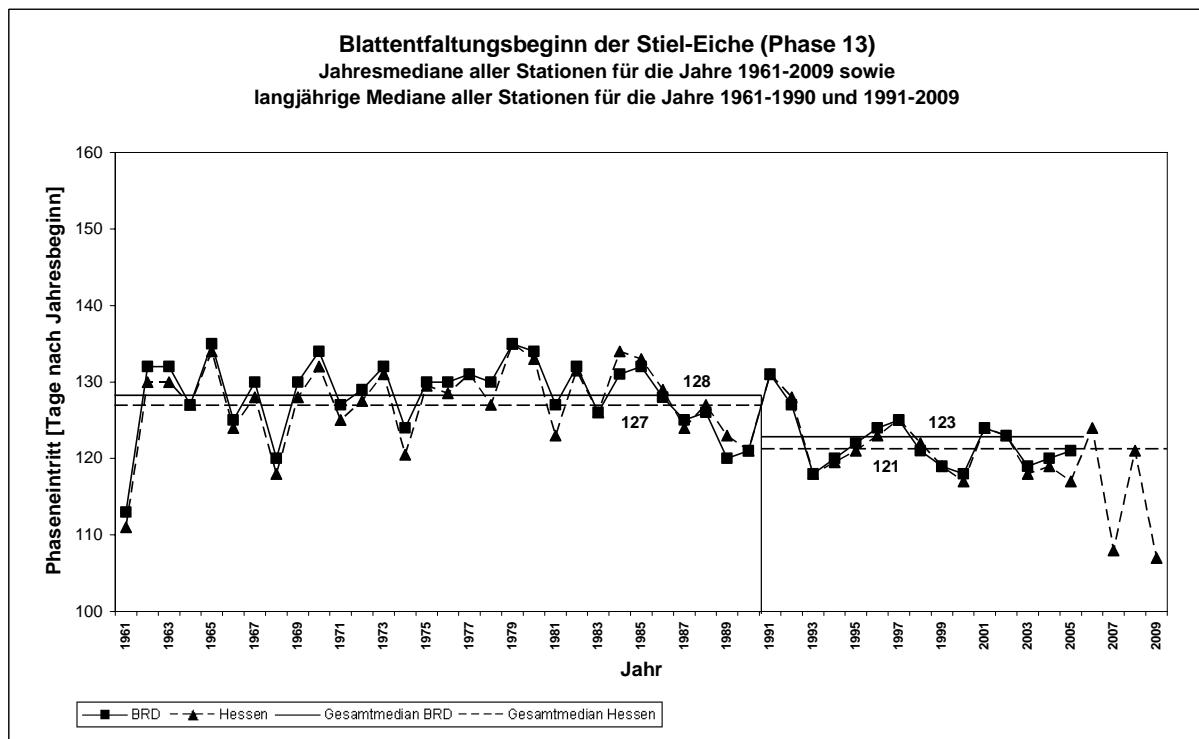
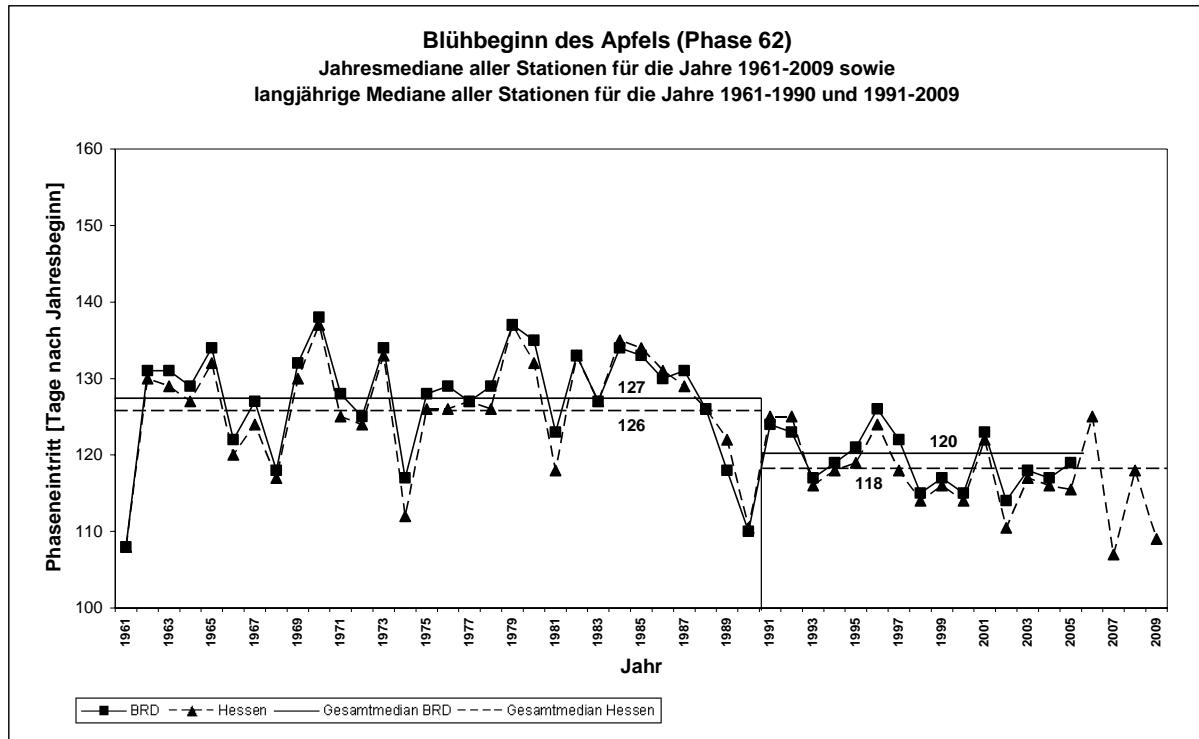
Phasen ID	Mittelwert									Median									Standardabweichung		
	61-09 gesamt	61-09 (90%)	61-90 (100%)	61-90 (90%)	71-00 (100%)	71-00 (90%)	91-09 (100%)	91-09 (90%)	61-09 gesamt	61-09 (90%)	61-90 (100%)	61-90 (90%)	71-00 (100%)	71-00 (90%)	91-09 (100%)	91-09 (90%)	61-90 (90%)	71-00 (90%)	91-09 (90%)		
Wildwachsende Pflanzen									Wildwachsende Pflanzen									Wildwachs. Pflanzen			
1	58,1	55,6	60,0	59,6	54,8	54,2	44,9	46,0	57,5	55,0	58,0	57,9	55,0	53,9	45,1	46,5	10,7	11,0	10,9		
2	57,6	56,9	60,0	60,1	56,9	56,3	48,9	51,1	57,0	56,4	58,0	59,8	55,9	55,9	50,4	52,2	7,6	7,3	8,2		
6	92,8	90,2	94,2	95,0	92,0	91,6	82,1	84,0	92,6	90,0	93,8	94,6	92,4	91,8	81,1	83,8	6,9	7,0	6,6		
52	95,7	93,4	95,0	96,7	94,2	93,6	85,5	87,3	94,9	92,9	93,2	95,5	93,3	93,1	86,7	87,7	7,4	7,1	7,1		
7	110,6	110,2	110,6	112,9	109,9	110,2	102,4	104,9	110,8	110,9	111,8	113,2	110,0	110,5	103,1	105,4	6,7	6,4	6,1		
115	95,8	90,6	93,2	93,3	93,2	93,6	86,9	87,3	95,6	89,5	93,1	93,1	94,1	94,1	88,5	88,8	4,8	5,6	6,8		
62	124,0	123,9	127,2	126,7	125,0	124,5	116,0	116,9	124,3	122,4	128,6	126,8	124,0	124,1	116,1	116,2	6,1	6,5	6,7		
13	124,6	124,6	126,6	127,6	126,1	126,2	117,7	119,6	125,4	125,1	127,9	128,7	126,8	127,0	119,2	120,5	6,4	6,1	6,2		
15	130,7	130,6	133,9	133,8	132,6	132,8	123,3	125,0	131,4	131,2	133,7	134,3	131,7	133,3	123,8	125,0	6,6	6,3	5,5		
19	142,3	140,0	143,2	143,8	141,2	141,2	132,6	134,9	141,8	138,9	142,0	144,0	139,7	140,9	132,2	133,7	6,8	6,5	7,5		
18	154,2	153,5	156,1	157,4	155,3	154,6	145,3	147,1	154,9	153,6	157,4	157,9	155,7	155,3	145,3	147,8	7,0	6,8	6,7		
123	153,9	145,5	157,5	150,1	153,3	152,4	142,6	145,5	154,1	144,2	157,5	149,5	154,0	153,3	145,4	146,7	4,0	6,4	8,2		
20	153,3	152,7	155,1	155,7	153,2	153,9	146,9	148,6	153,1	153,3	155,7	155,9	154,9	154,9	147,3	150,1	5,9	6,5	6,9		
64	176,5	176,0	181,9	179,9	178,3	177,3	168,7	170,5	177,4	176,3	182,3	180,8	178,9	177,9	167,4	170,1	8,9	8,3	6,3		
100	186,0	184,9	187,8	187,7	186,1	185,5	178,7	180,0	186,0	184,8	187,7	187,4	186,6	185,6	177,4	179,2	7,3	7,1	6,8		
109	222,3	214,6	207,0	218,1	210,6	219,5	210,4	212,6	220,9	212,3	209,5	218,4	215,1	216,4	207,6	212,1	9,7	10,5	8,4		
65	223,8	224,2	225,8	225,0	224,2	224,3	225,3	220,6	224,5	224,5	223,8	223,9	224,7	224,4	224,2	221,3	6,3	5,7	9,5		
67	242,0	240,0	246,0	245,9	243,2	243,2	232,9	234,9	241,9	240,4	245,3	246,3	245,0	242,6	233,4	233,9	11,3	9,2	8,8		
177	248,9	251,1	259,3	253,0	253,3	251,0	246,4	244,5	249,6	248,7	254,7	252,2	252,9	250,7	246,8	246,0	10,4	14,6	13,6		
72	267,7	266,5	271,9	270,9	269,4	268,3	260,1	262,0	268,1	268,1	275,5	271,5	270,5	269,8	260,7	262,0	10,1	7,6	9,2		
68	264,4	263,7	264,3	265,1	264,9	264,4	262,1	262,6	264,4	263,6	264,8	265,1	264,0	264,0	262,1	263,1	6,3	6,3	6,6		
73	288,0	289,9	289,2	289,0	289,5	288,5	292,1	290,6	288,1	291,1	289,0	288,7	290,3	288,1	293,3	291,2	7,4	7,5	6,8		
226	.	.	.	309,1	.	309,6	.	308,5	.	.	309,0	.	309,6	.	310,0	6,6	6,6	7,4			
94	300,1	297,1	298,5	300,5	298,1	299,1	294,2	293,7	300,0	296,4	298,5	299,6	297,1	298,7	292,3	292,3	5,9	6,5	7,6		
Obst									Obst									Obst			
54	113,0	113,5	115,1	114,9	114,3	113,6	105,5	108,9	113,6	114,3	116,2	115,8	115,8	113,4	107,3	109,6	5,8	5,3	6,1		
56	118,7	117,5	120,9	120,7	118,0	118,4	114,1	113,5	118,9	118,7	120,5	120,7	117,5	118,3	114,2	113,1	6,0	5,8	5,4		
60	118,3	116,6	119,7	119,3	117,6	117,1	108,5	111,5	118,7	116,4	119,7	119,5	118,1	117,3	109,3	112,0	7,7	7,0	7,0		
102	178,6	155,1	188,1	180,7	.	177,3	161,5	169,4	178,6	155,1	188,1	183,9	.	180,9	153,6	171,1	11,0	12,3	12,1		
103	190,4	191,8	196,1	192,1	194,7	192,9	183,0	183,1	190,2	191,1	196,6	192,0	194,7	193,7	184,6	184,6	7,1	5,2	6,4		
104	200,5	200,4	203,9	203,2	202,2	200,7	193,7	192,8	200,0	199,3	201,2	203,1	199,5	200,5	192,6	192,4	7,0	6,2	7,2		
107	245,0	238,9	237,5	242,1	.	243,4	259,3	247,5	244,8	242,2	238,0	242,6	.	245,8	259,9	248,4	10,0	11,5	18,1		
108	275,9	268,9	282,4	278,1	270,9	274,4	263,0	268,5	276,4	268,9	279,6	278,3	270,9	273,1	263,0	265,8	7,0	9,7	9,3		
Weinreben									Weinreben									Weinreben			
171	124,0	116,0	123,9	124,1	116,1	122,0	107,9	107,6	123,4	116,0	123,9	123,9	116,1	119,6	108,4	107,5	6,0	10,8	2,3		
172	166,3	165,3	169,2	169,9	166,1	167,2	159,6	158,1	168,3	165,6	169,2	169,4	166,1	166,9	159,7	158,8	1,8	2,1	3,3		
205	278,2	.	.	.	272,9	274,7	.	266,5	278,4	.	.	.	272,9	272,9	.	268,4	.	5,5	4,2		

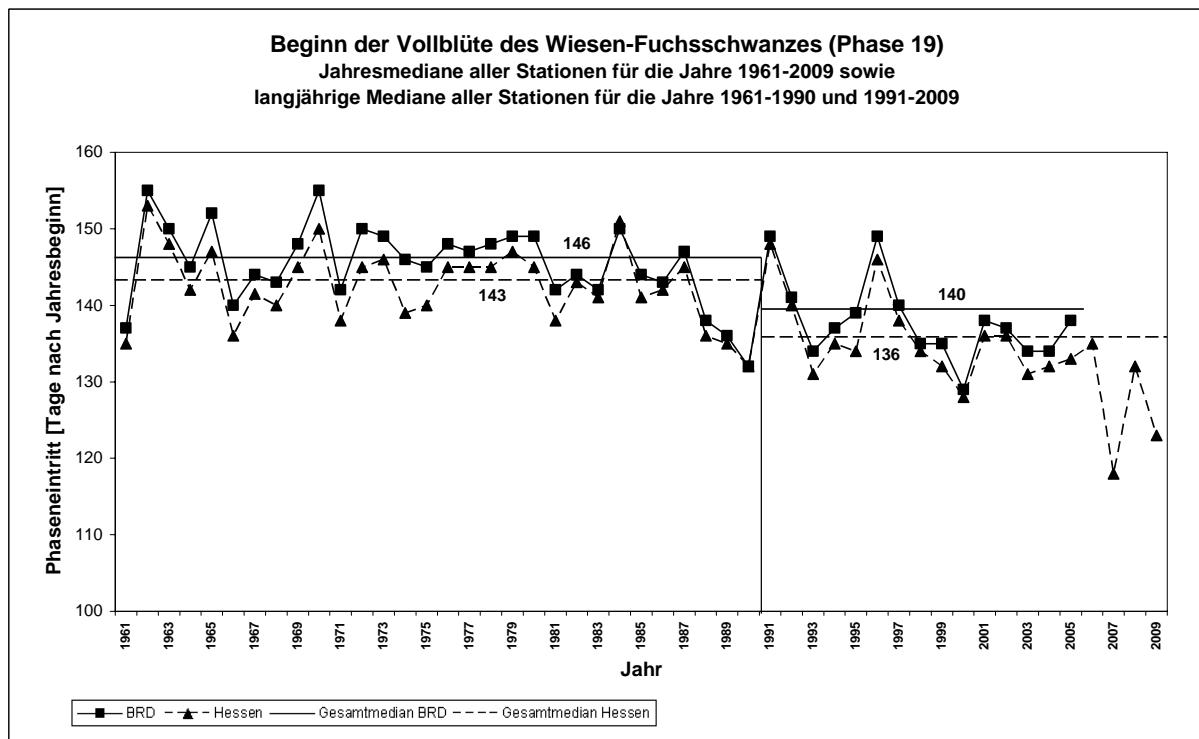
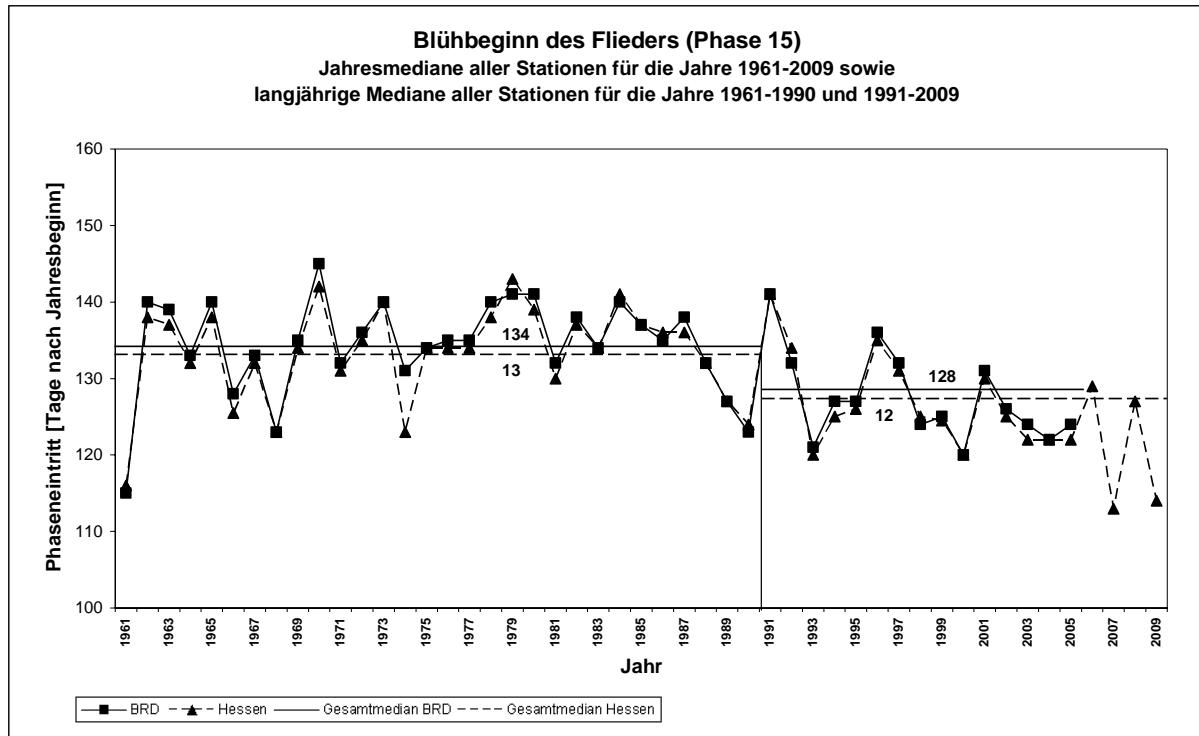
Anhang 4

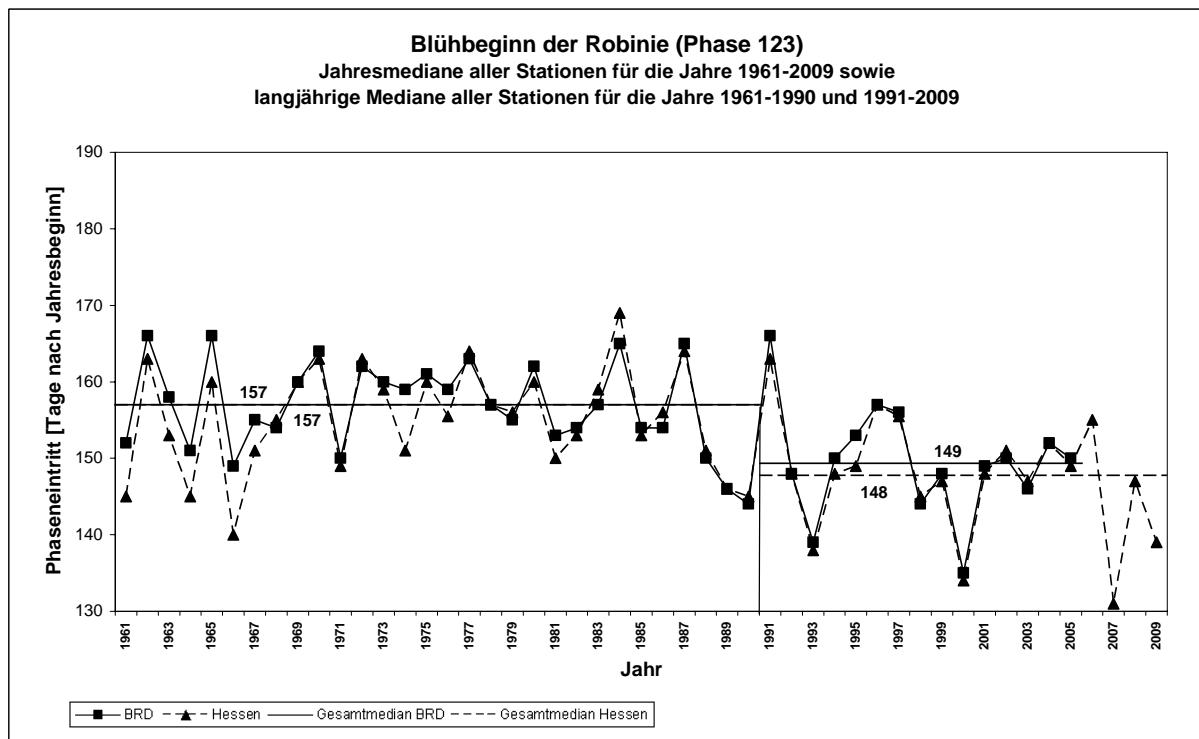
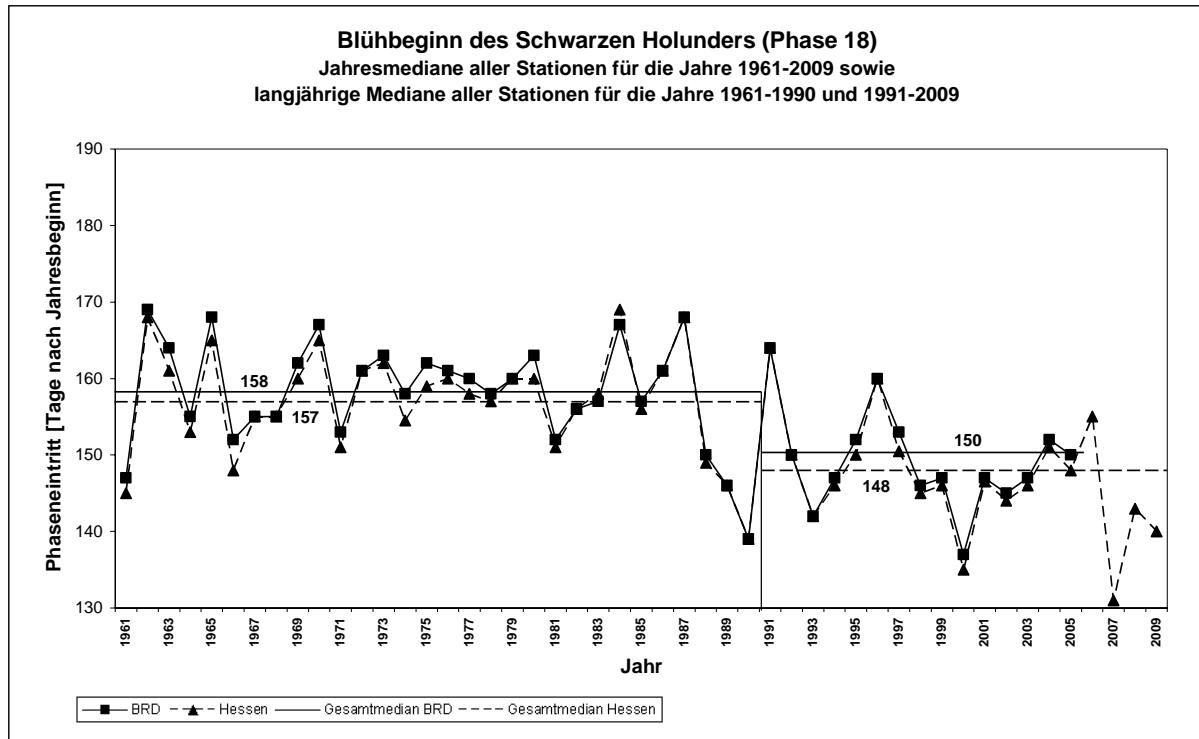
Deskriptive Statistik III:
Verlaufdiagramme zum Phasenbeginn zwischen 1961 und 2005/2009
in Deutschland und Hessen

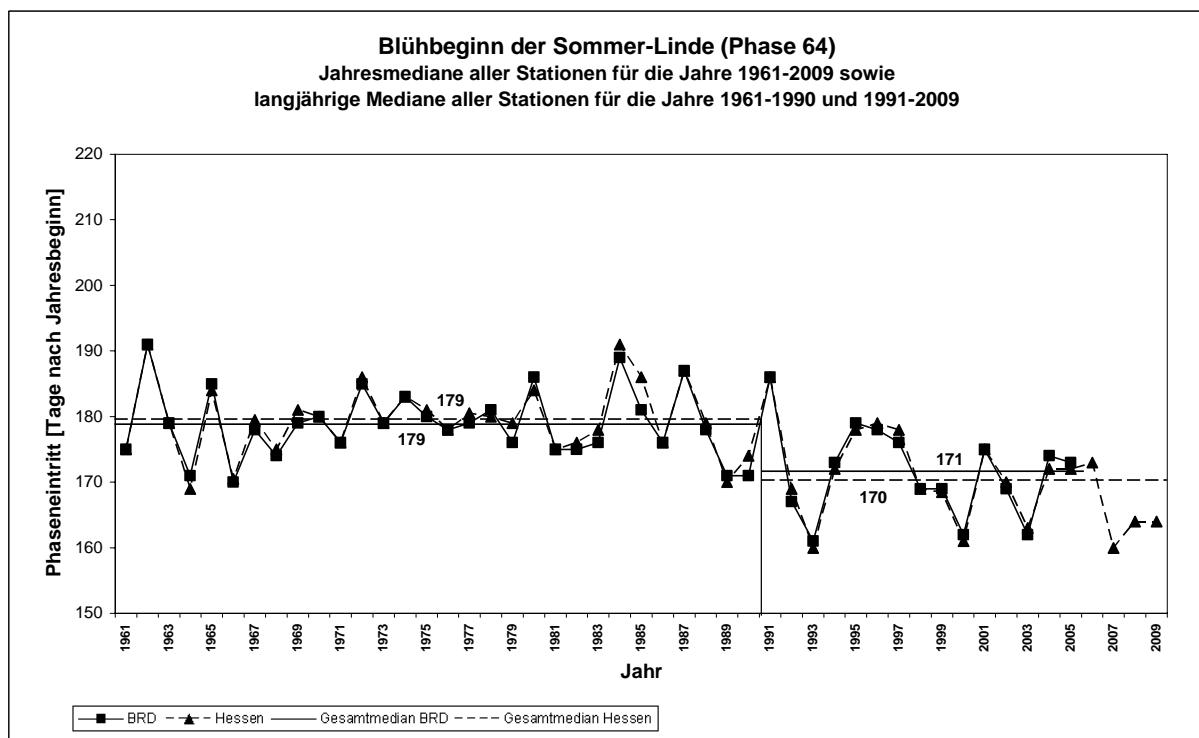
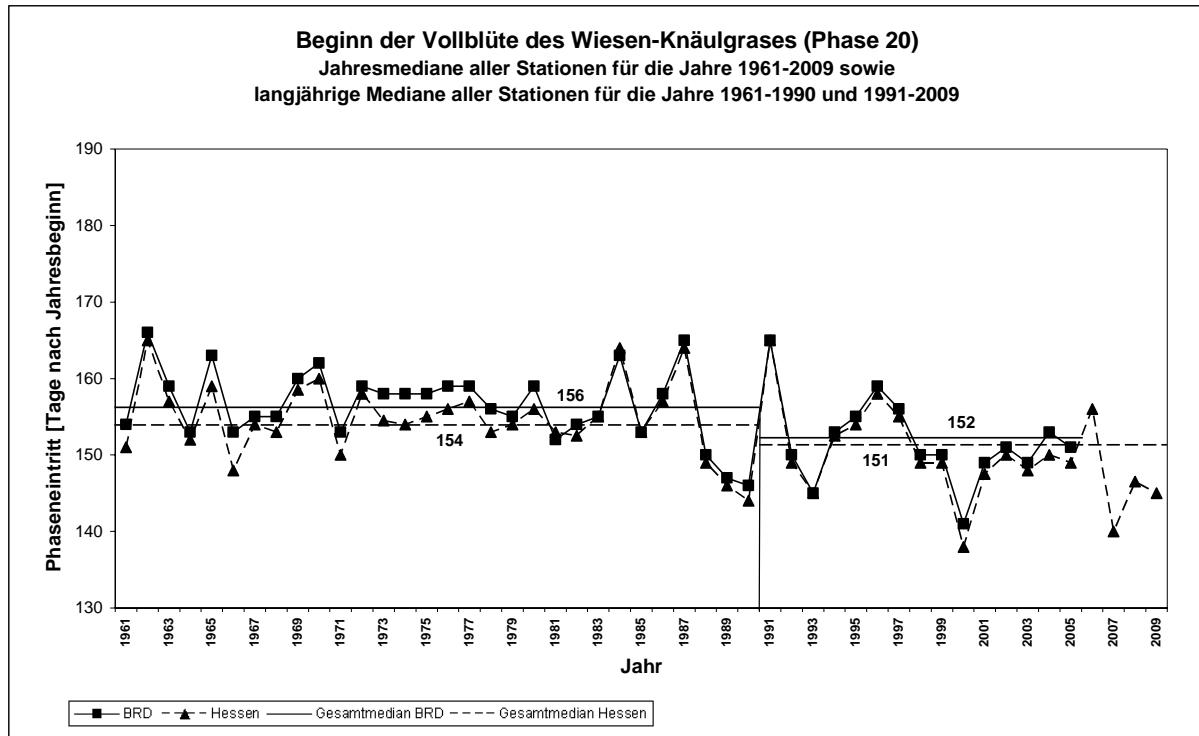


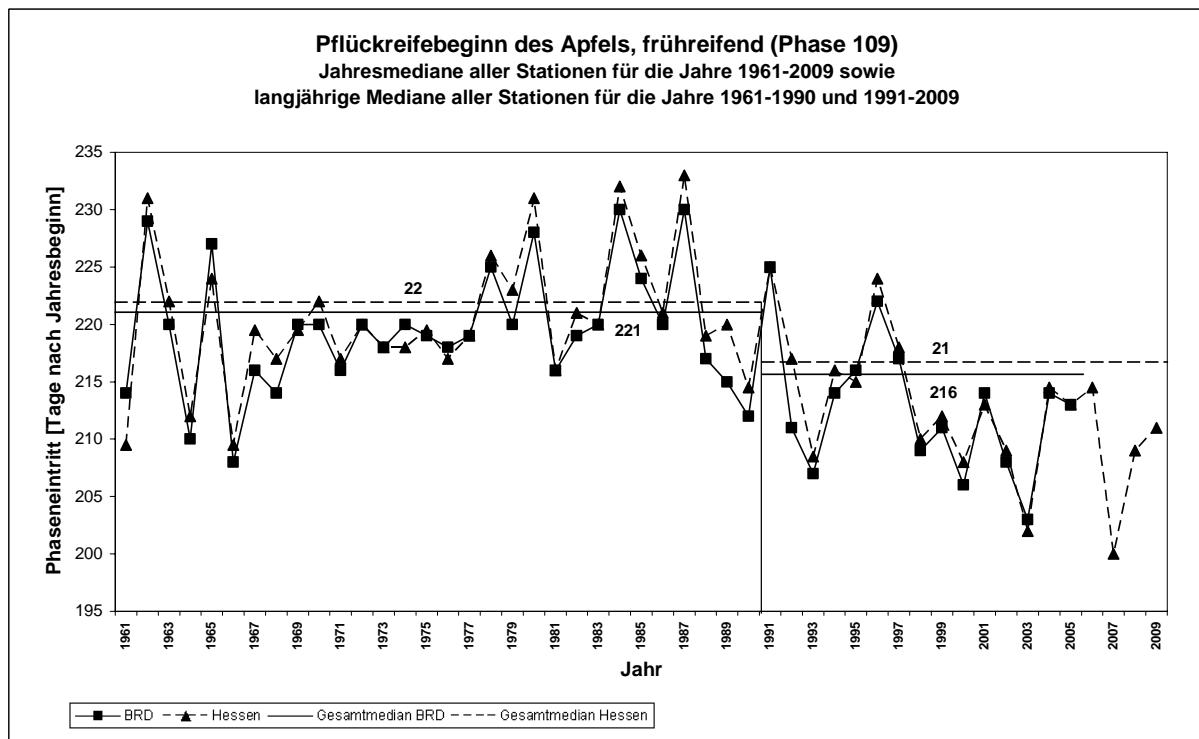
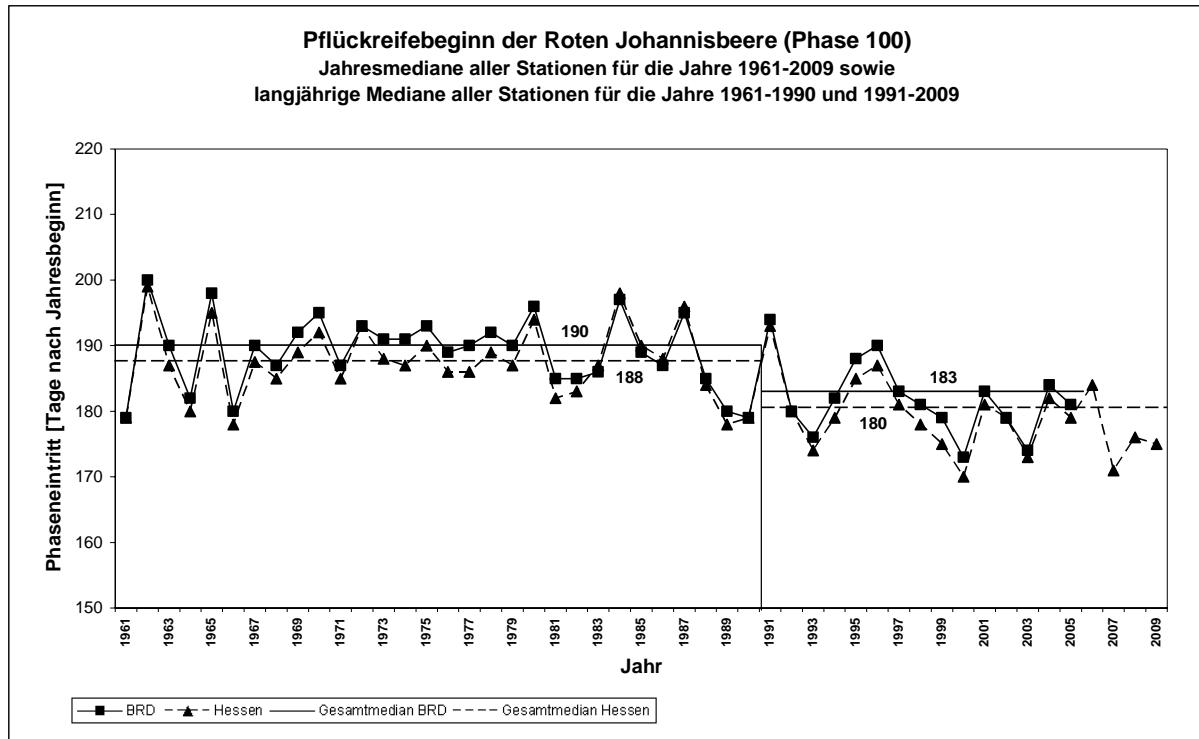


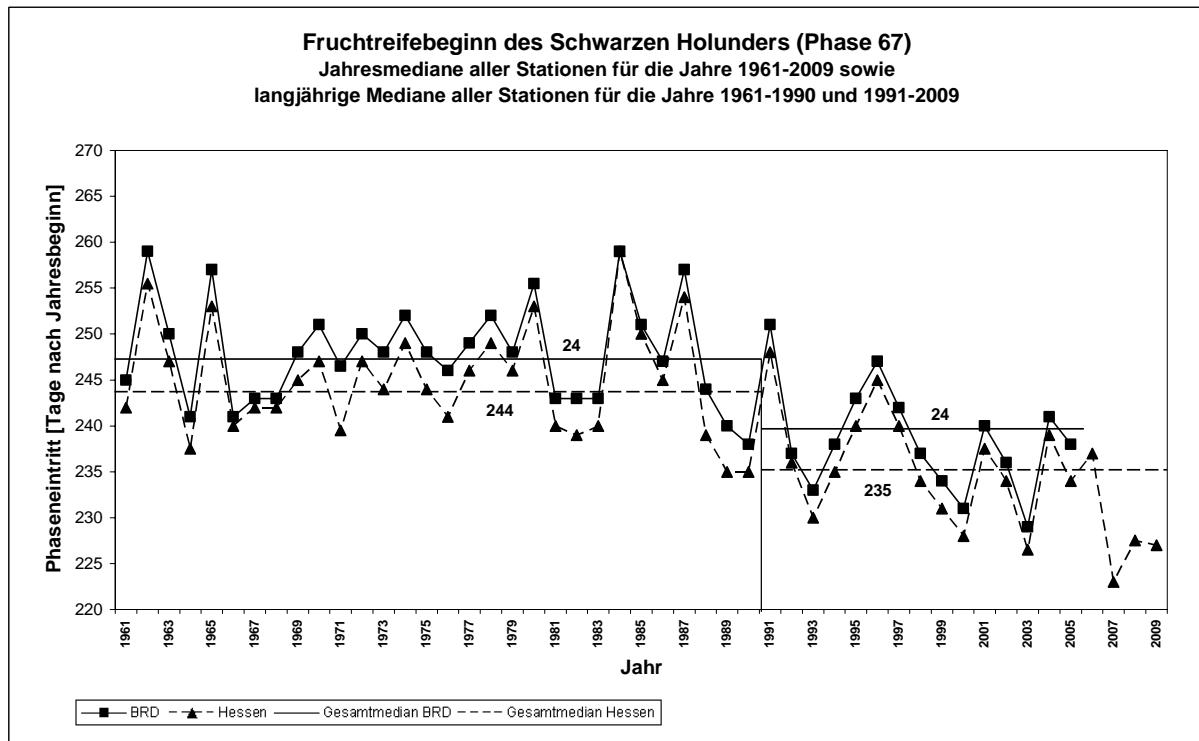
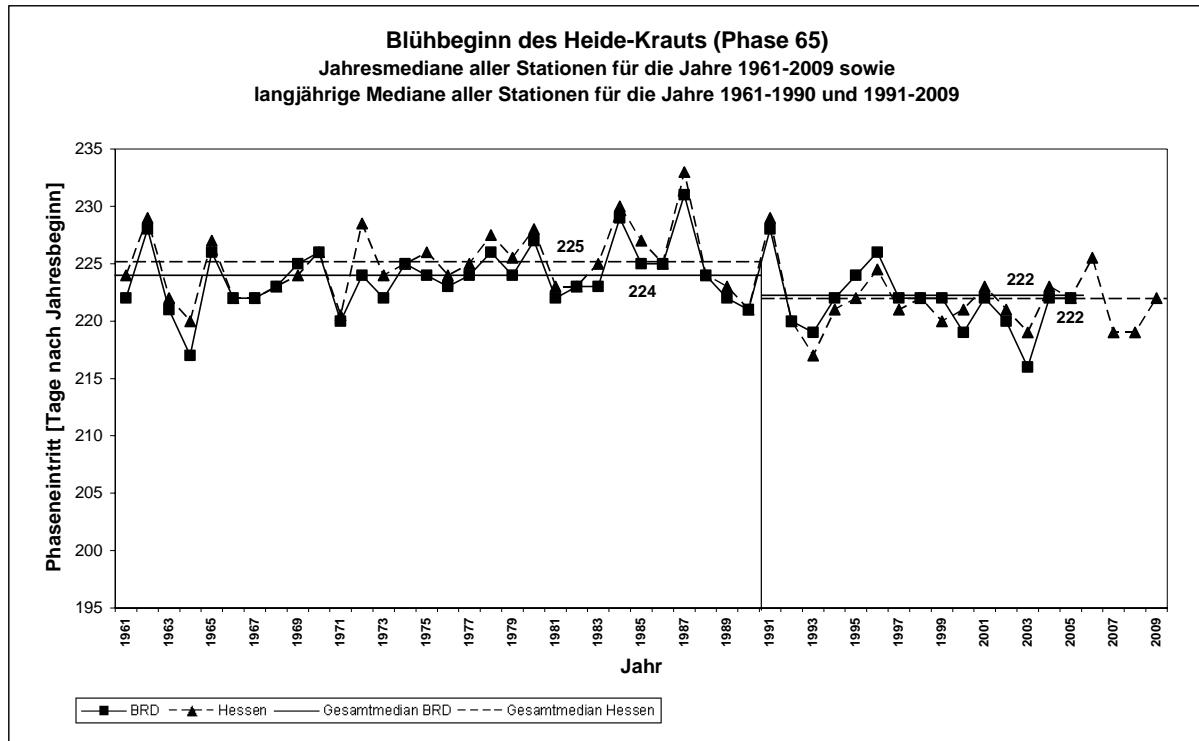


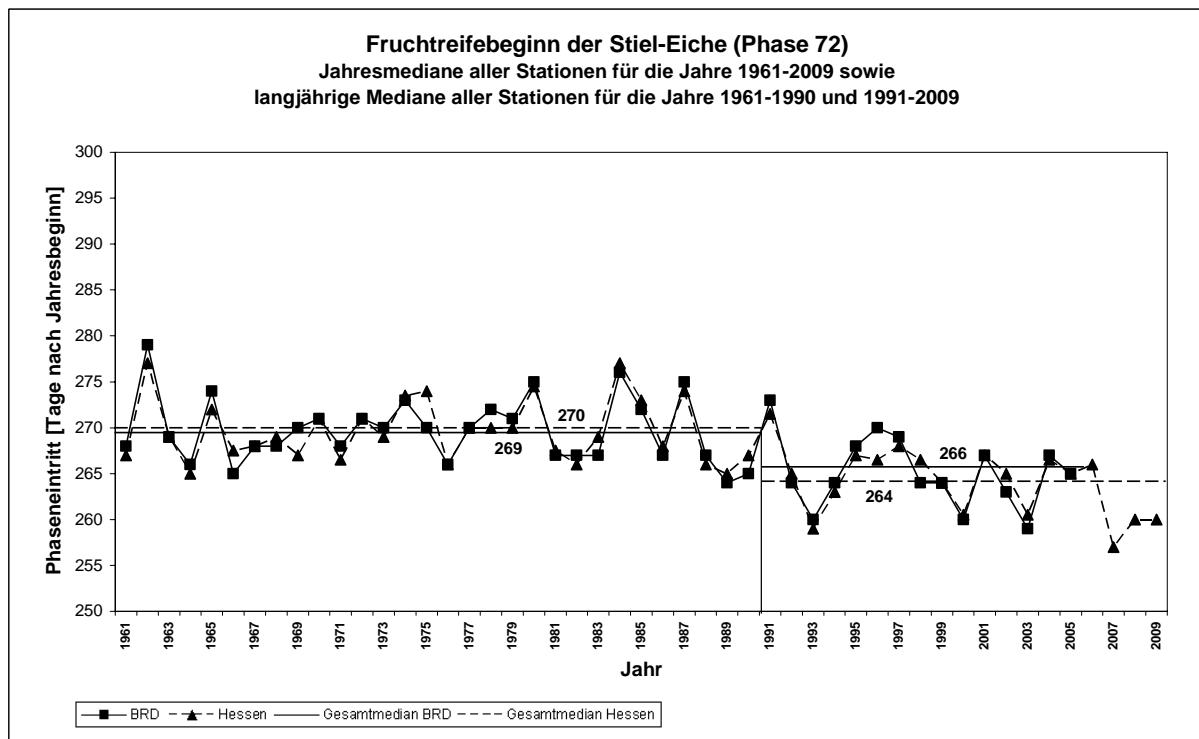
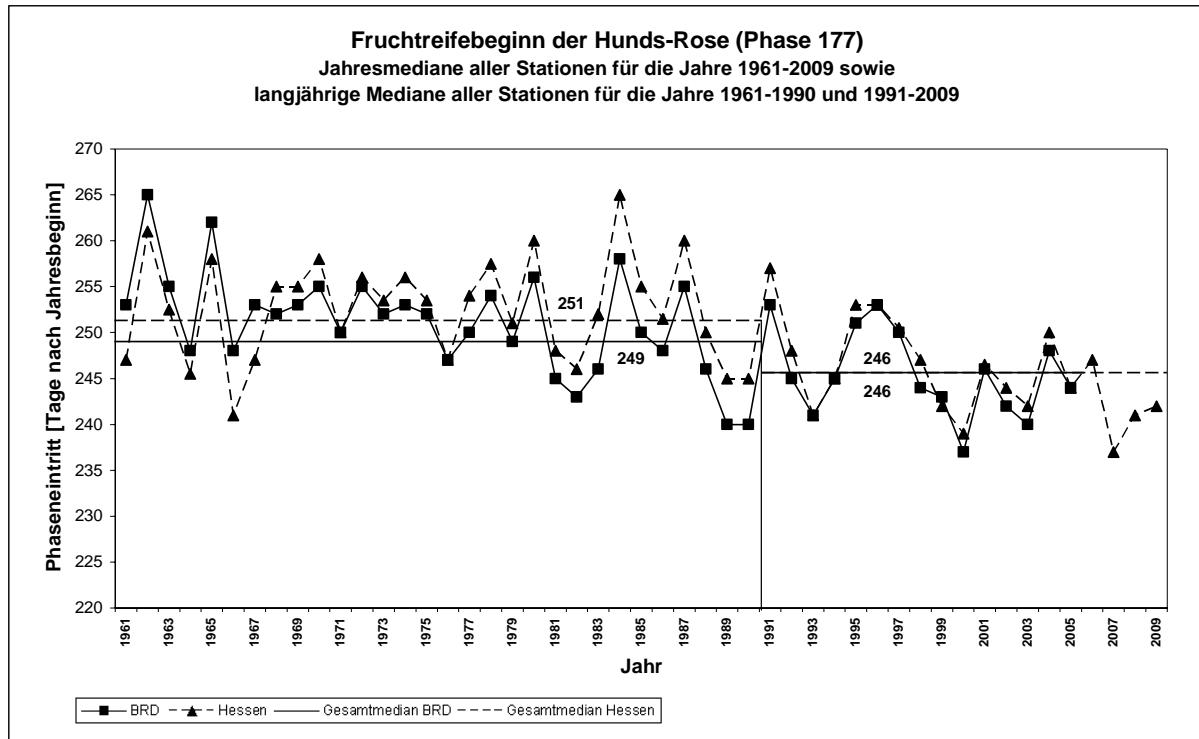


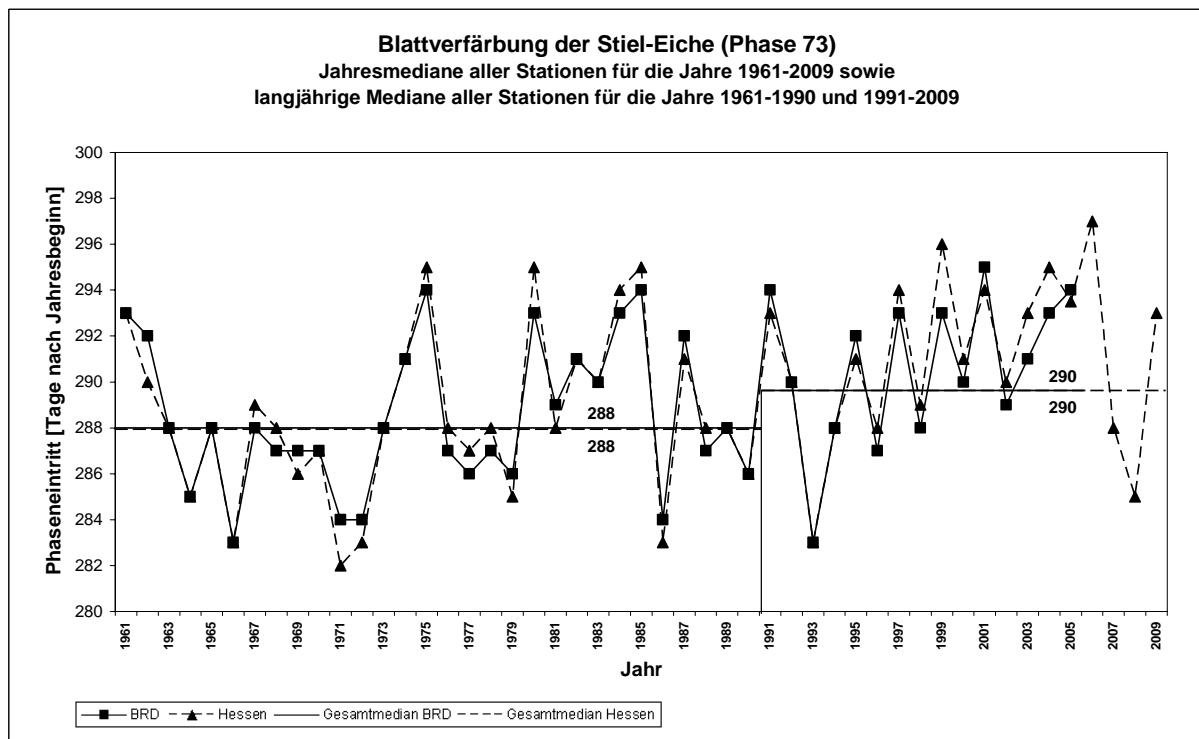
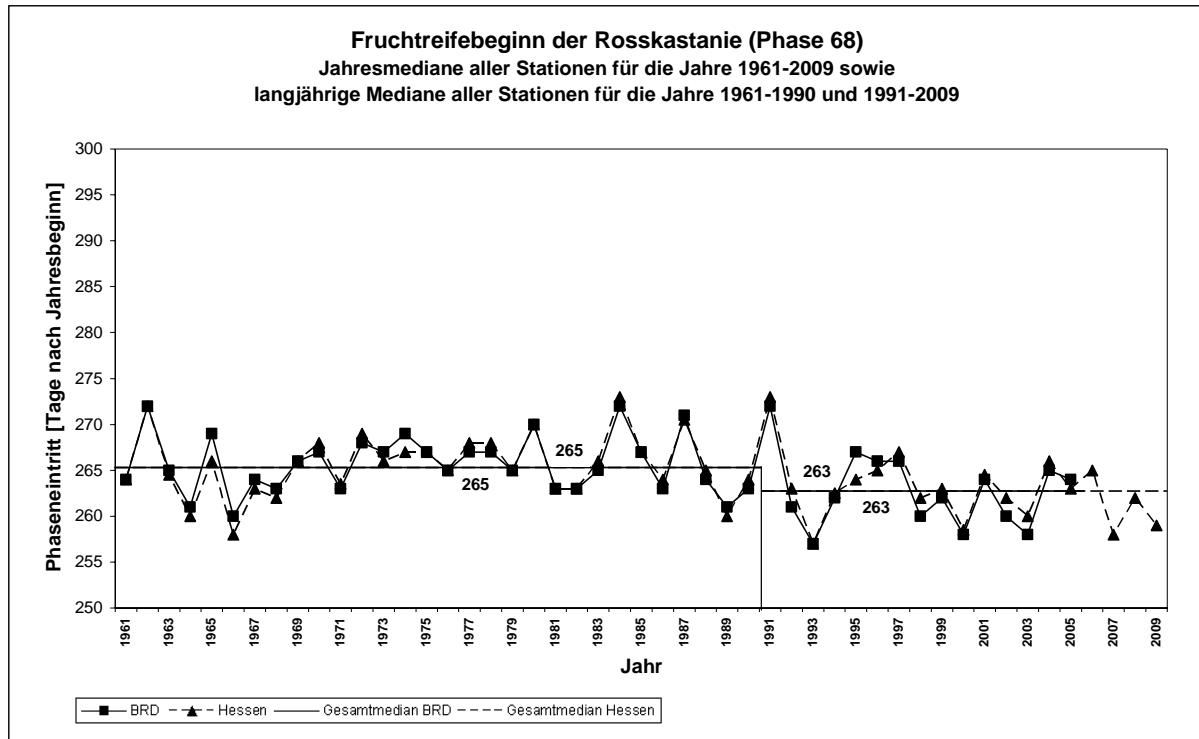


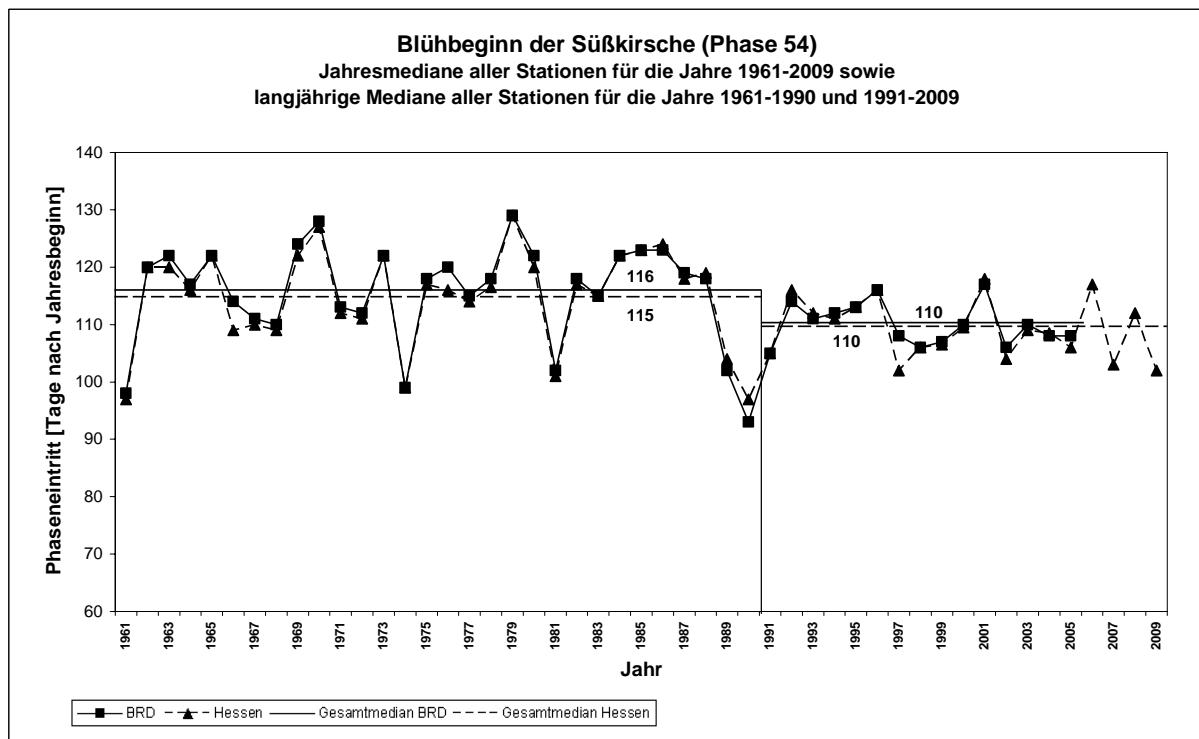
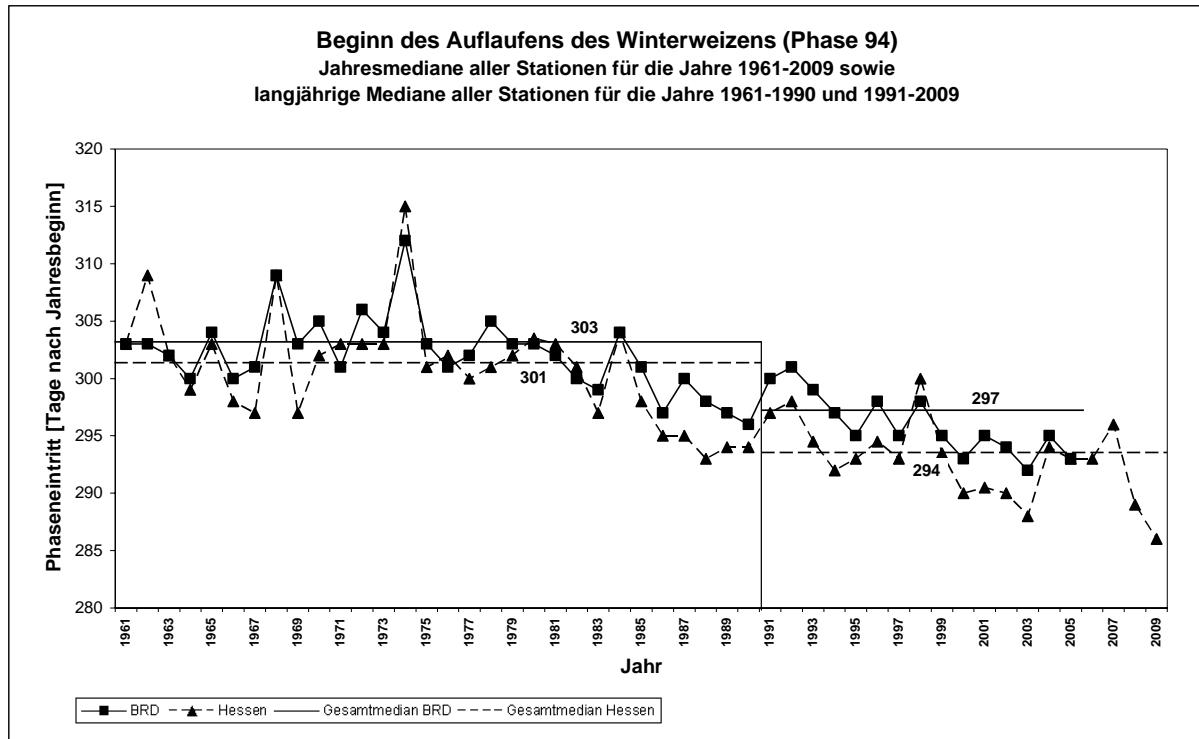


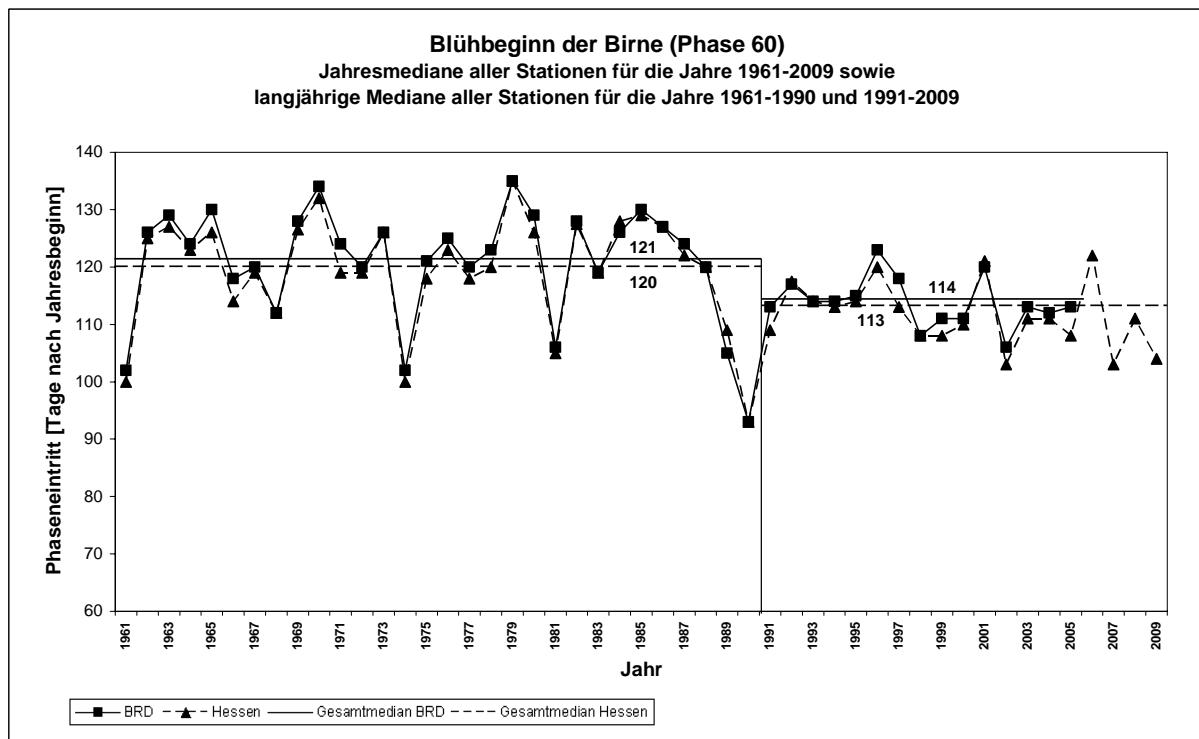
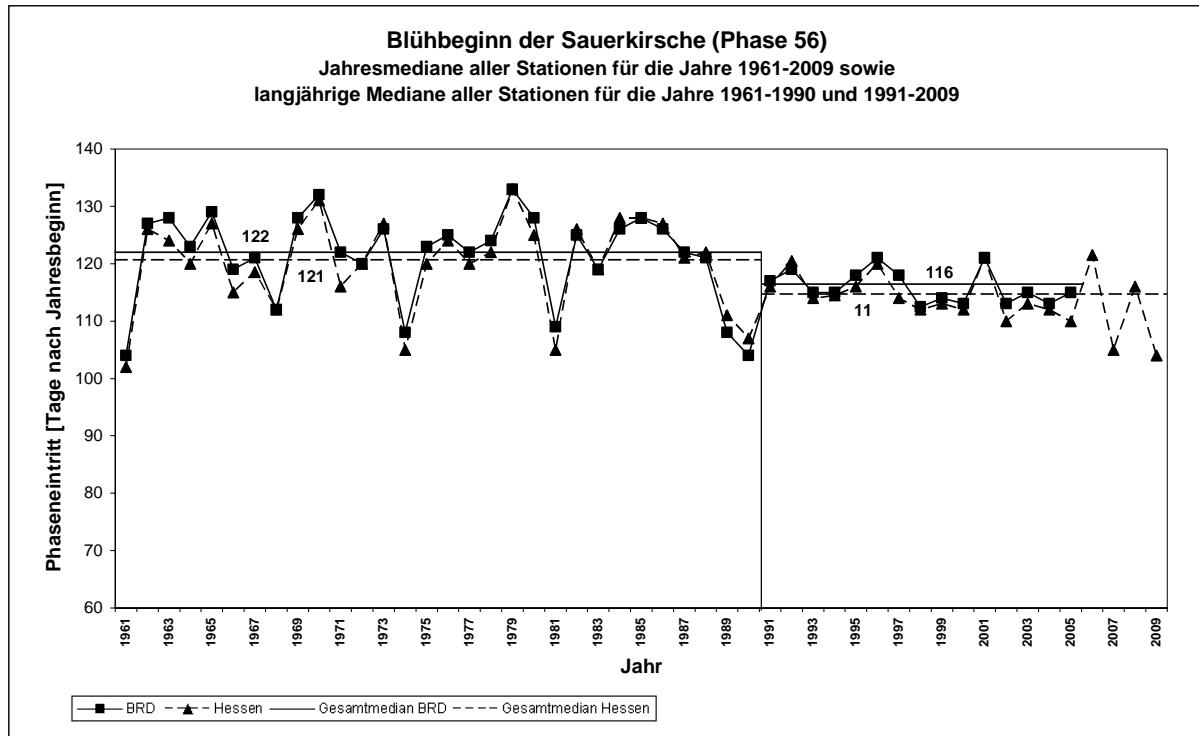


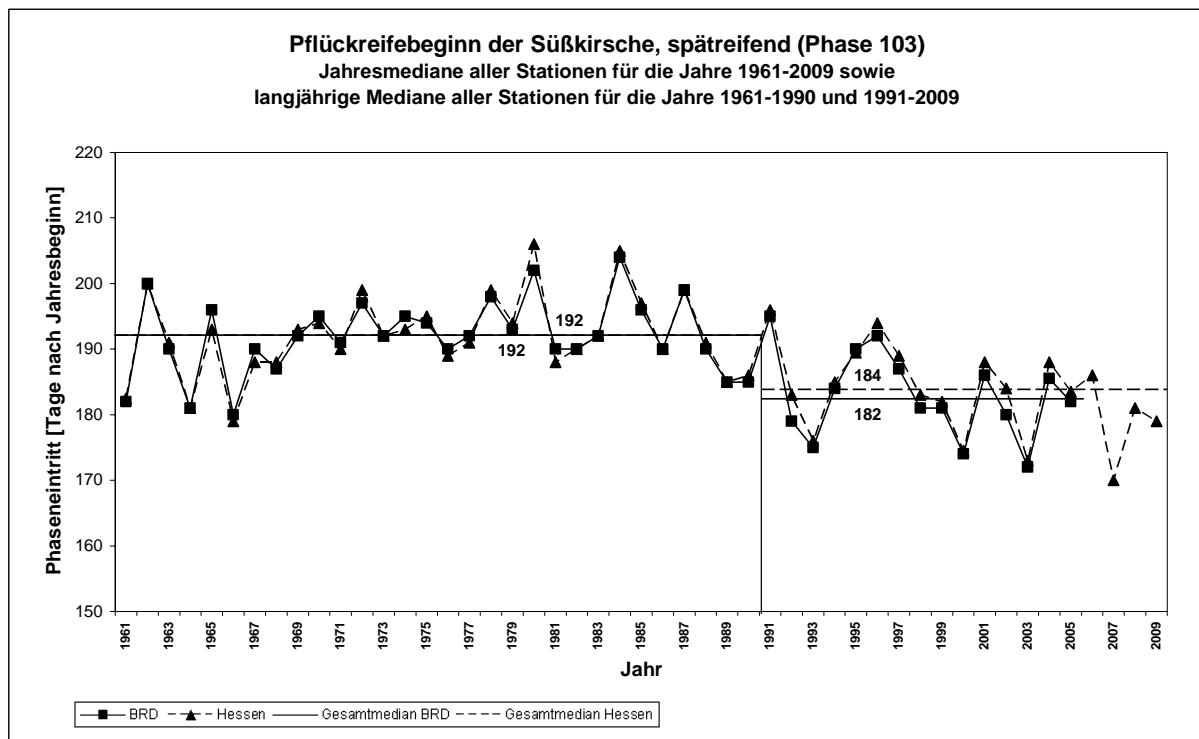
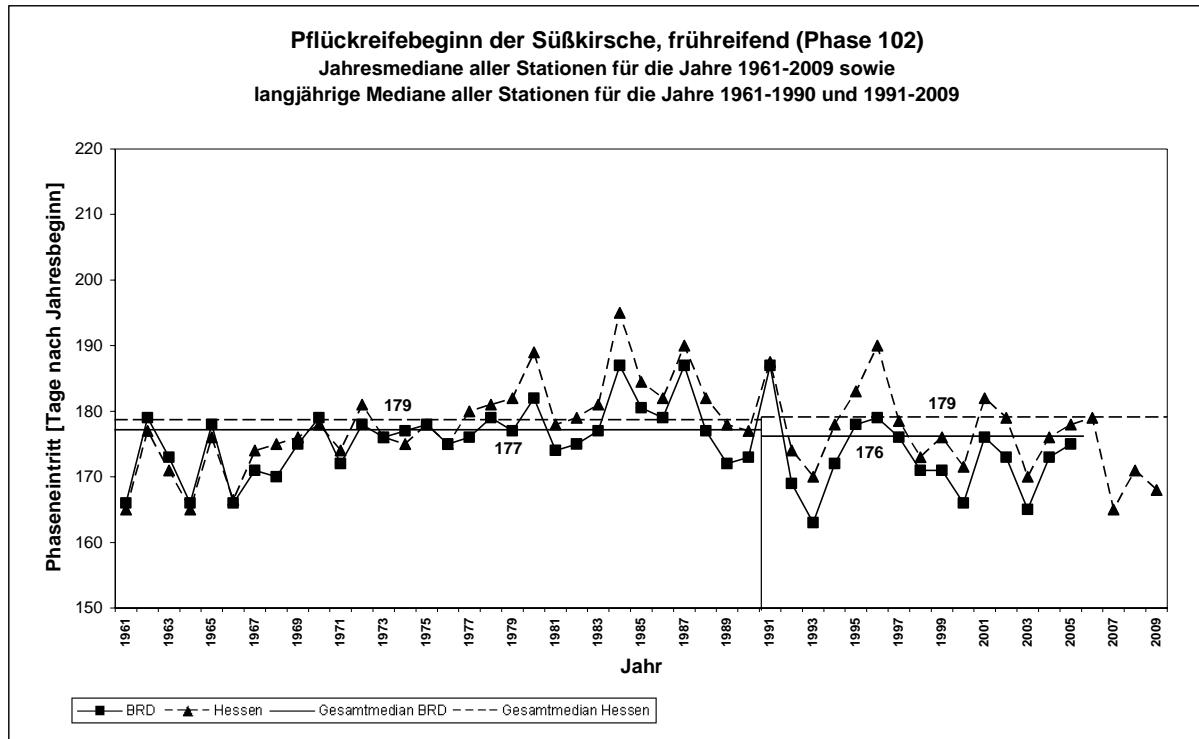


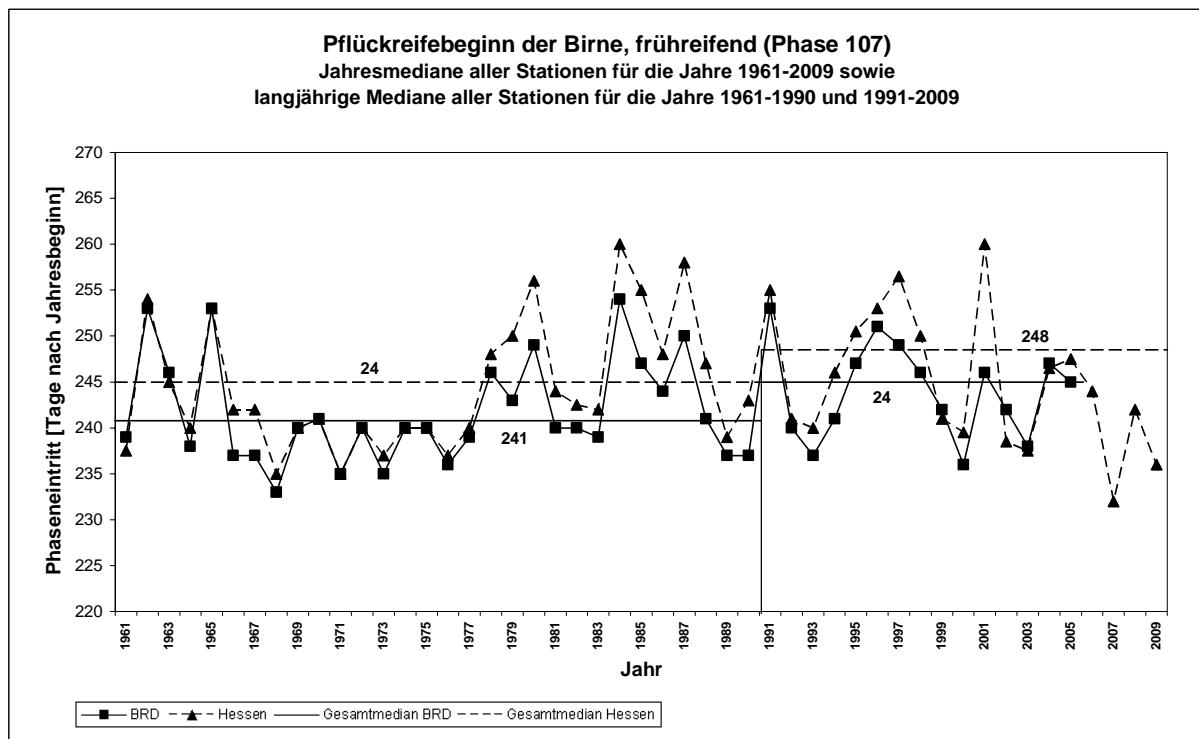
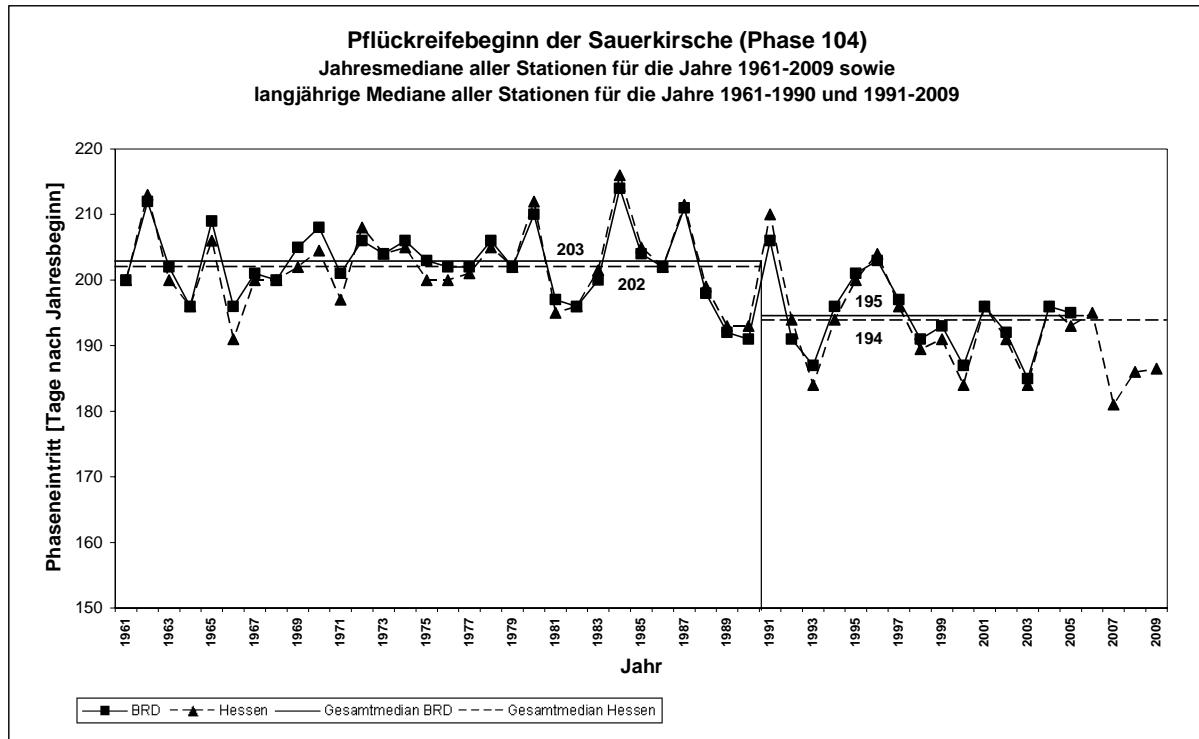


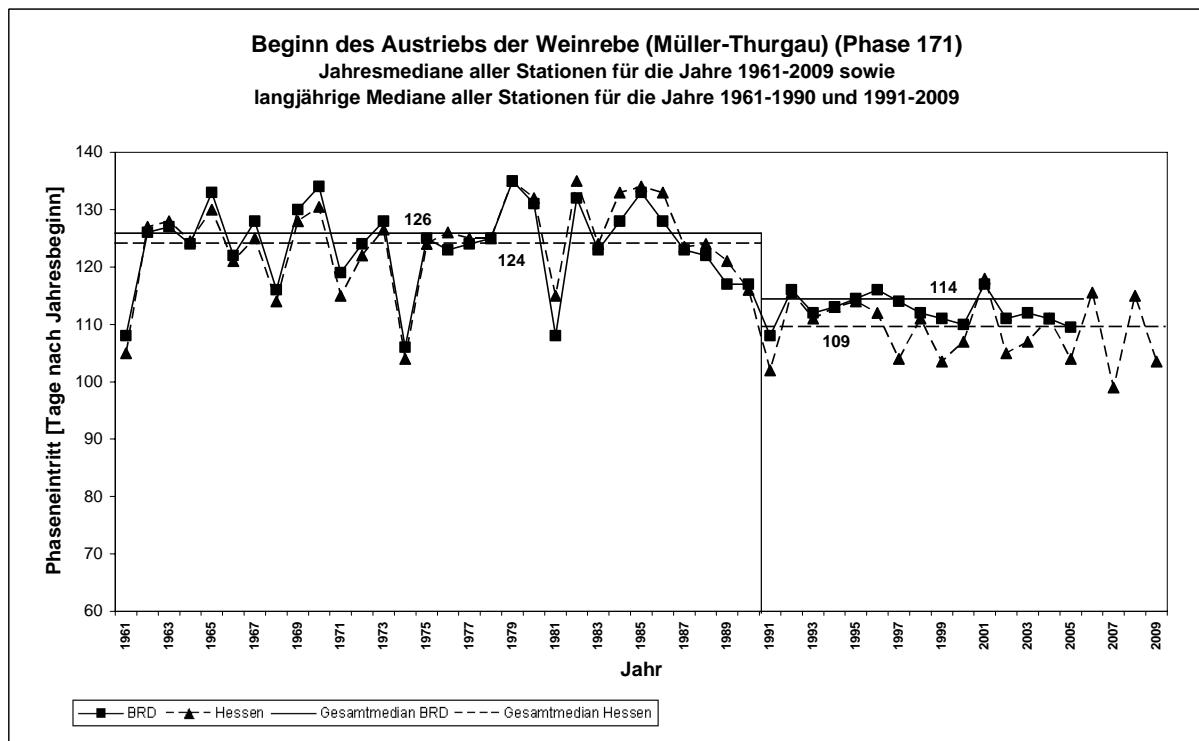
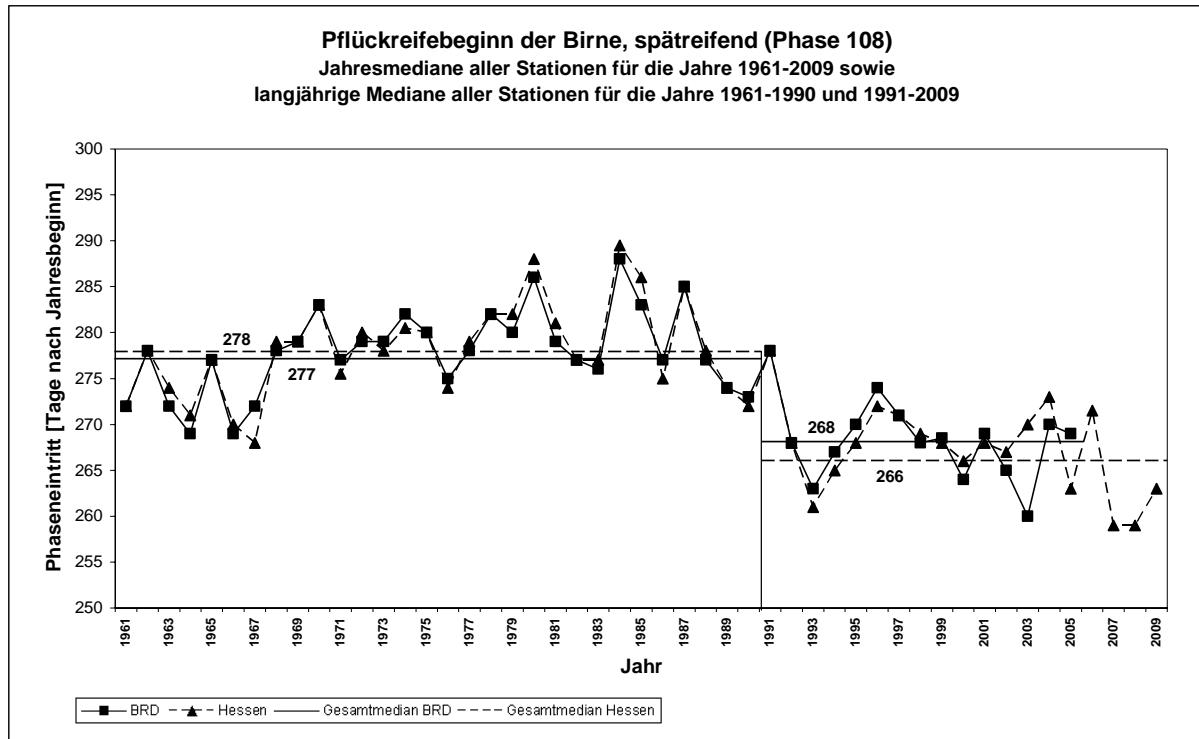


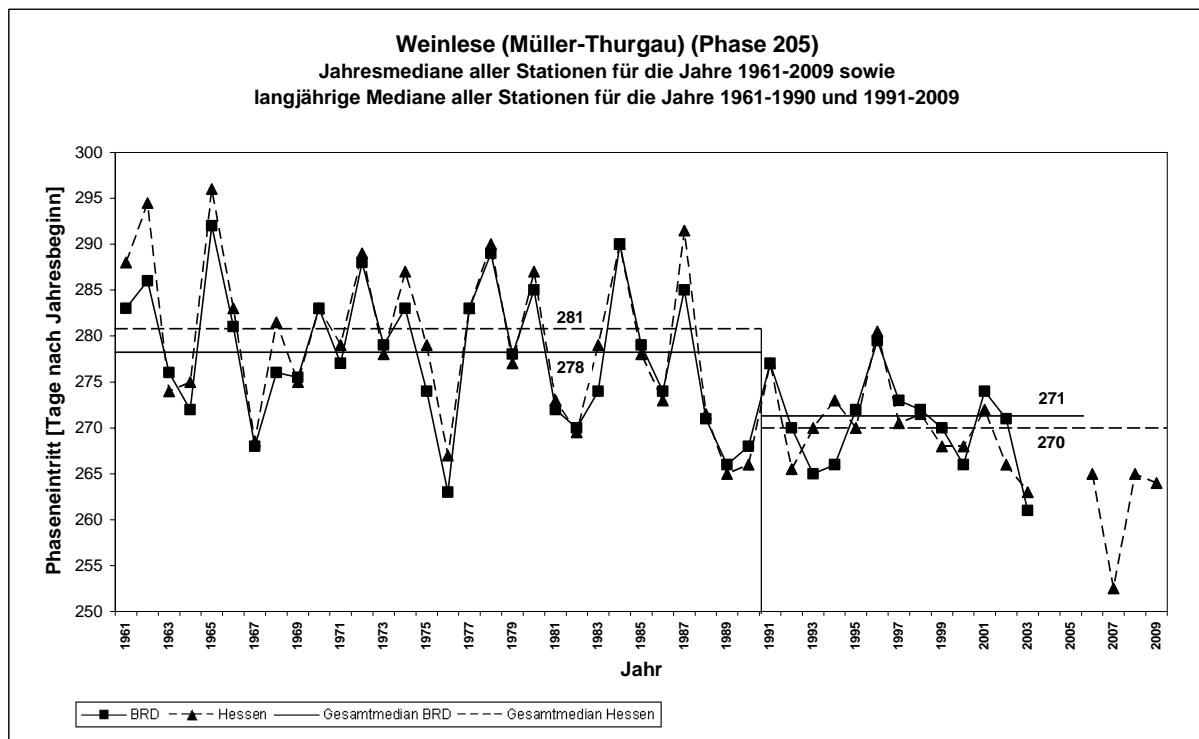
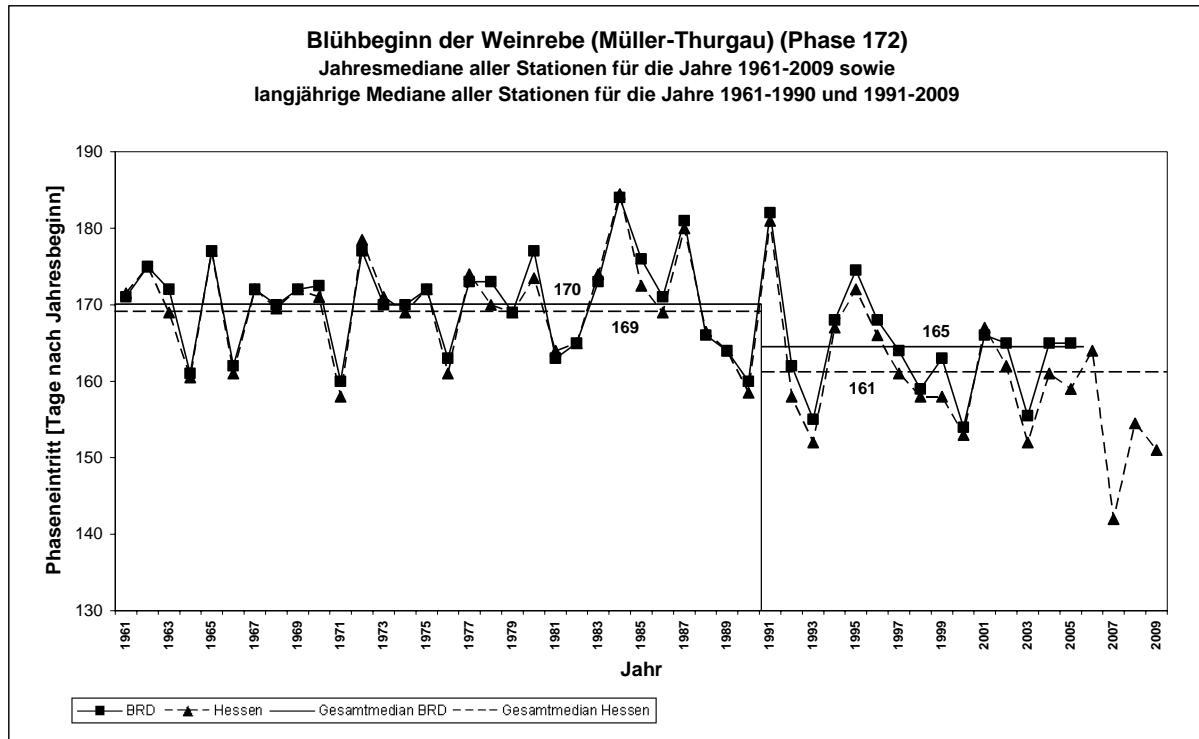






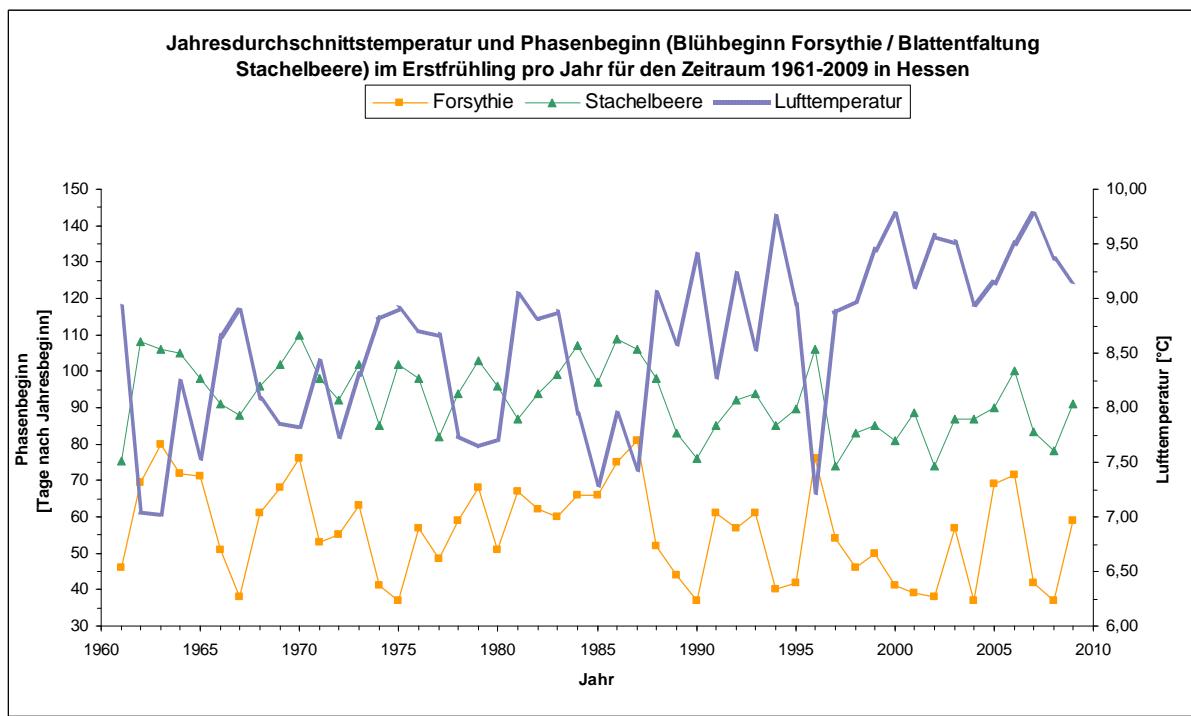
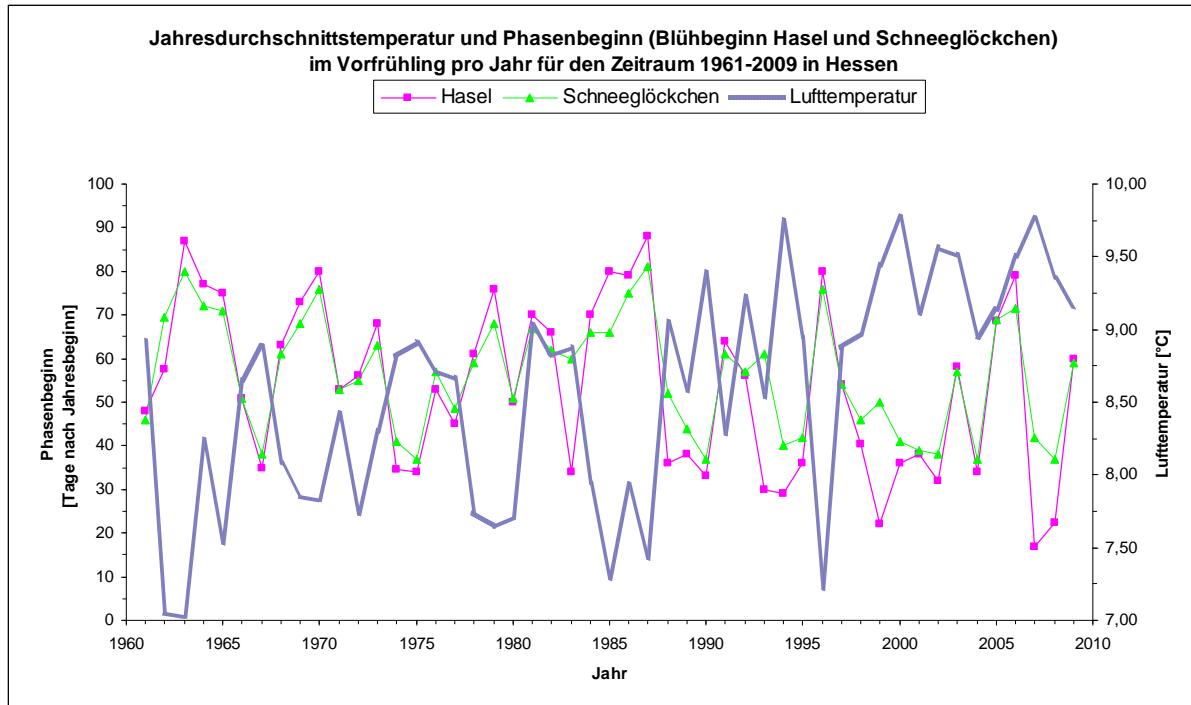


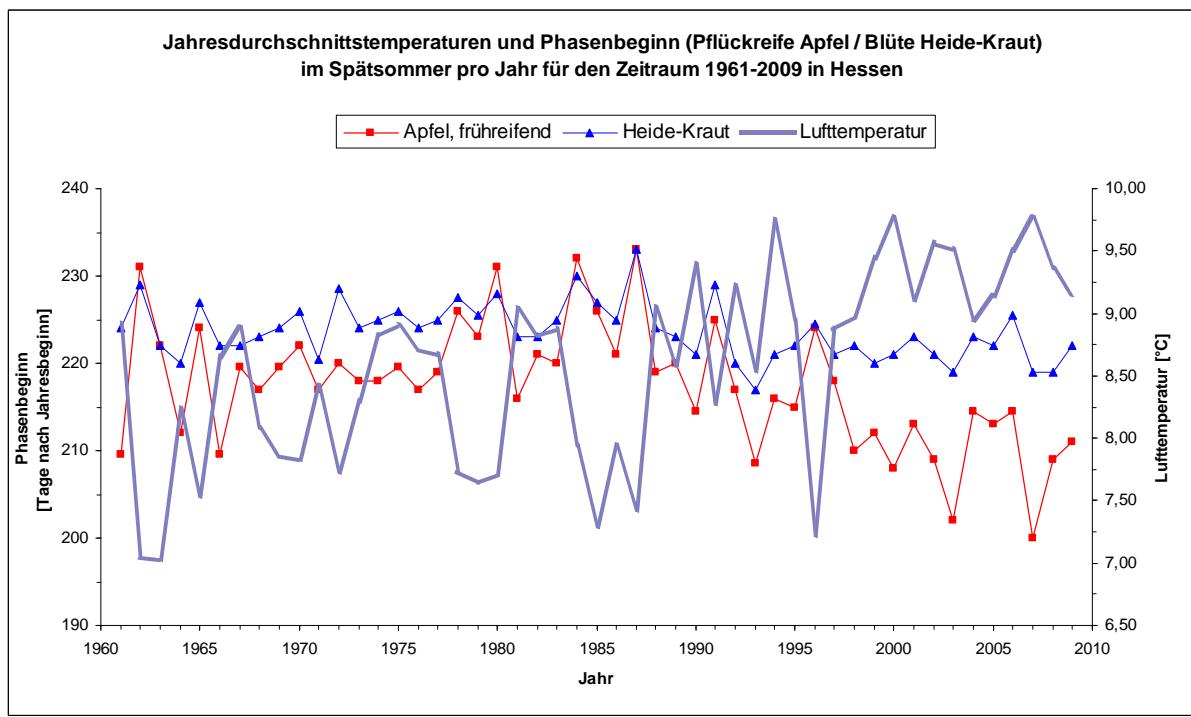
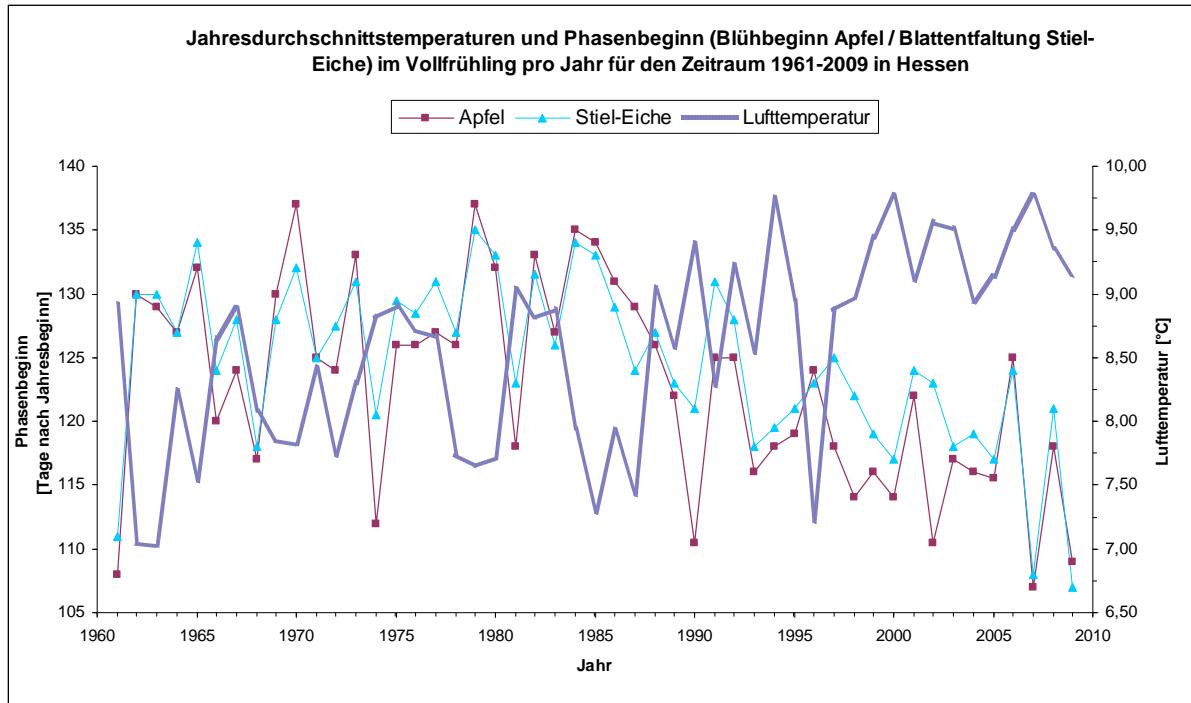




Anhang 5

Deskriptive Statistik IV:
Verlaufdiagramme für die Jahresdurchschnittstemperatur und
den Eintritt der Leit- und Ersatzphasen ausgewählter phänologischer Jahreszeiten zwi-
schen 1961 und 2009 in Hessen





Anhang 6

Bivariate Statistik I:

Ergebnisse der einfachen linearen Regressionsanalyse zwischen langjährig gemittelten Daten zur Lufttemperatur und zum Phaseneintritt in Deutschland für 35 ausgewählte Phänophasen für die Zeiträume 1961-1990, 1971-2000 und 1991-2005

Ergebnisse der Regressionsanalyse von langjährigen Jahresdurchschnittstemperaturen und langjährig gemittelten Phaseneintrittsterminen in Deutschland für die Zeiträume 1961-1990, 1971-2000 und 1991-2005

Phase	BRD 1961-1990		Gleichung		BRD 1971-2000		Gleichung		BRD 1991-2005		Gleichung	
	R ²	r			R ²	r			R ²	r		
1	0,59	-0,77	y = -9,926x + 143,020		0,62	-0,79	y = -10,413x + 145,005		0,48	-0,70	y = -9,967x + 138,687	
2	0,51	-0,71	y = -7,171x + 119,5		0,50	-0,71	y = -6,985x + 117,037		0,40	-0,63	y = -6,758x + 113,352	
6	0,71	-0,84	y = -7,589x + 158,67		0,76	-0,87	y = -8,782x + 167,754		0,66	-0,81	y = -8,420x + 163,313	
52	0,49	-0,70	y = -5,637x + 143,518		0,50	-0,71	y = -6,254x + 148,072		0,38	-0,62	y = -5,924x + 143,518	
7	0,49	-0,70	y = -5,215x + 156,125		0,55	-0,74	y = -6,086x + 163,894		0,51	-0,72	y = -6,364x + 165,639	
115	0,22	-0,47	y = -3,601x + 125,387		0,32	-0,57	y = -4,337x + 130,984		0,23	-0,48	y = -4,204x + 127,625	
62	0,57	-0,76	y = -5,328x + 171,138		0,70	-0,84	y = -6,249x + 178,832		0,65	-0,80	y = -6,437x + 178,056	
13	0,47	-0,69	y = -5,120x + 170,328		0,56	-0,75	y = -5,890x + 177,147		0,46	-0,68	y = -5,493x + 172,376	
15	0,60	-0,78	y = -5,788x + 181,585		0,69	-0,83	y = -6,283x + 186,891		0,61	-0,78	y = -5,887x + 181,411	
19	0,18	-0,43	y = -3,447x + 173,432		0,22	-0,47	y = -3,879x + 176,179		0,16	-0,39	y = -3,611x + 171,985	
18	0,50	-0,71	y = -5,312x + 201,062		0,52	-0,72	y = -5,576x + 202,590		0,52	-0,72	y = -6,234x + 206,258	
123	0,34	-0,59	y = -4,224x + 190,911		0,47	-0,69	y = -5,478x + 201,765		0,42	-0,65	y = -5,630x + 201,221	
20	0,25	-0,50	y = -3,704x + 186,346		0,33	-0,57	y = -4,307x + 191,462		0,28	-0,53	y = -4,506x + 192,618	
64	0,46	-0,68	y = -6,116x + 229,457		0,52	-0,72	y = -6,461x + 232,050		0,36	-0,60	y = -5,443x + 221,254	
100	0,49	-0,70	y = -5,857x + 237,049		0,49	-0,70	y = -6,226x + 240,444		0,34	-0,58	y = -5,453x + 232,409	
109	0,45	-0,67	y = -6,177x + 269,9		0,44	-0,66	y = -6,528x + 274,127		0,30	-0,55	y = -5,977x + 267,946	
65	0,02	-0,14	y = -1,054x + 232,311		0,01	-0,09	y = -0,627x + 228,807		0,01	-0,09	y = -0,857x + 228,573	
67	0,25	-0,50	y = -5,727x + 293,710		0,28	-0,53	y = -5,705x + 293,557		0,30	-0,55	y = -6,106x + 294,504	
177	0,15	-0,38	y = -5,544x + 296,450		0,13	-0,37	y = -5,518x + 294,729		0,11	-0,34	y = -5,249x + 290,894	
72	0,09	-0,30	y = -3,015x + 294,015		0,12	-0,34	y = -3,211x + 295,623		0,11	-0,33	y = -3,446x + 295,739	
68	0,15	-0,39	y = -2,706x + 287,566		0,17	-0,41	y = -2,607x + 287,045		0,18	-0,42	y = -3,233x + 292,039	
73	0,01	0,12	y = 0,954x + 280,421		0,02	0,13	y = 1,040x + 279,977		0,01	0,11	y = 1,058x + 280,116	
94	0,03	0,19	y = 1,697x + 286,976		0,07	0,27	y = 2,706x + 276,276		0,08	0,29	y = 3,648x + 261,520	
54	0,60	-0,77	y = -5,360x + 159,505		0,67	-0,82	y = -6,084x + 165,926		0,66	-0,82	y = -6,452x + 168,935	
56	0,57	-0,75	y = -5,086x + 163,219		0,64	-0,80	y = -5,781x + 169,039		0,60	-0,78	y = -5,714x + 168,166	
60	0,64	-0,80	y = -6,318x + 173,021		0,72	-0,85	y = -7,257x + 180,983		0,67	-0,82	y = -7,535x + 182,786	
102	0,41	-0,64	y = -6,363x + 227,715		0,38	-0,61	y = -6,150x + 227,666		0,29	-0,54	y = -5,897x + 226,418	
103	0,32	-0,57	y = -4,403x + 228,712		0,41	-0,64	y = -5,325x + 236,823		0,26	-0,51	y = -4,908x + 227,910	
104	0,29	-0,54	y = -4,659x + 241,11		0,29	-0,53	y = -4,710x + 240,525		0,24	-0,49	y = -4,697x + 237,495	
107	0,18	-0,42	y = -4,299x + 275,697		0,38	-0,61	y = -7,705x + 308,418		0,24	-0,49	y = -7,516x + 315,056	
108	0,10	-0,31	y = -2,562x + 300,241		0,14	-0,38	y = -3,539x + 307,255		0,07	-0,26	y = -4,085x + 306,456	

R^2 für die Regression der langjährigen Monatsdurchschnittstemperaturen und der langjährig gemittelten Phaseneintritte in Deutschland für den Zeitraum 1961-1990

Weinphasen						
höchster Wert						
Mittel	Min/Max	signifikante Korrelation vor Mittel				
± 3 Tage		Max aber nicht ausgewählt da keine Korrelation				
		u./o. geringes n				

R^2 für die Regression der langjährigen Monatsdurchschnittstemperaturen und der langjährig gemittelten Phaseneintritte in Deutschland für den Zeitraum 1971-2000

Weinphasen						
höchster Wert						
Mittel	Min/Max	signifikante Korrelation vor Mittel				
± 3 Tage		Max aber nicht ausgewählt da keine Korrelation				
		u./o. geringes n				

R^2 für die Regression der langjährigen Monatsdurchschnittstemperaturen und der langjährig gemittelten Phaseneintritte in Deutschland für den Zeitraum 1991-2005

Weinphasen						
höchster Wert						
Mittel	Min/Max	signifikante Korrelation vor Mittel				
± 3 Tage		Max aber nicht ausgewählt da keine Korrelation				
		u./o. geringes n				

Ergebnisse der Regressionsanalyse von langjährigen Temperaturmitteln ausgewählter Monatsreihen und langjährig gemittelten Phaseneintrittstermine in Deutschland für den Zeitraum 1961-1990

Phase	Zeitraum	BRD 1961-1990		Gleichung
		R ²	r	
1	Dez-Apr	0,62	-0,79	y = -0.8796x + 82.225
2	Dez-Apr	0,56	-0,75	y = -0.6644x + 76.036
6	Feb-Mai	0,72	-0,85	y = -0.721x + 138.92
52	Mrz-Mai	0,49	-0,70	y = -0.5342x + 138.48
7	Mrz-Mai	0,53	-0,73	y = -0.5146x + 152.94
115	Mrz-Mai	0,27	-0,52	y = -0.3748x + 124.78
62	Mrz-Jun	0,68	-0,82	y = -0.5612x + 181.48
13	Mrz-Mai	0,53	-0,73	y = -0.5151x + 168.07
15	Mrz-Jun	0,69	-0,83	y = -0.5966x + 191.4
19	Mai-Jun	0,21	-0,46	y = -0.377x + 196.84
18	Apr-Jul	0,56	-0,75	y = -0.5566x + 229.54
123	Mai-Jun	0,36	-0,60	y = -0.443x + 217.62
20	Mai-Jun	0,31	-0,56	y = -0.4038x + 211.4
64	Mai-Aug	0,50	-0,71	y = -0.6381x + 276.69
100	Mai-Aug	0,54	-0,73	y = -0.6183x + 283.02
109	Jun-Sep	0,57	-0,76	y = -0.7549x + 336.85
65	Jul-Sep	0,01	-0,11	y = -0.0976x + 238.49
67	Jul-Okt	0,31	-0,55	y = -0.6821x + 341.77
177	Jul-Okt	0,15	-0,39	y = -0.6238x + 337.83
72	Aug-Okt	0,09	-0,30	y = -0.3418x + 313.32
68	Aug-Okt	0,15	-0,38	y = -0.2964x + 303.57
73	Sep-Nov	0,01	0,12	y = 0.1021x + 279.38
94	Sep-Nov	0,01	0,12	y = 0.1099x + 291.44
226	-	-	-	-
54	Feb-Mai	0,68	-0,82	y = -0.5332x + 146.95
56	Mrz-Jun	0,69	-0,83	y = -0.5489x + 174.33
60	Feb-Jun	0,71	-0,84	y = -0.6415x + 171.11
102	Mai-Jul	0,47	-0,69	y = -0.7267x + 283.79
103	Jun-Aug	0,42	-0,65	y = -0.5279x + 278.69
104	Jun-Aug	0,40	-0,63	y = -0.6173x + 303.89
107	Jul-Sep	0,26	-0,51	y = -0.5657x + 328.92
108	Sep-Nov	0,09	-0,30	y = -0.2611x + 301.72
171	Feb-Mai	0,19	-0,44	y = -0.4047x + 151.49
172	Mai-Jun	0,39	-0,62	y = -0.3909x + 228.21
205	-	-	-	-

Ergebnisse der Regressionsanalyse von langjährigen Temperaturmitteln ausgewählter Monatsreihen und langjährig gemittelten Phaseneintrittstermine in Deutschland für den Zeitraum 1971-2000

Phase	Zeitraum	BRD 1971-2000		Gleichung
		R ²	r	
1	Dez-Apr	0,62	-0,79	$y = -0.9015x + 82.086$
2	Dez-Apr	0,54	-0,73	$y = -0.6505x + 75.802$
6	Jan-Mai	0,77	-0,88	$y = -0.8158x + 134.35$
52	Mrz-Mai	0,48	-0,69	$y = -0.5742x + 141.29$
7	Feb-Mai	0,59	-0,77	$y = -0.5961x + 149.34$
115	Mrz-Mai	0,37	0,61	$y = -0.4296x + 128.76$
62	Mrz-Jun	0,76	-0,87	$y = -0.6356x + 188.82$
13	Apr-Jun	0,59	-0,77	$y = -0.5858x + 196.05$
15	Apr-Jun	0,73	-0,86	$y = -0.6205x + 206.59$
19	Apr-Jun	0,28	-0,53	$y = -0.4323x + 194.16$
18	Apr-Jul	0,59	-0,77	$y = -0.5885x + 232.59$
123	Mai-Jun	0,54	-0,73	$y = -0.5707x + 212.07$
20	Mai-Jun	0,42	-0,65	$y = -0.4794x + 221.58$
64	Apr-Jul	0,58	-0,76	$y = -0.6543x + 263.53$
100	Mai-Aug	0,53	-0,73	$y = -0.6629x + 290.46$
109	Jun-Sep	0,55	-0,74	$y = -0.7761x + 341.31$
65	Jul-Sep	0,01	-0,07	$y = -0.0536x + 231.98$
67	Jul-Sep	0,34	0,59	$y = -0.6451x + 347.74$
177	Jul-Okt	0,14	-0,38	$y = -0.6215x + 335.26$
72	Aug-Okt	0,12	-0,34	$y = -0.3614x + 315.3$
68	Aug-Okt	0,16	-0,40	$y = -0.2841x + 301.81$
73	Sep-Nov	0,02	0,14	$y = 0.1138x + 279.03$
94	Sep-Nov	0,03	0,16	$y = 0.172x + 284.73$
226	-	-	-	-
54	Feb-Mai	0,73	-0,86	$y = -0.6022x + 151.9$
56	Mrz-Jun	0,73	-0,85	$y = -0.6036x + 179.69$
60	Feb-Jun	0,77	-0,88	$y = -0.7225x + 177.63$
102	Mai-Jul	0,58	-0,76	$y = -0.7682x + 291.62$
103	Mai-Aug	0,55	-0,74	$y = -0.5999x + 285.02$
104	Jun-Aug	0,40	-0,63	$y = -0.575x + 295.94$
107	Jul-Sep	0,40	-0,63	$y = -0.8363x + 375.93$
108	Sep-Okt	0,15	-0,39	$y = -0.3998x + 320.82$
171	Mrz-Apr	0,26	-0,51	$y = -0.5107x + 155.9$
172	Apr-Jun	0,60	-0,78	$y = -0.6548x + 253.1$
205	Mar-Okt	0,61	-0,78	$y = -1.1315x + 426.6$

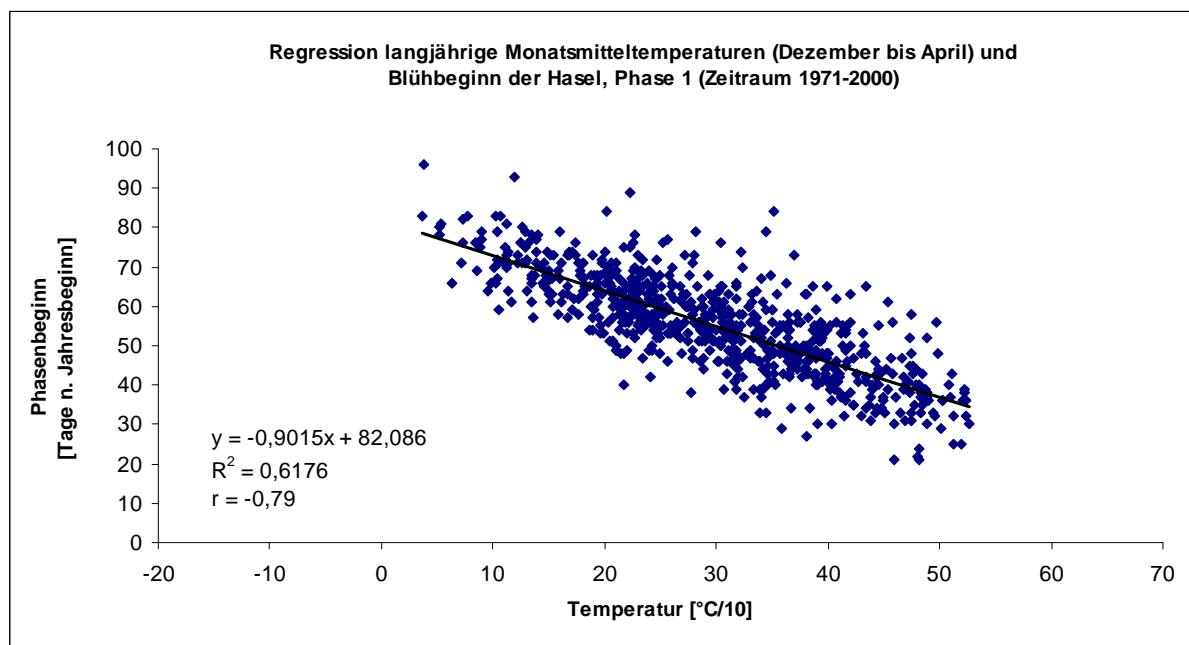
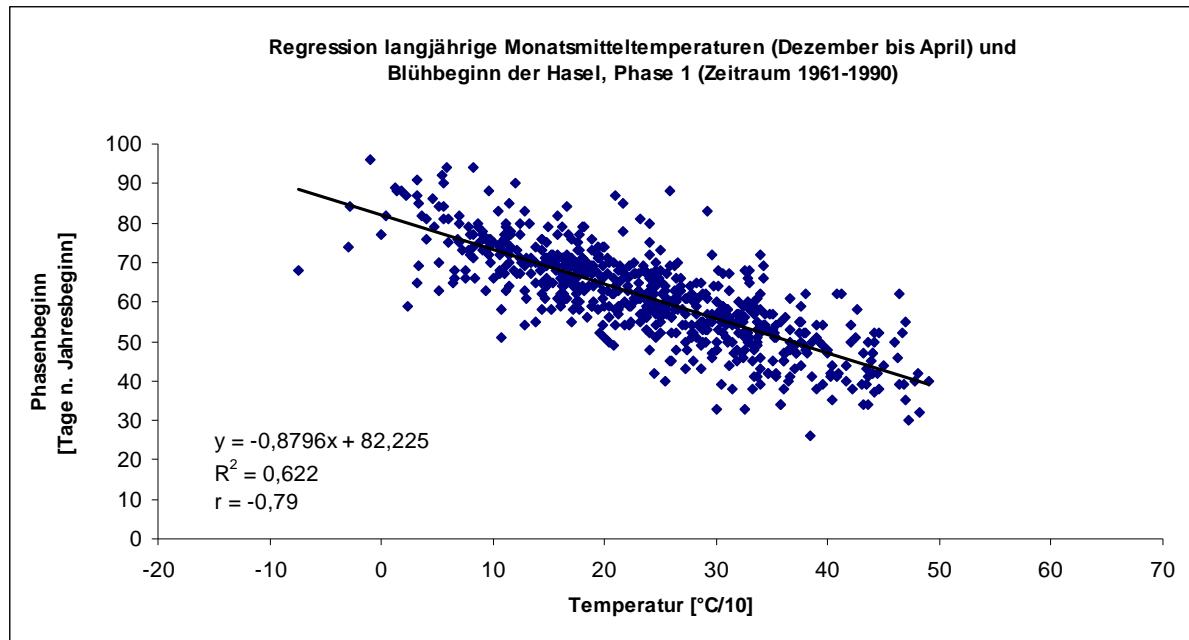
Ergebnisse der Regressionsanalyse von langjährigen Temperaturmitteln ausgewählter Monatsreihen und langjährig gemittelten Phaseneintrittstermine in Deutschland für den Zeitraum 1991-2005

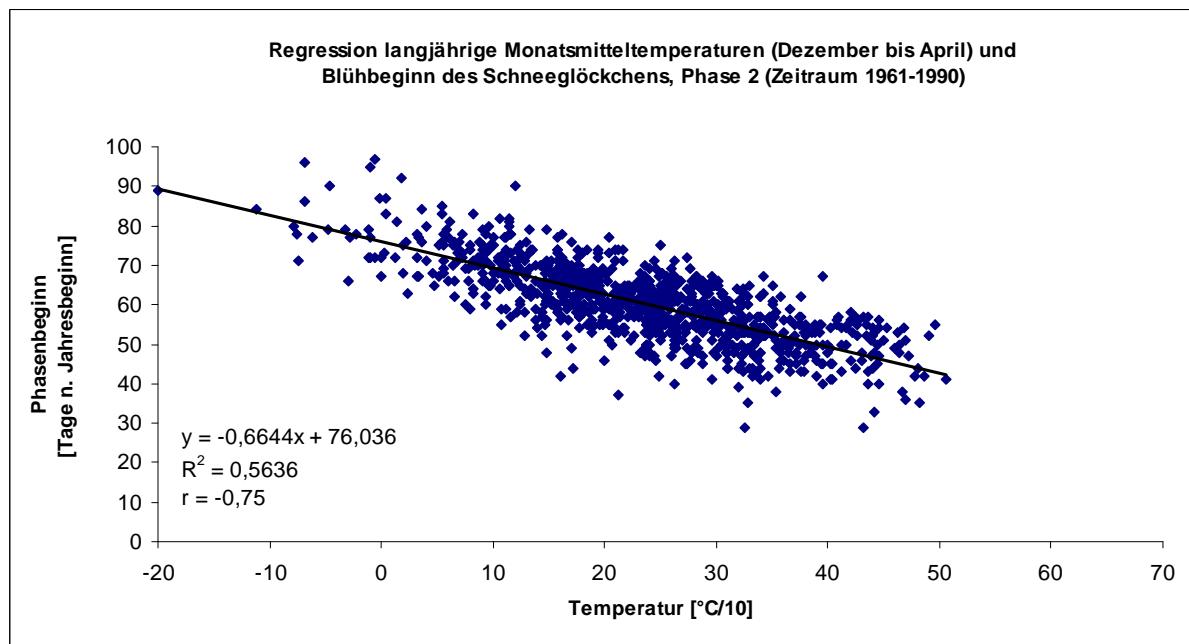
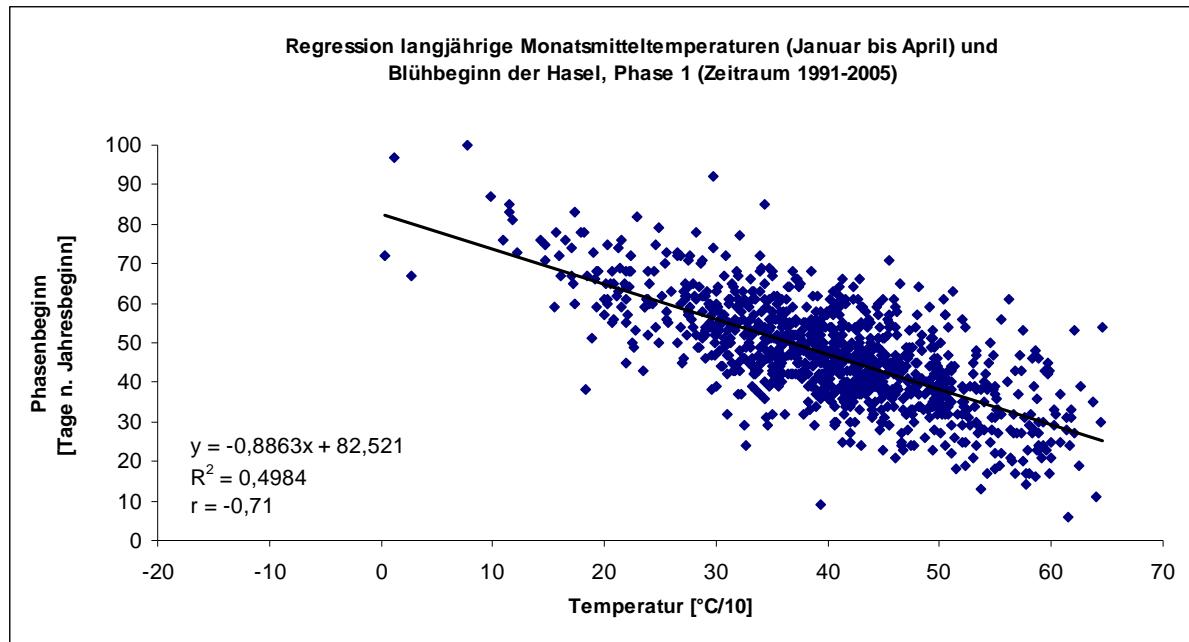
Phase	Zeitraum	BRD 1991-2005		Gleichung
		R ²	r	
1	Jan-Apr	0,50	-0,71	y = -0.8863x + 82.521
2	Jan-Apr	0,41	-0,64	y = -0.6089x + 75.569
6	Jan-Mai	0,68	-0,82	y = -0.7908x + 132.33
52	Feb-Mai	0,38	-0,62	y = -0.5555x + 128.55
7	Mrz-Mai	0,52	-0,72	y = -0.5979x + 160.59
115	Feb-Mai	0,27	-0,51	y = -0.4157x + 118.49
62	Feb-Mai	0,68	-0,83	y = -0.6217x + 163.22
13	Apr-Mai	0,49	-0,70	y = -0.5377x + 181.54
15	Mrz-Jun	0,69	-0,83	y = -0.5908x + 190.9
19	Apr-Jun	0,20	-0,45	y = -0.3879x + 188.39
18	Apr-Jul	0,55	-0,74	y = -0.6107x + 235.29
123	Mai-Jun	0,49	-0,70	y = -0.5713x + 234.27
20	Apr-Jul	0,39	-0,63	y = -0.5083x + 223.11
64	Mai-Jul	0,40	-0,63	y = -0.5535x + 259.48
100	Jun-Aug	0,37	-0,61	y = -0.5616x + 280.15
109	Jun-Sep	0,38	-0,62	y = -0.7145x + 331.14
65	Jul-Sep	0,00	-0,06	y = -0.0525x + 229.42
67	Jul-Okt	0,32	-0,57	y = -0.6737x + 337.56
177	Jul-Okt	0,11	-0,33	y = -0.5519x + 323.84
72	Aug-Okt	0,12	-0,34	y = -0.3971x + 317.96
68	Jul-Okt	0,19	-0,43	y = -0.3561x + 314.75
73	Sep-Nov	0,02	0,13	y = 0.1305x + 277.9
94	Sep-Okt	0,05	0,23	y = 0.3116x + 259.65
226	Okt-Dez	0,02	0,15	y = 0,1452x + 300,75
54	Feb-Mai	0,70	-0,84	y = -0.6207x + 153.92
56	Mrz-Mai	0,66	-0,81	y = -0.5527x + 165.07
60	Feb-Mai	0,71	-0,84	y = -0.7231x + 165
102	Mai-Jul	0,46	-0,68	y = -0.699x + 284.02
103	Mai-Jul	0,36	-0,60	y = -0.5648x + 272.96
104	Jun-Aug	0,34	-0,58	y = -0.5246x + 286.04
107	Aug-Okt	0,26	-0,51	y = -0.8578x + 362.01
108	Aug-Okt	0,08	-0,28	y = -0.473x + 333.18
171	Mrz-Apr	0,38	-0,62	y = -0.3127x + 136.09
172	Apr-Jun	0,73	-0,85	y = -0.6483x + 252.02
205	Apr-Okt	0,13	-0,36	y = -0.4361x + 332.78

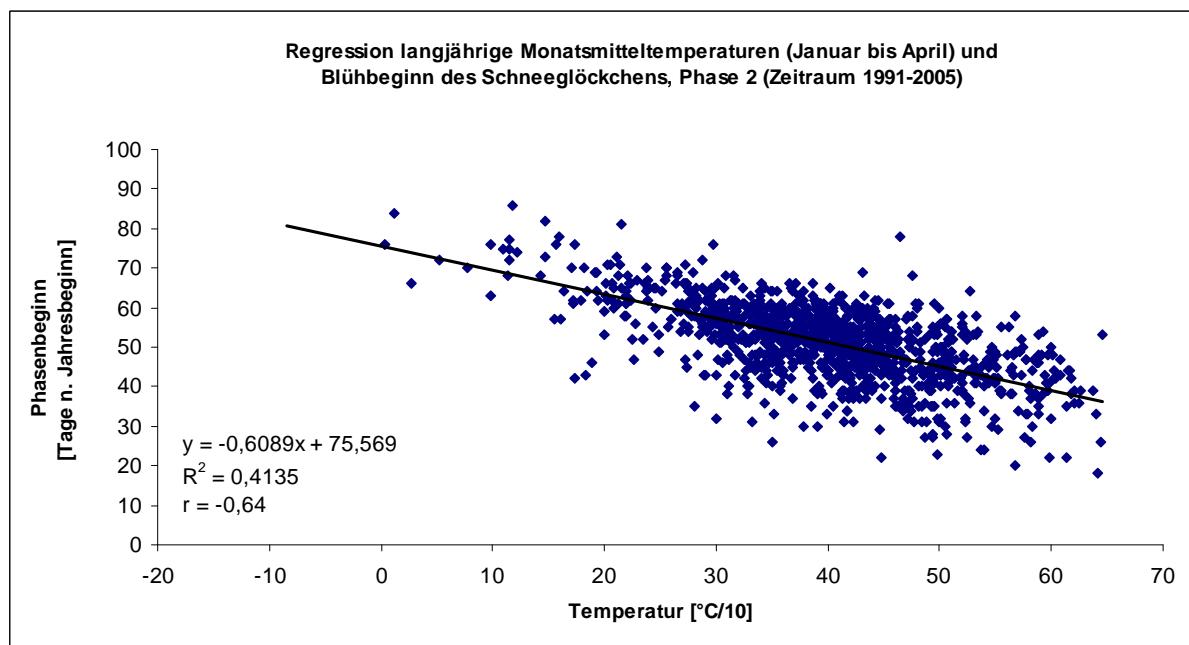
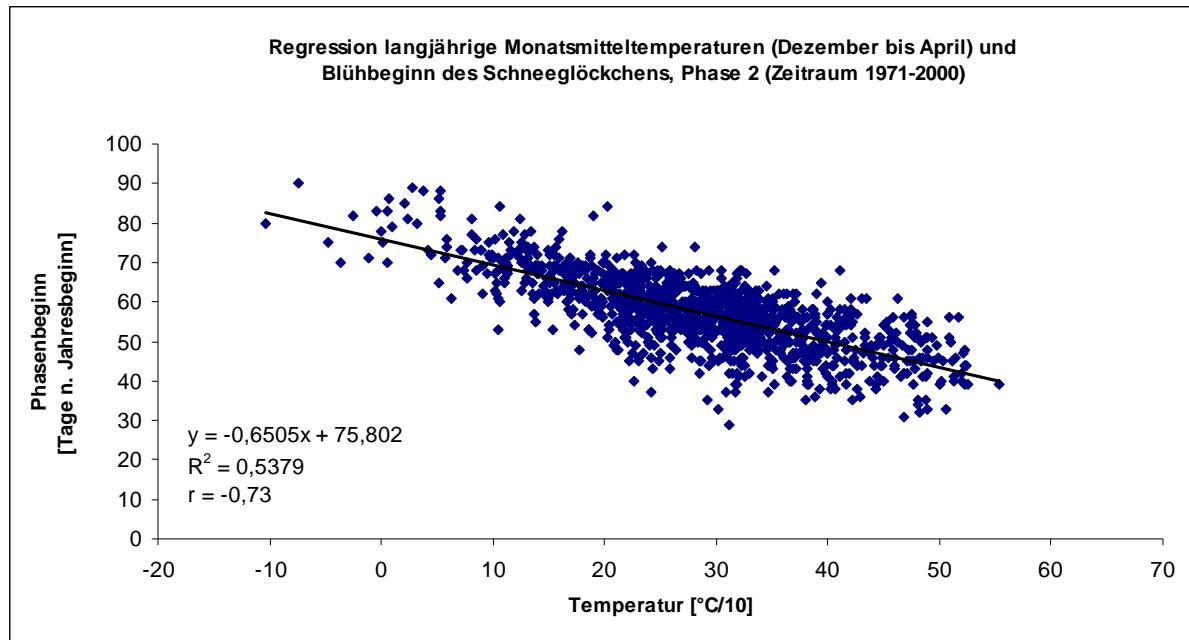
Anhang 7

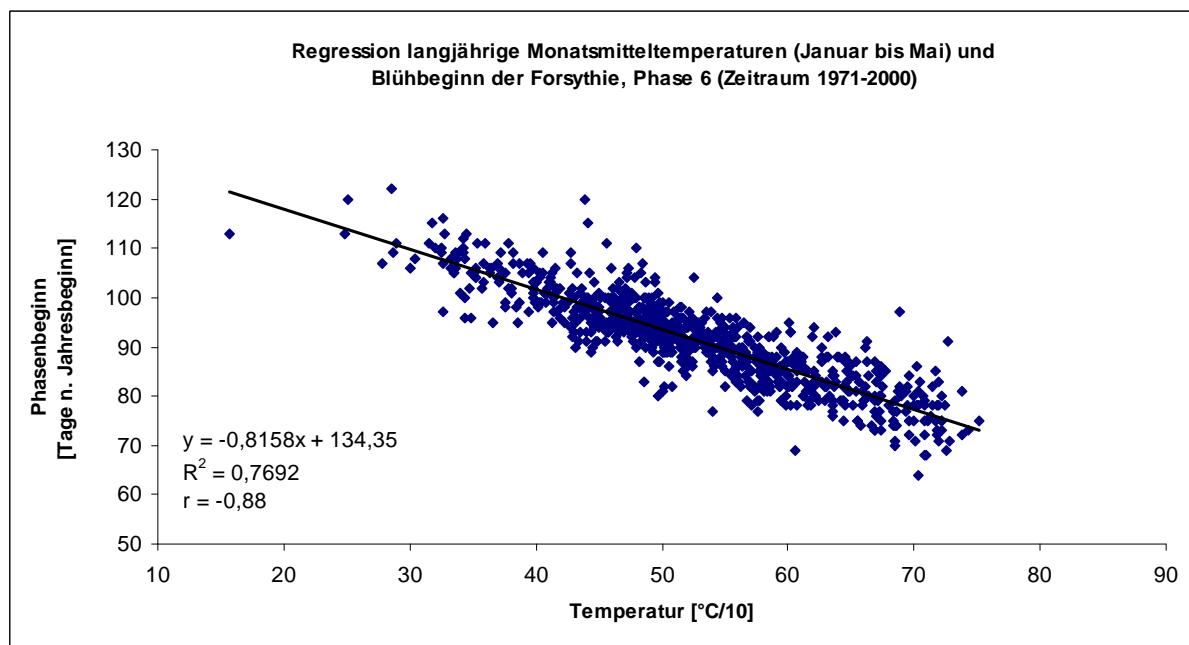
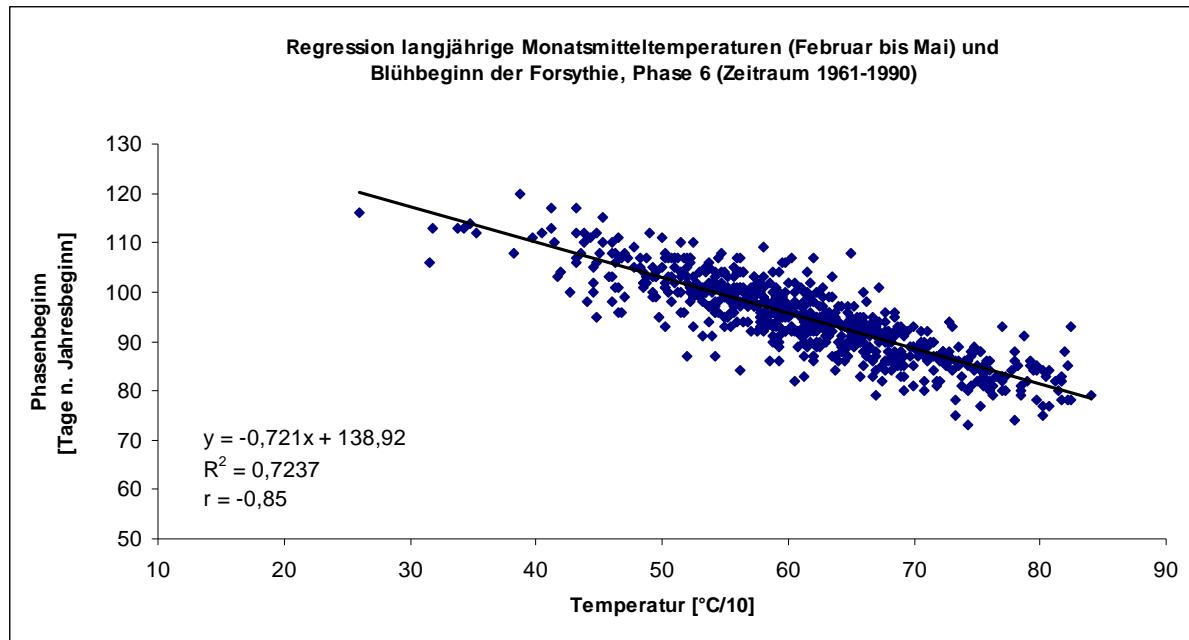
Bivariate Statistik II:

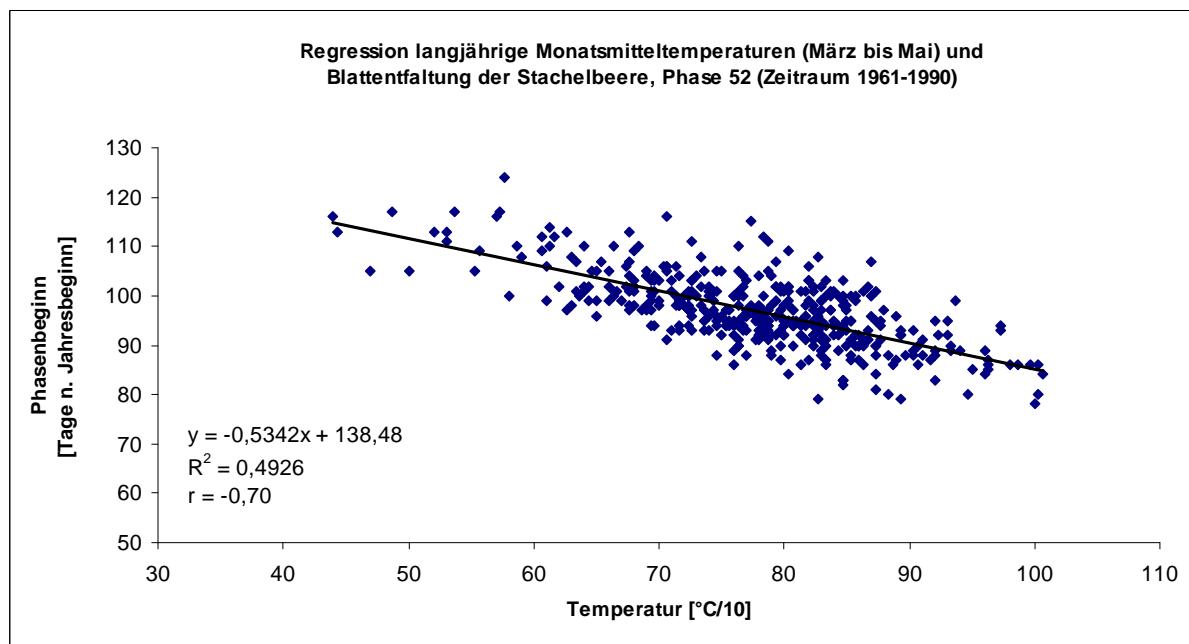
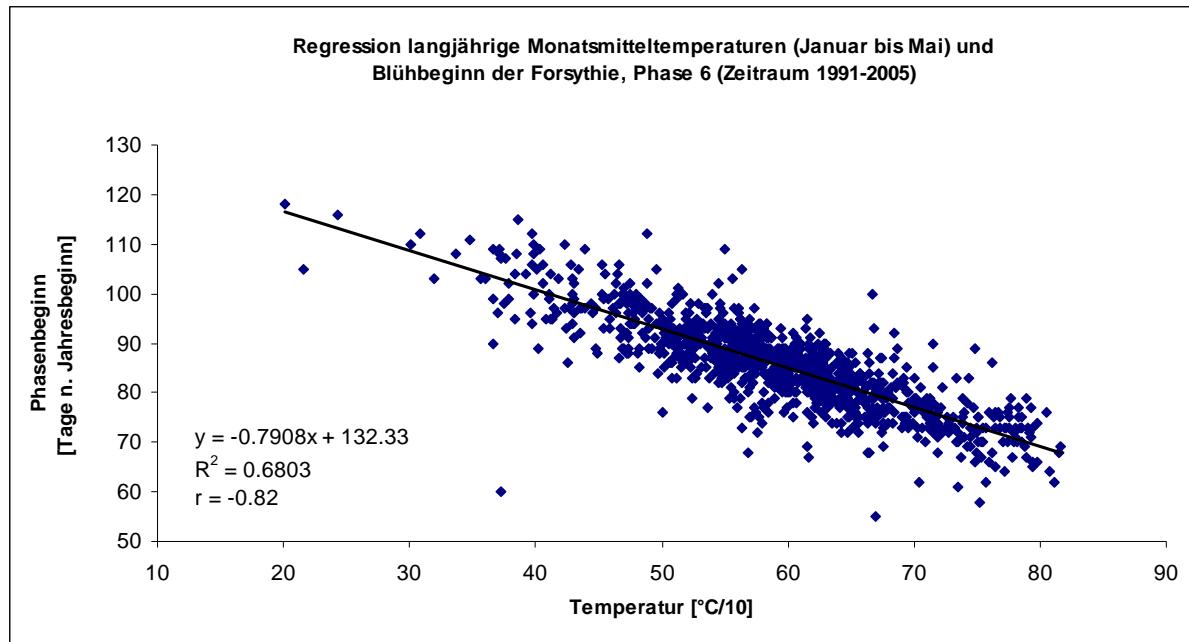
Regressionsdiagramme zwischen den langjährigen Durchschnittstemperaturen ausgewählter Monate (Monatsreihen) und dem Phasenbeginn

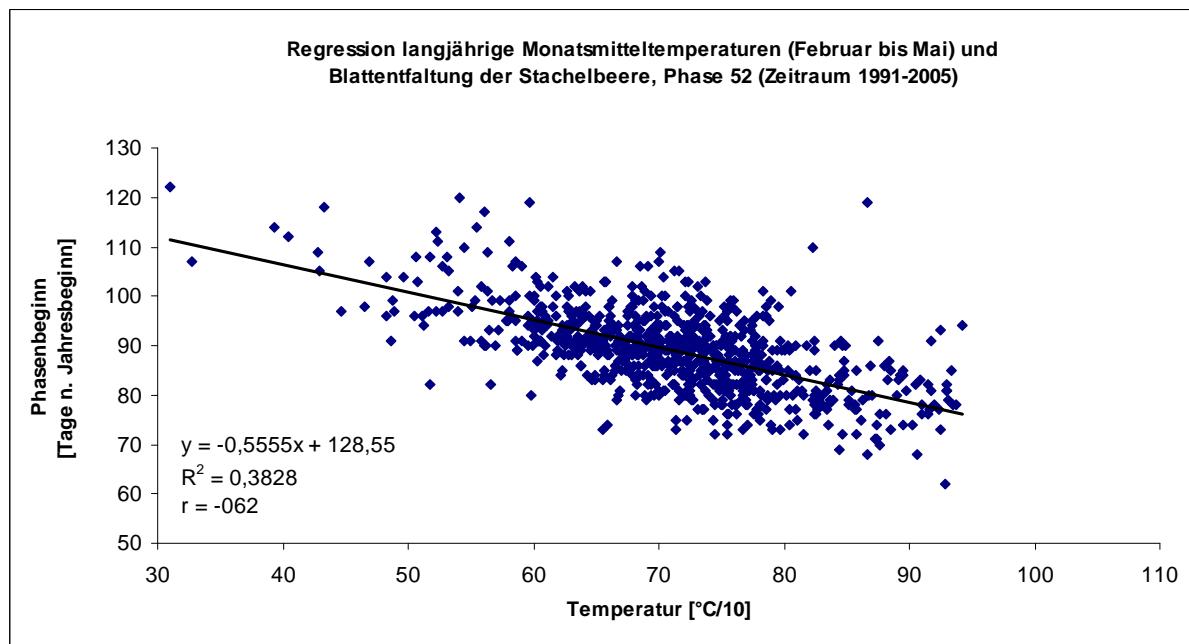
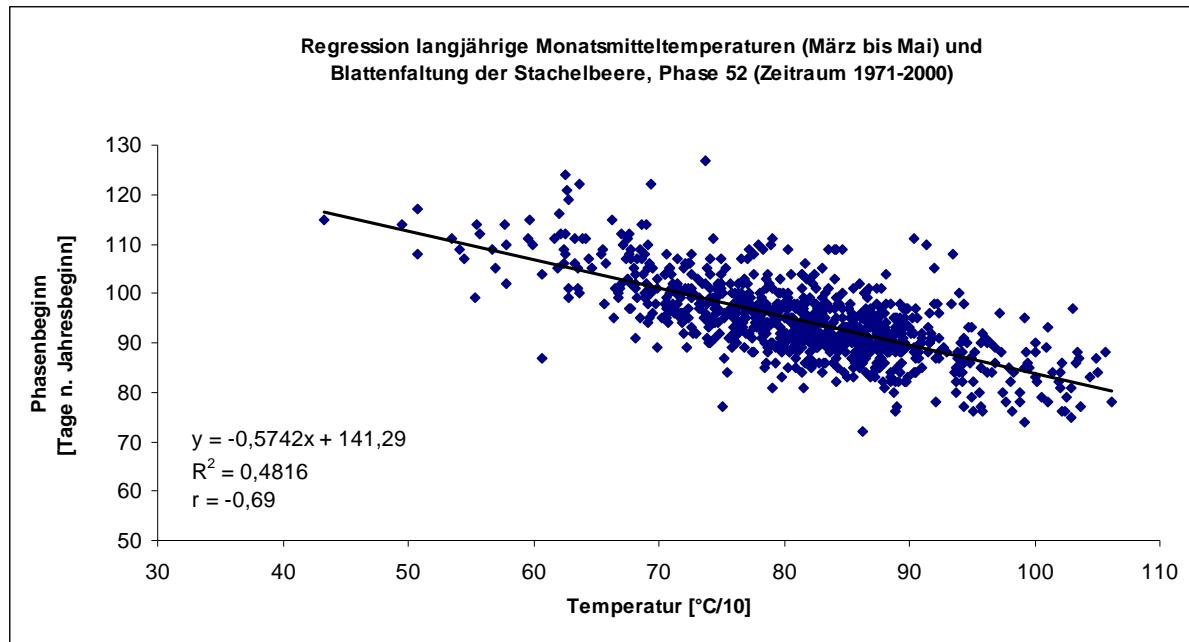


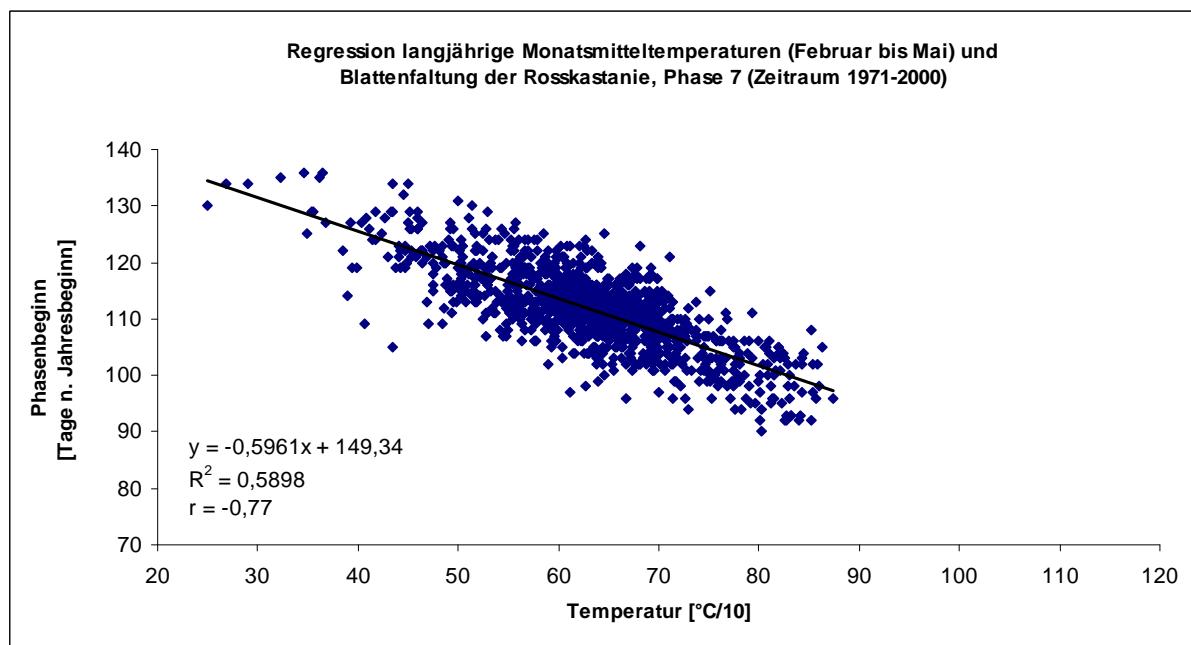
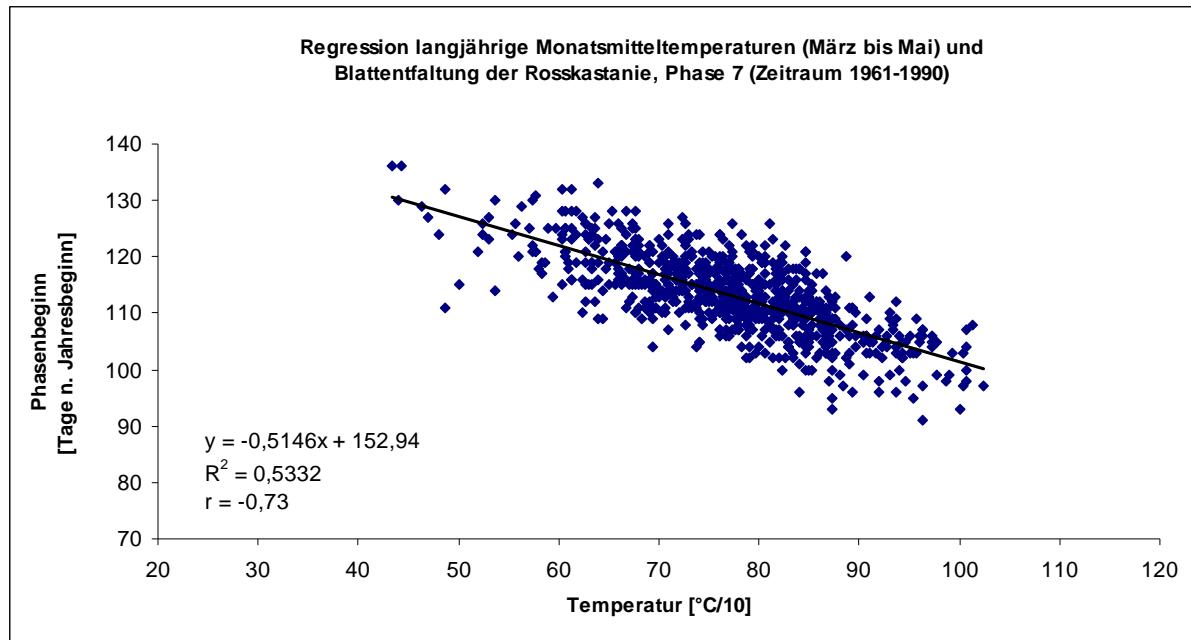


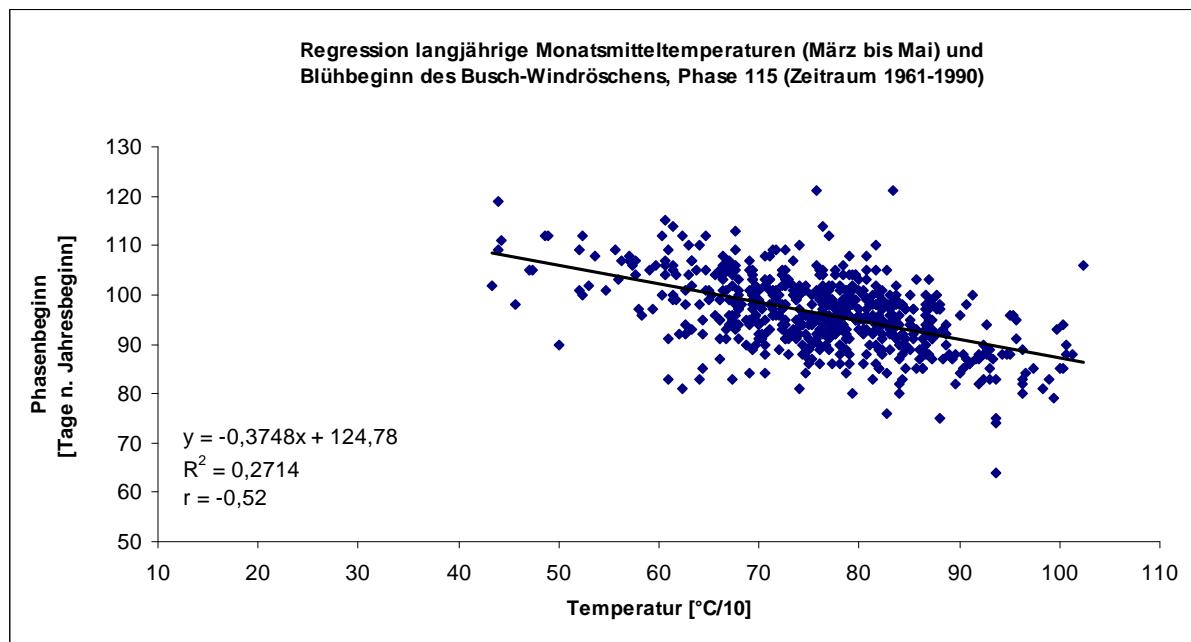
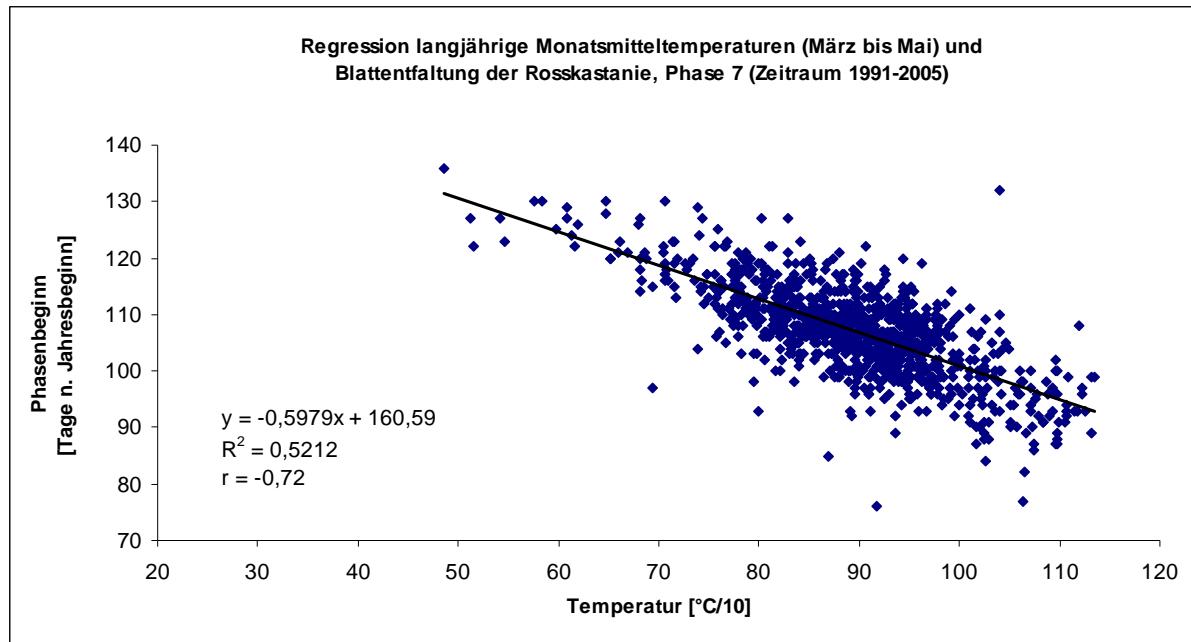


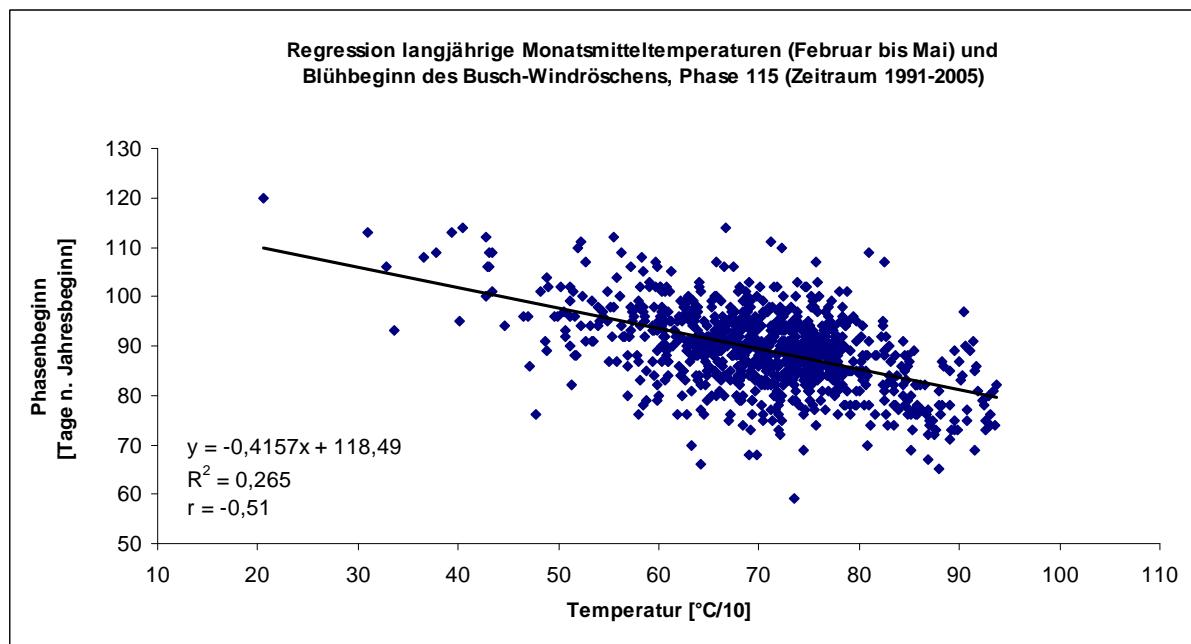
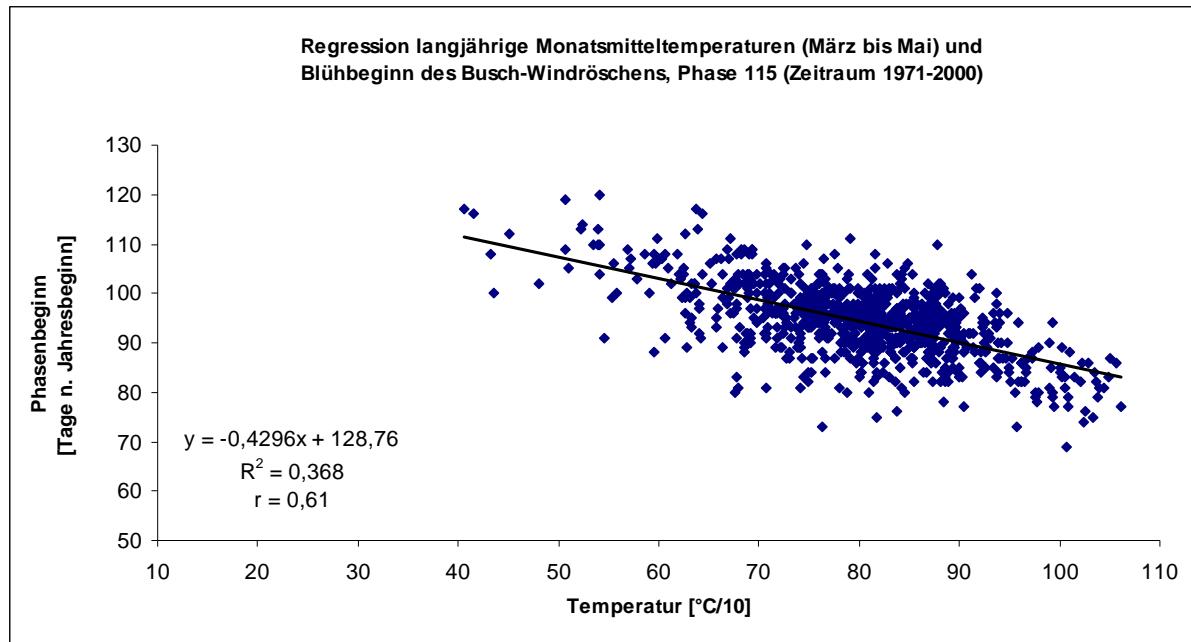


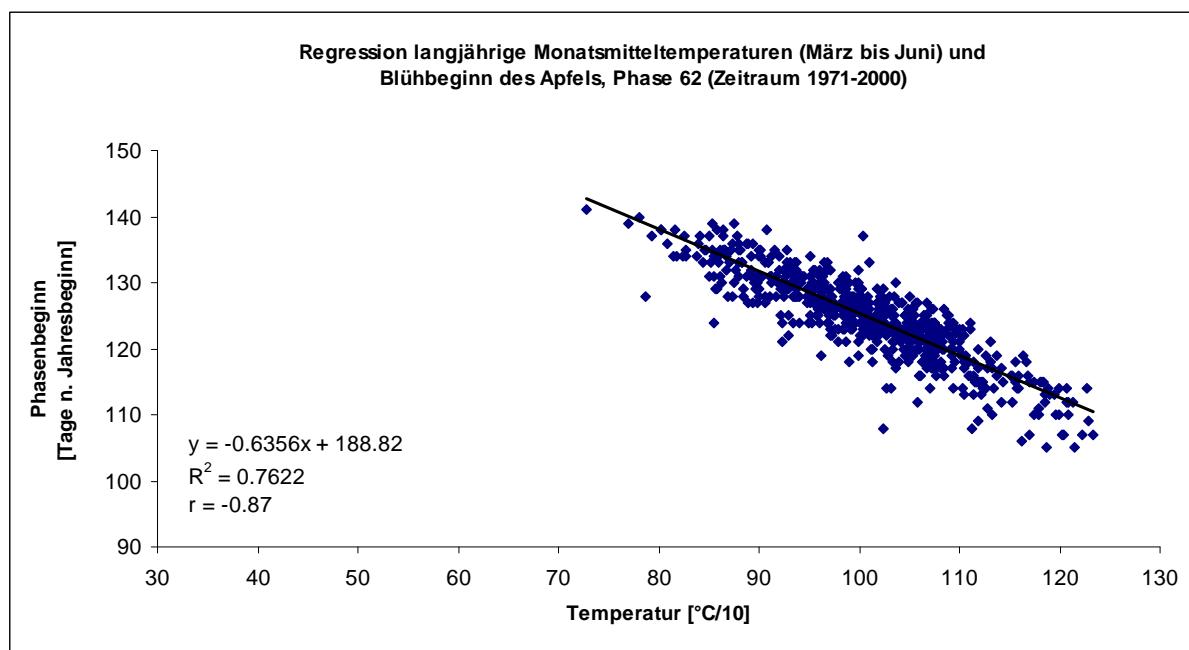
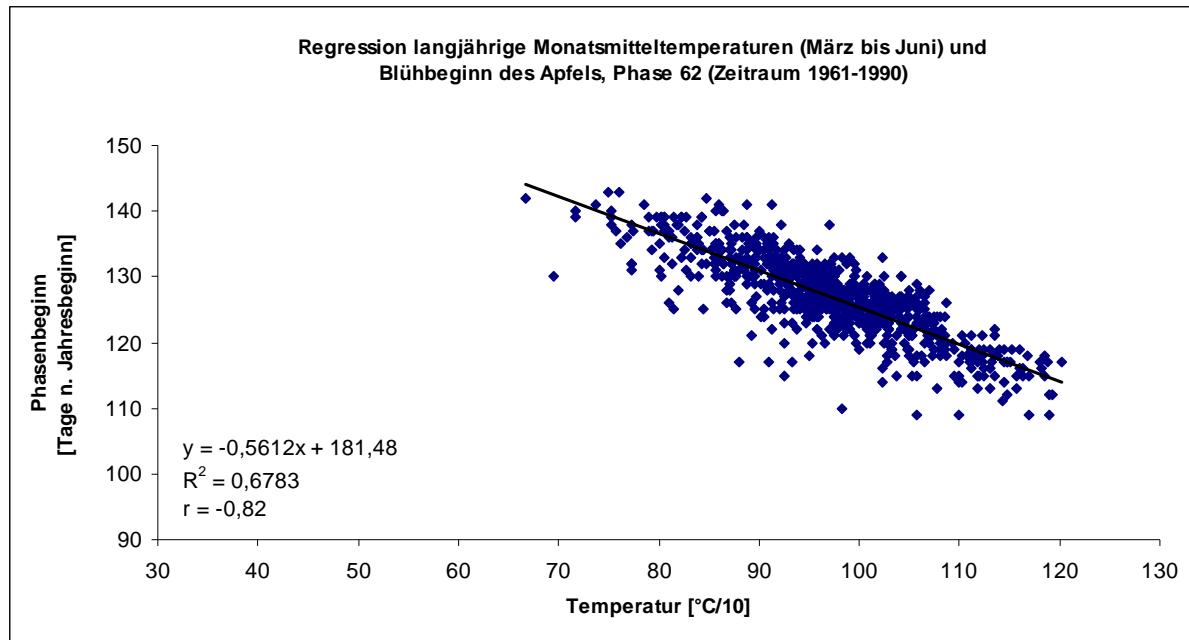


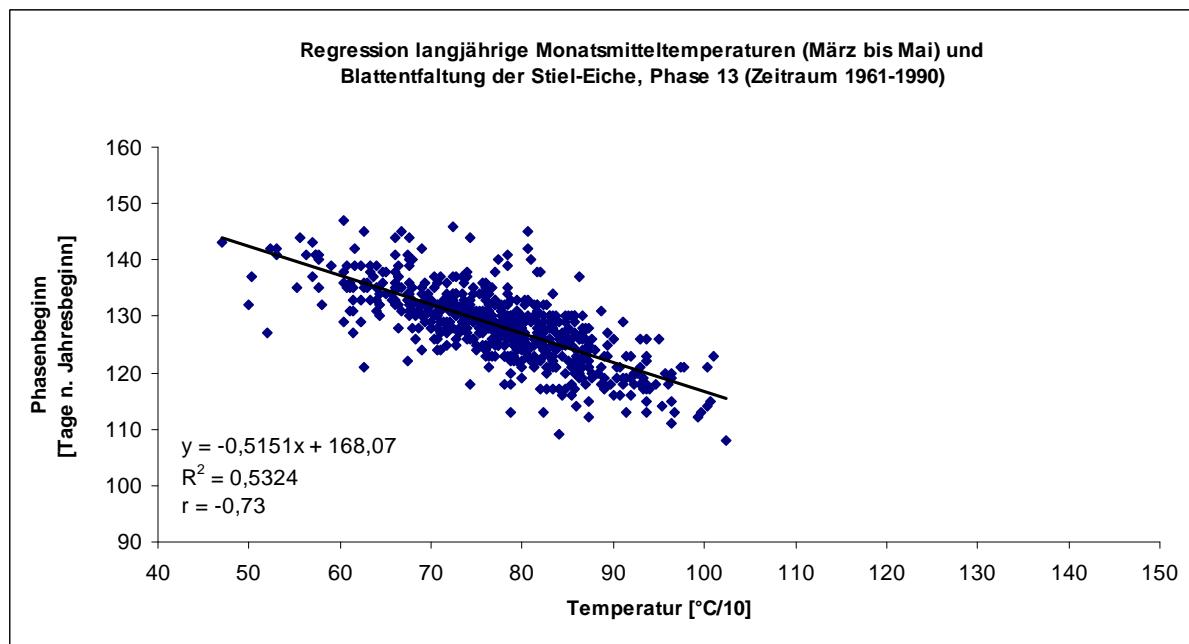
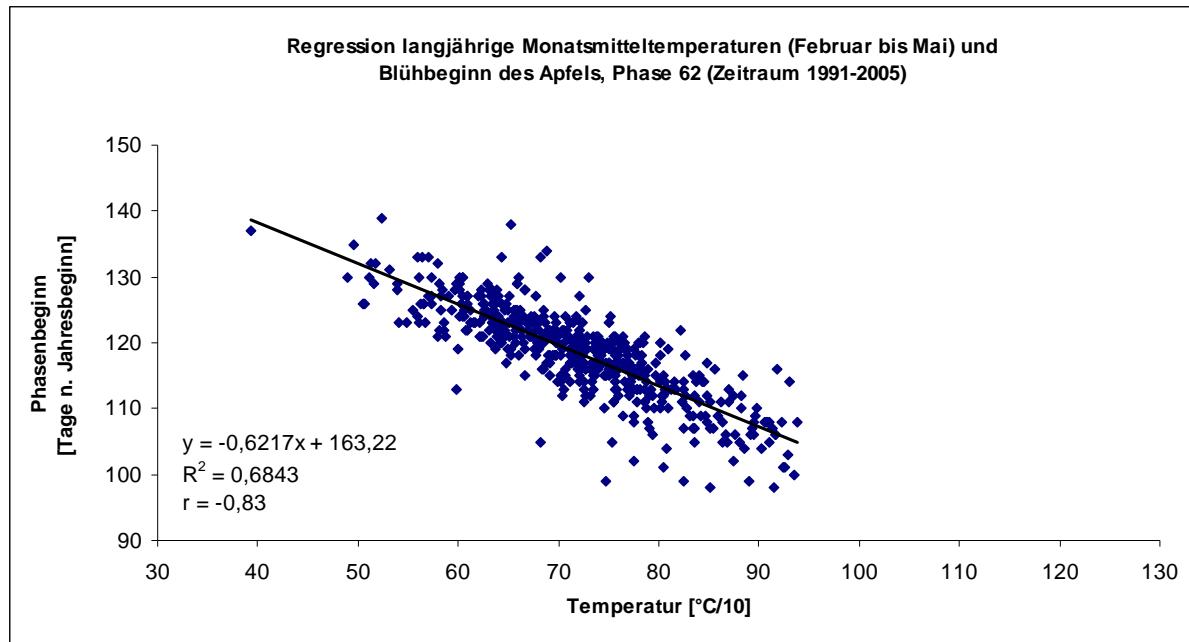


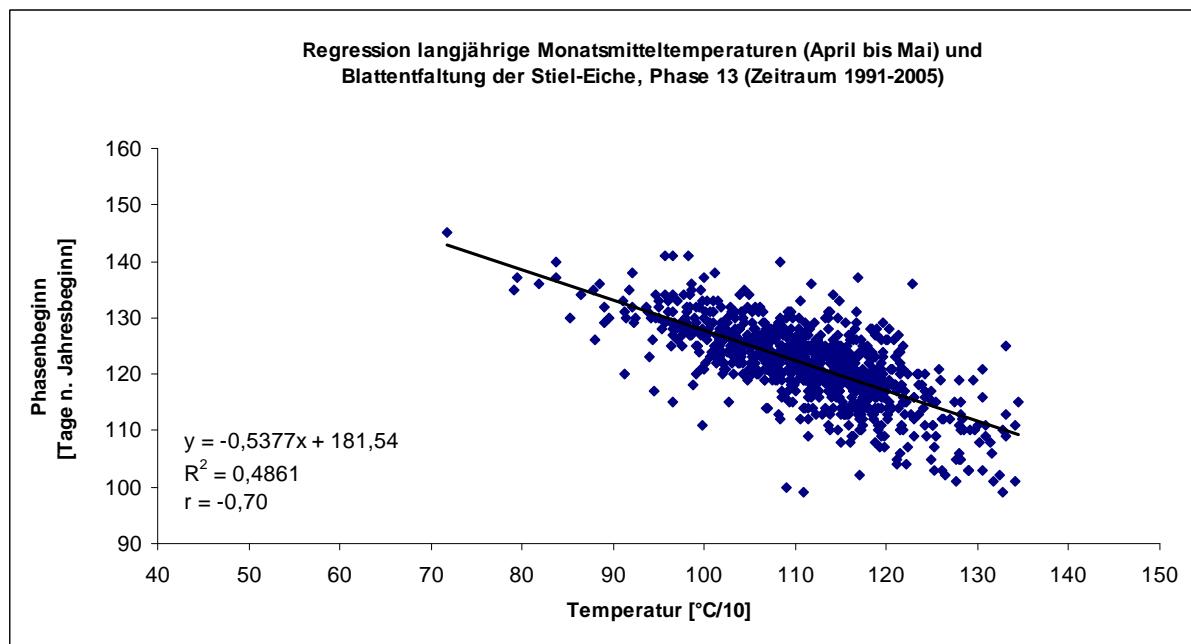
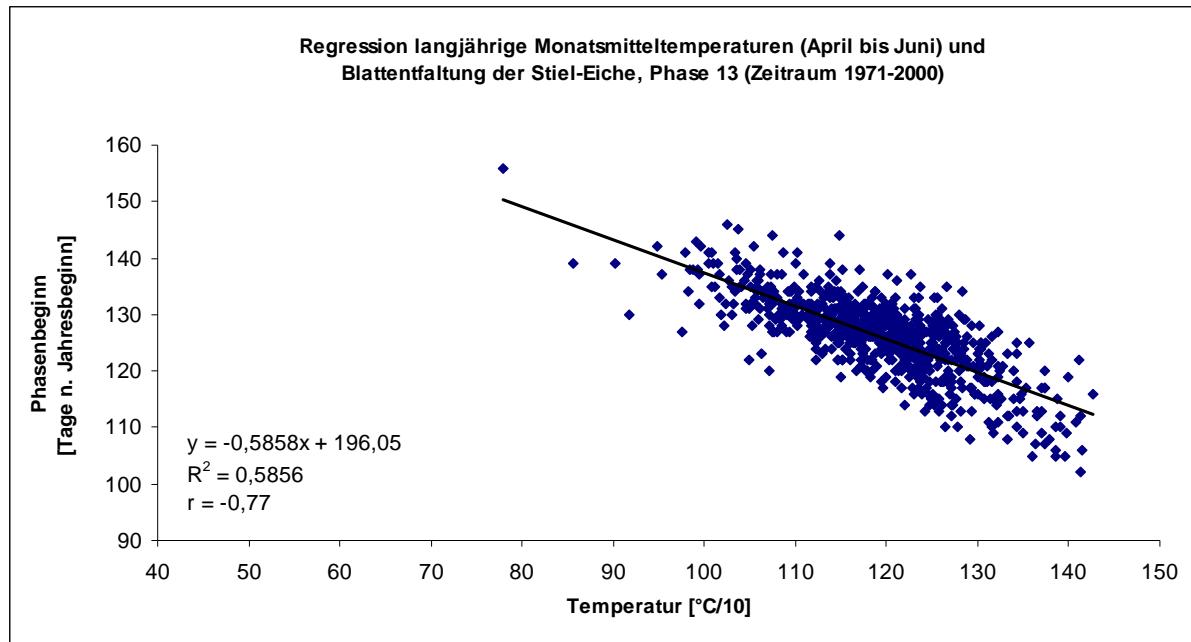


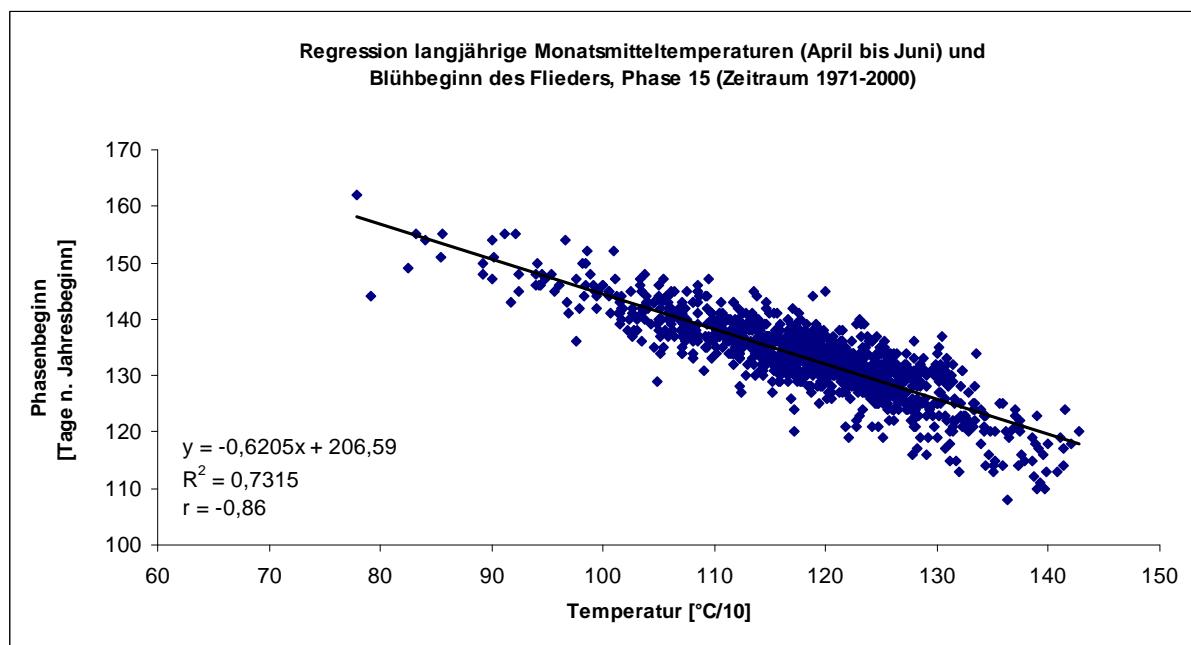
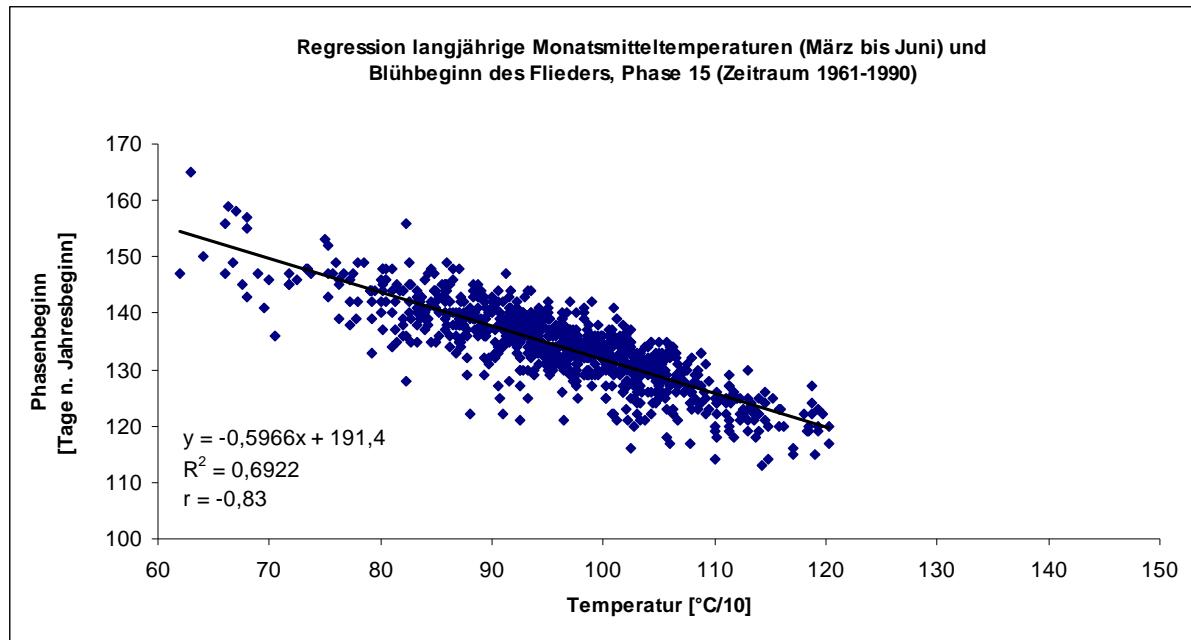


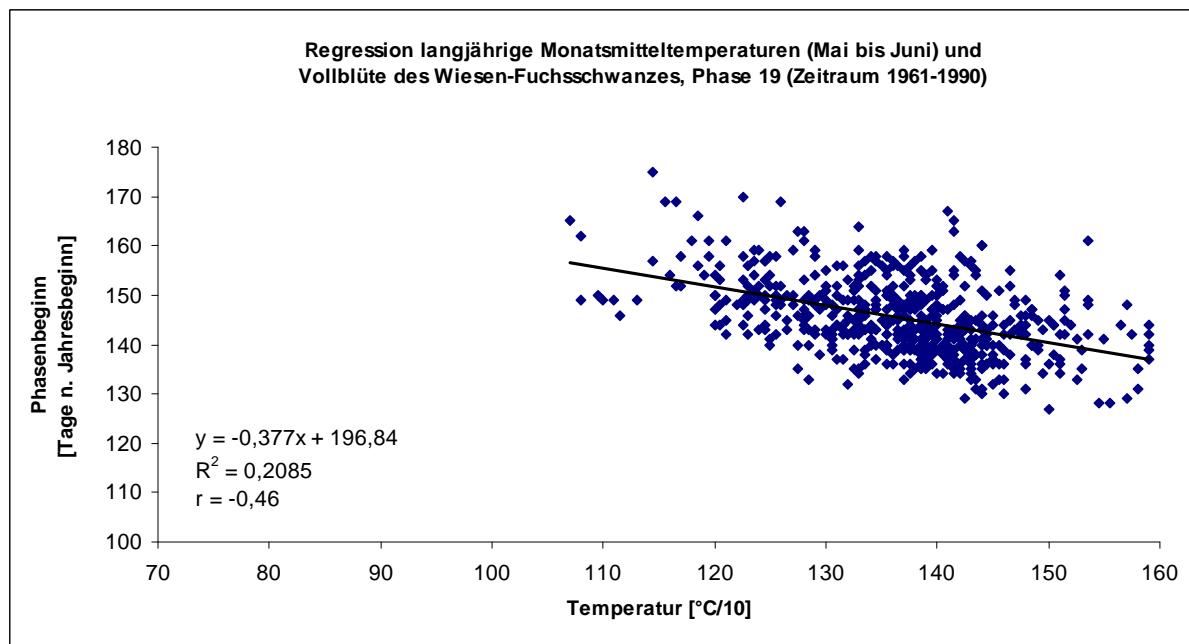
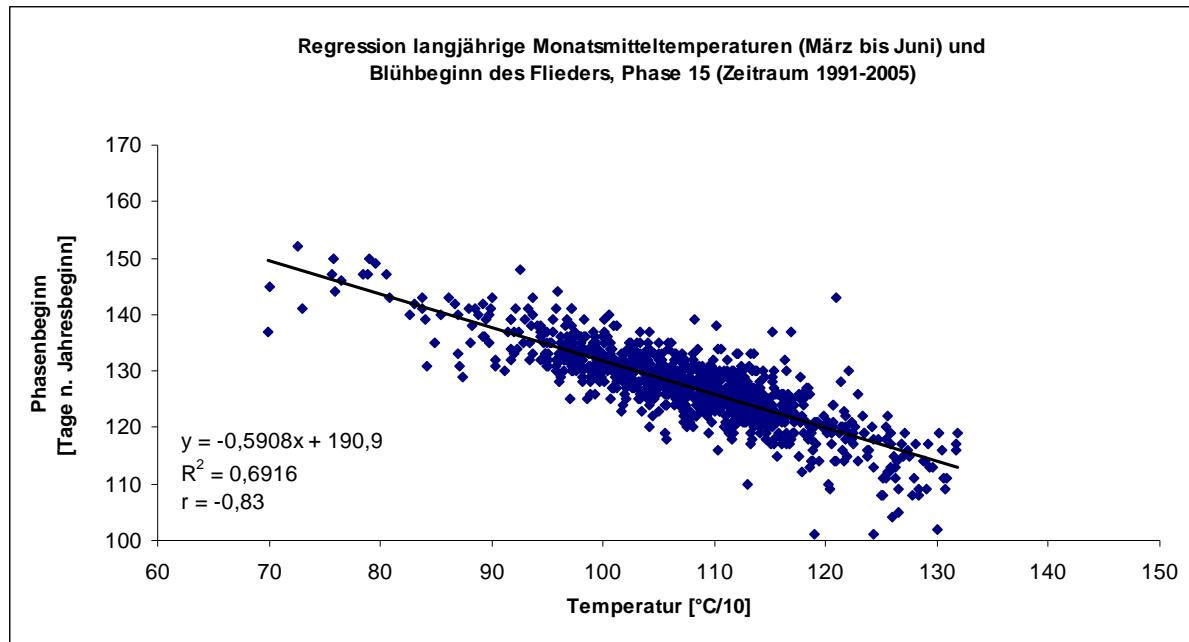


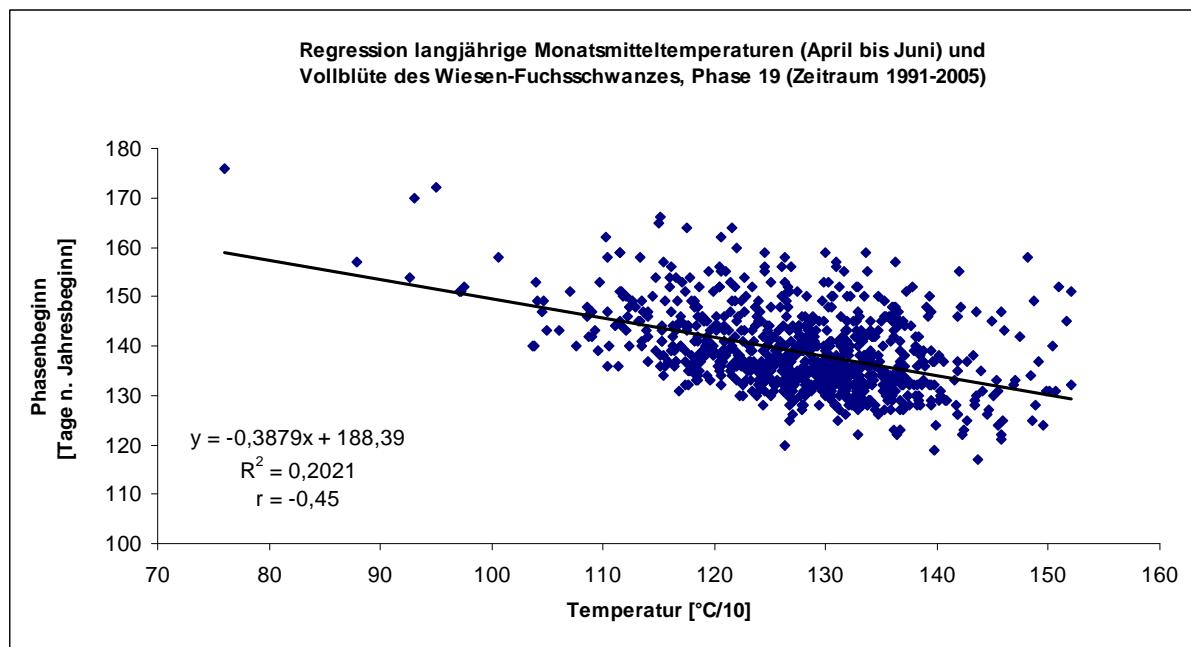
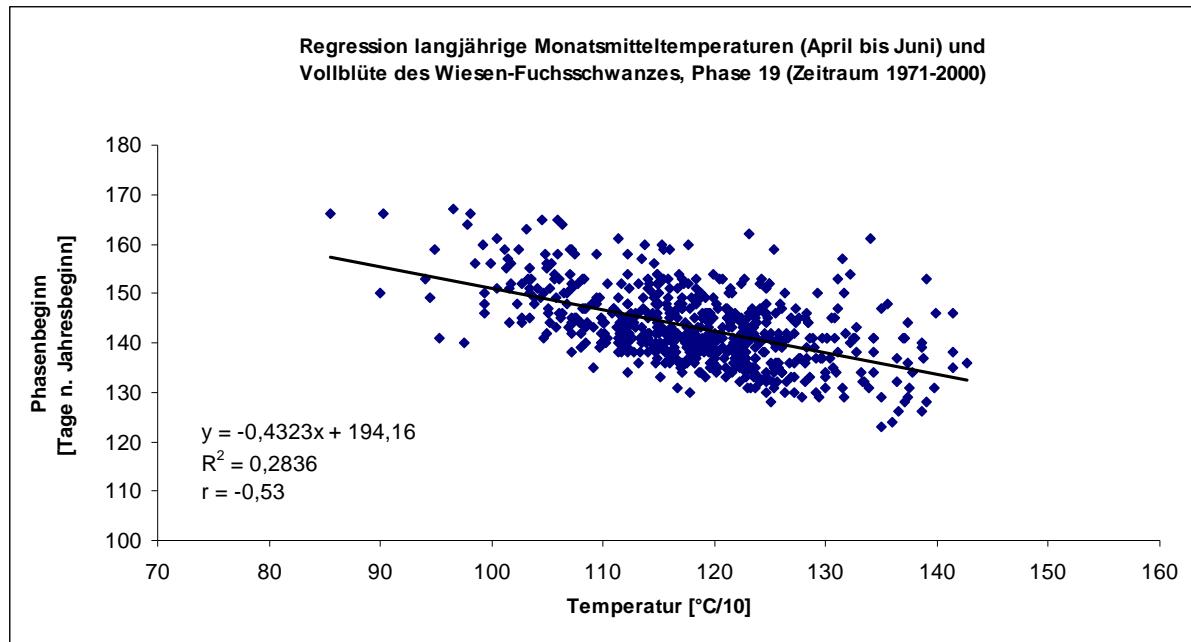


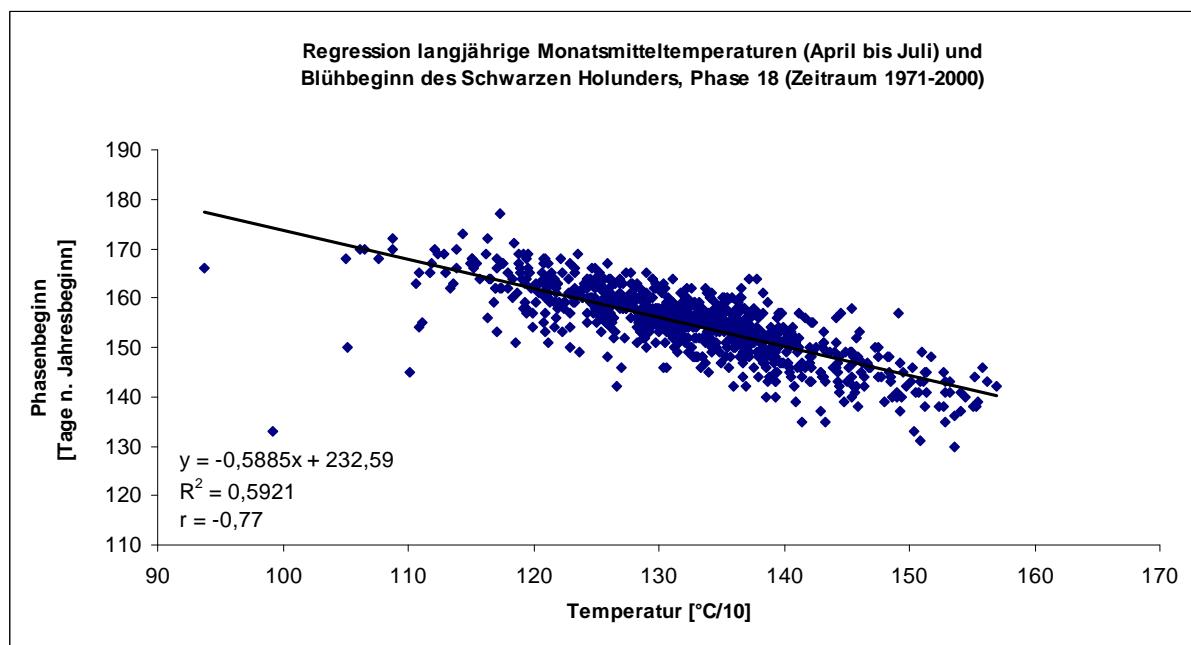
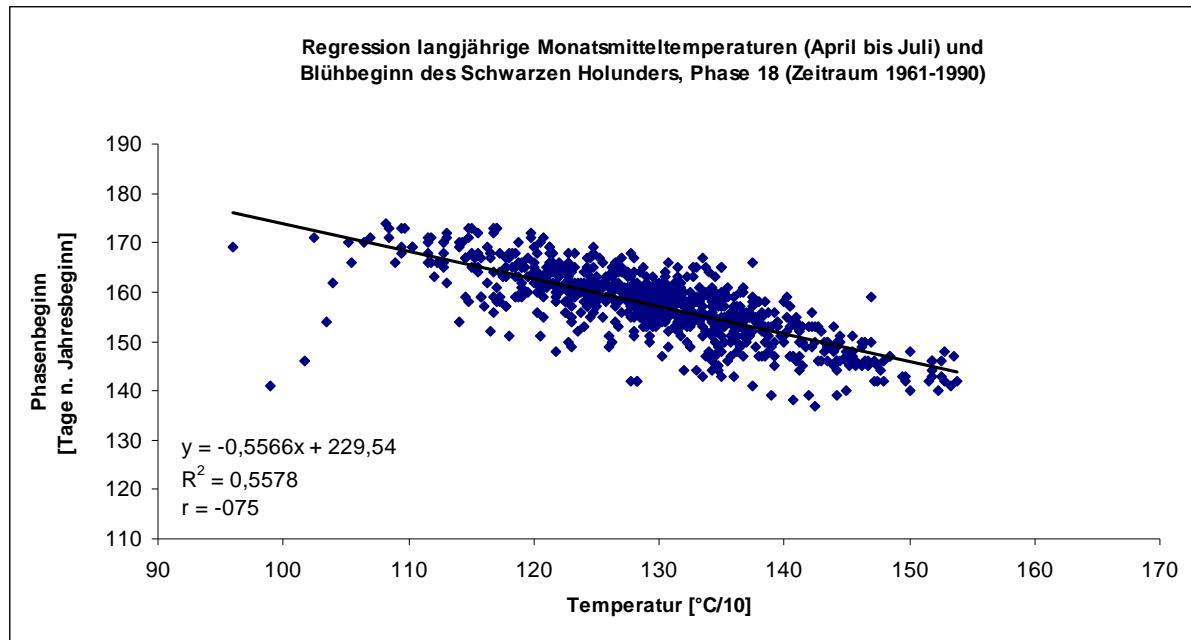


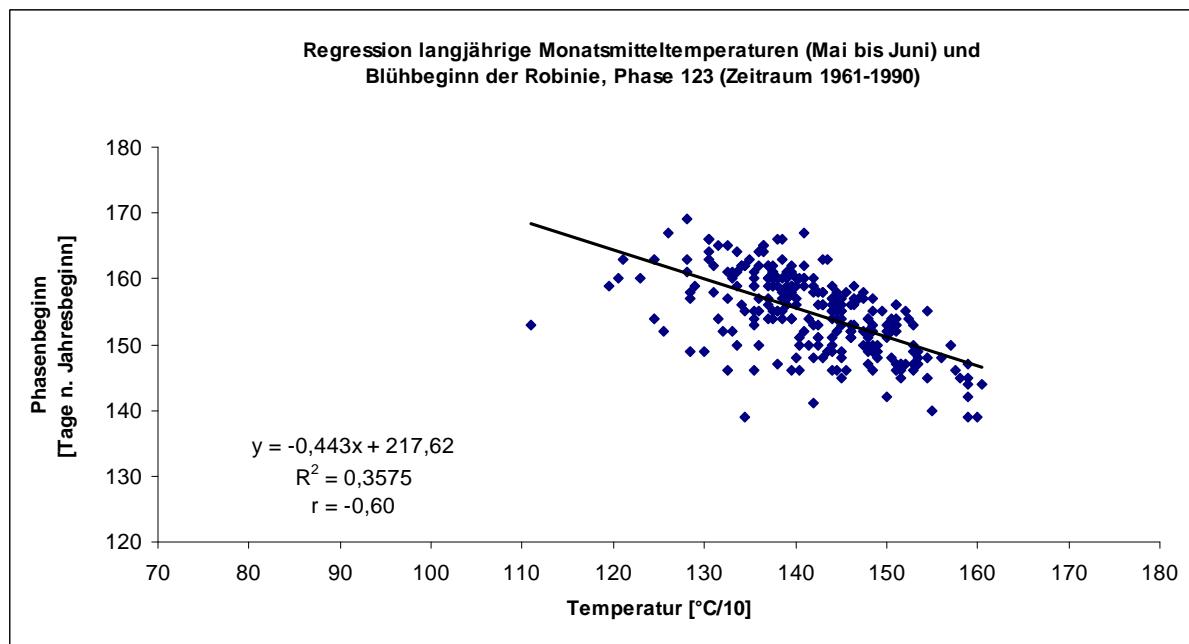
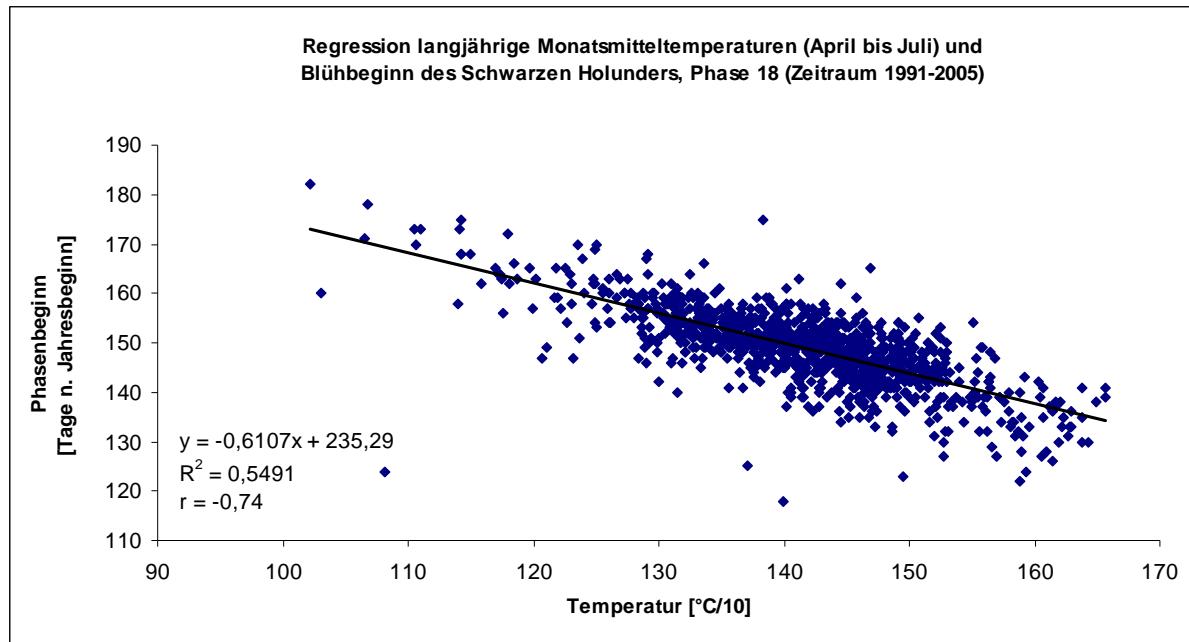


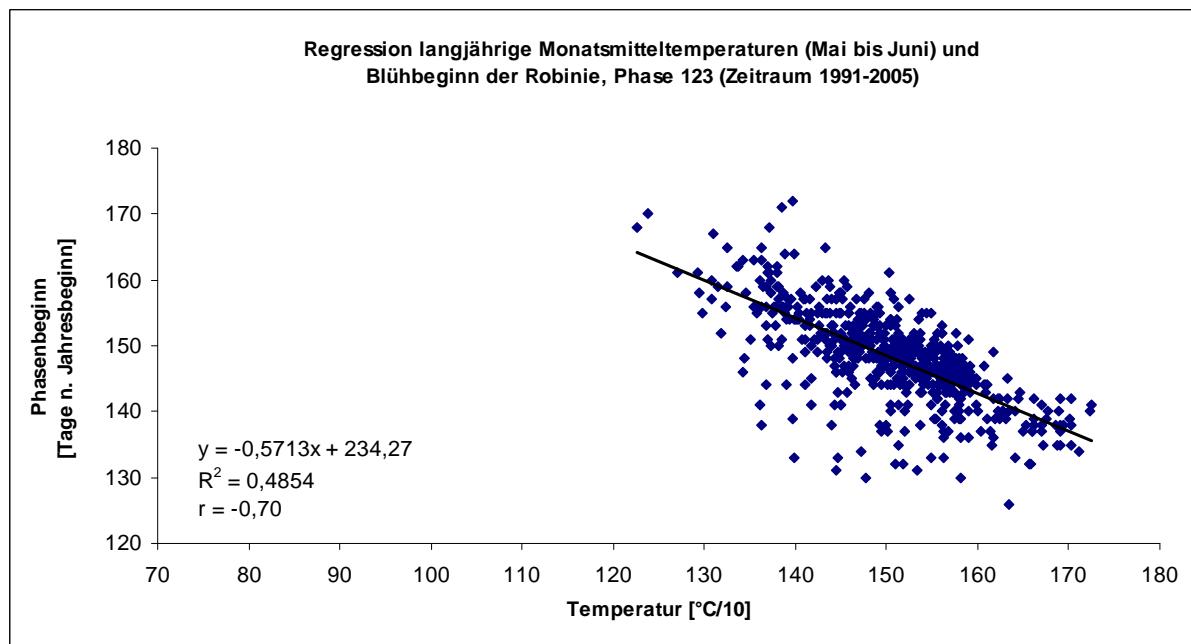
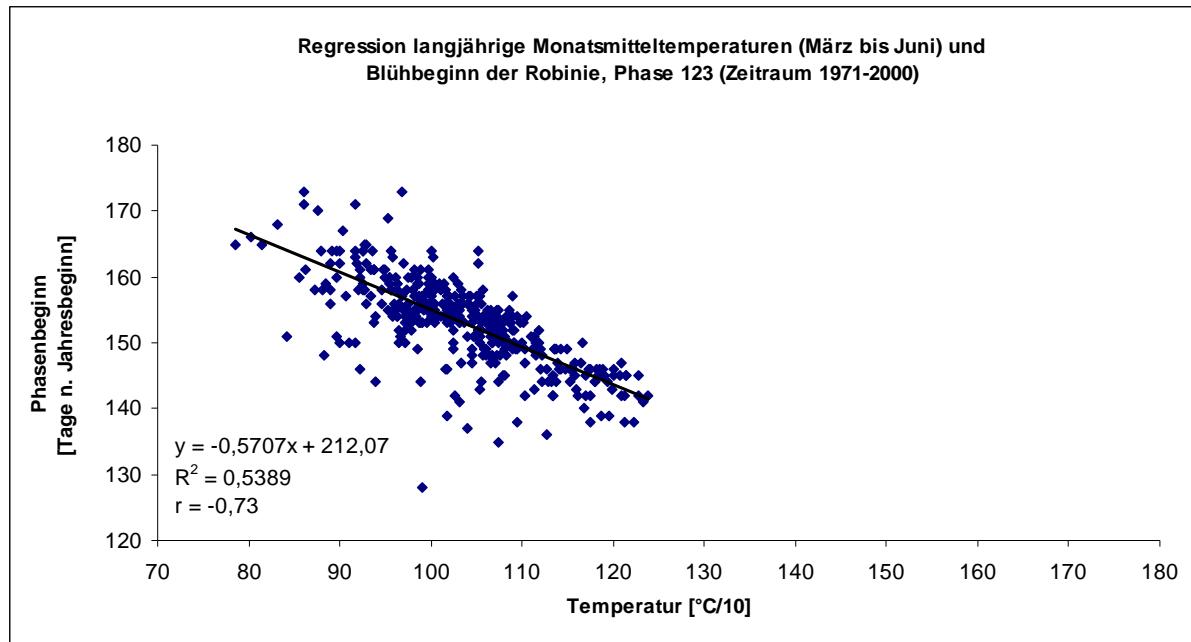


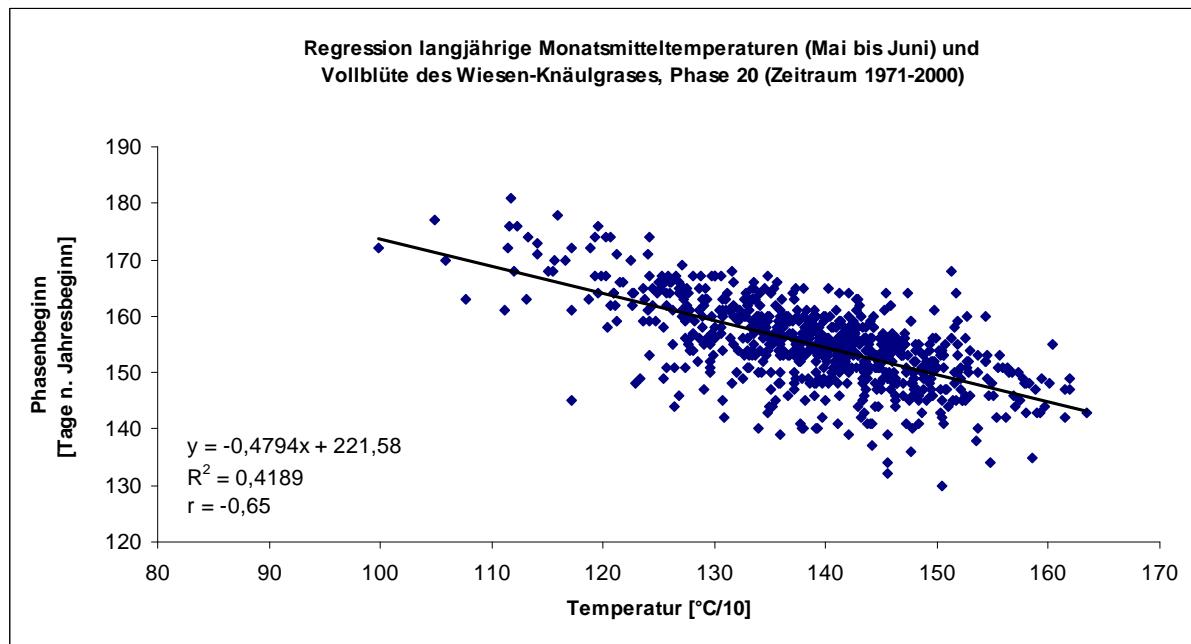
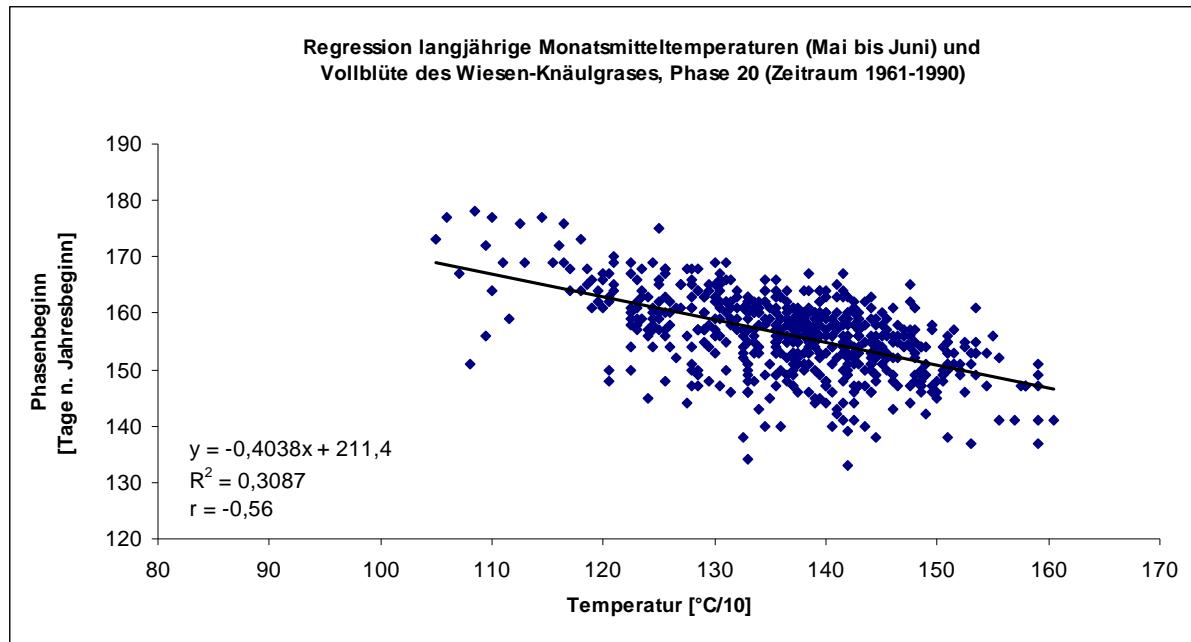


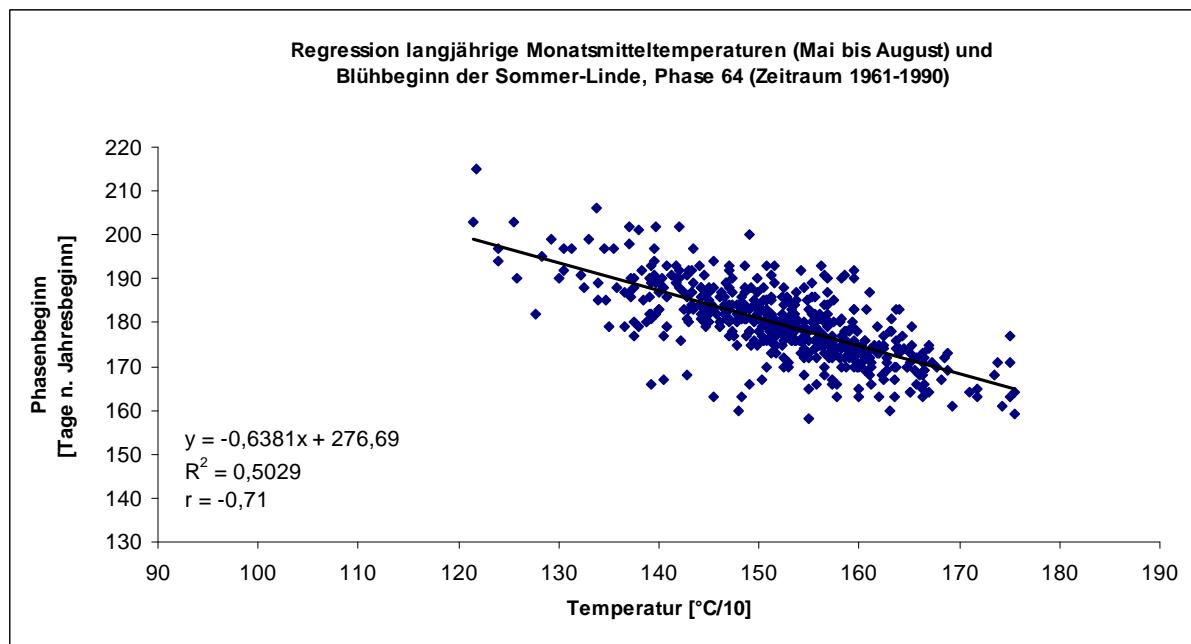
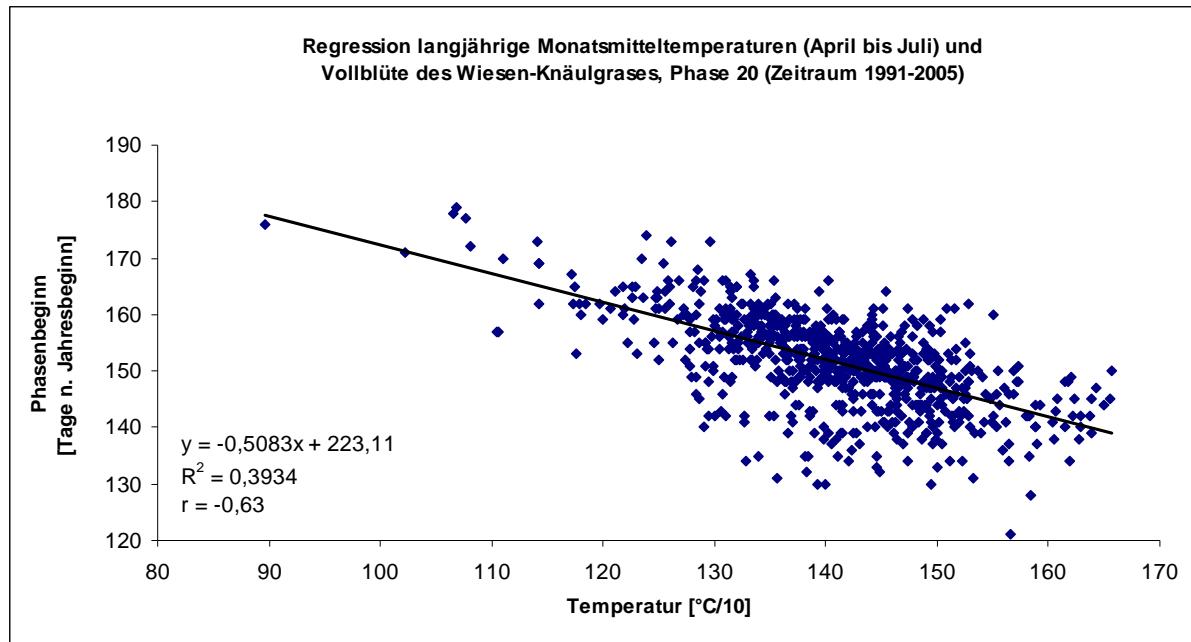


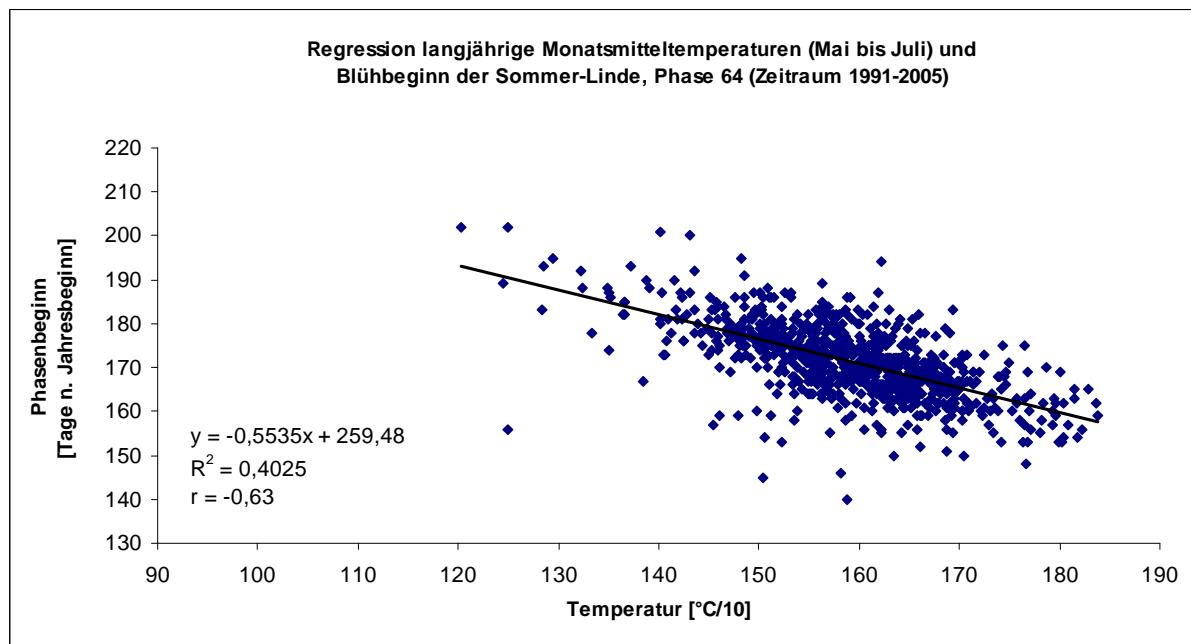
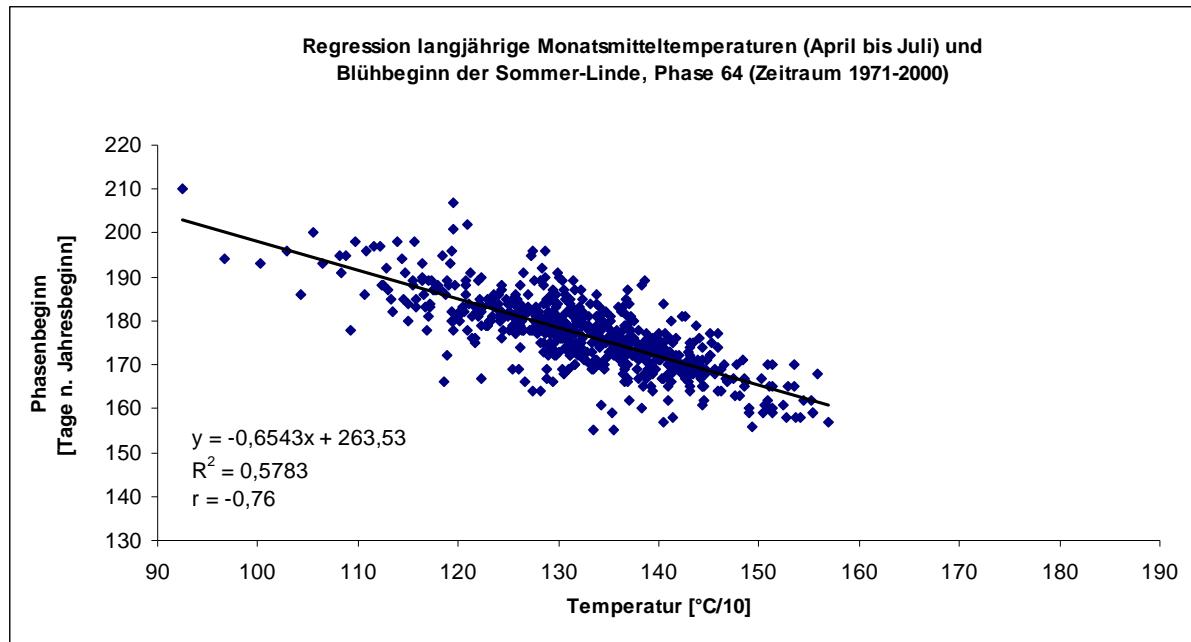


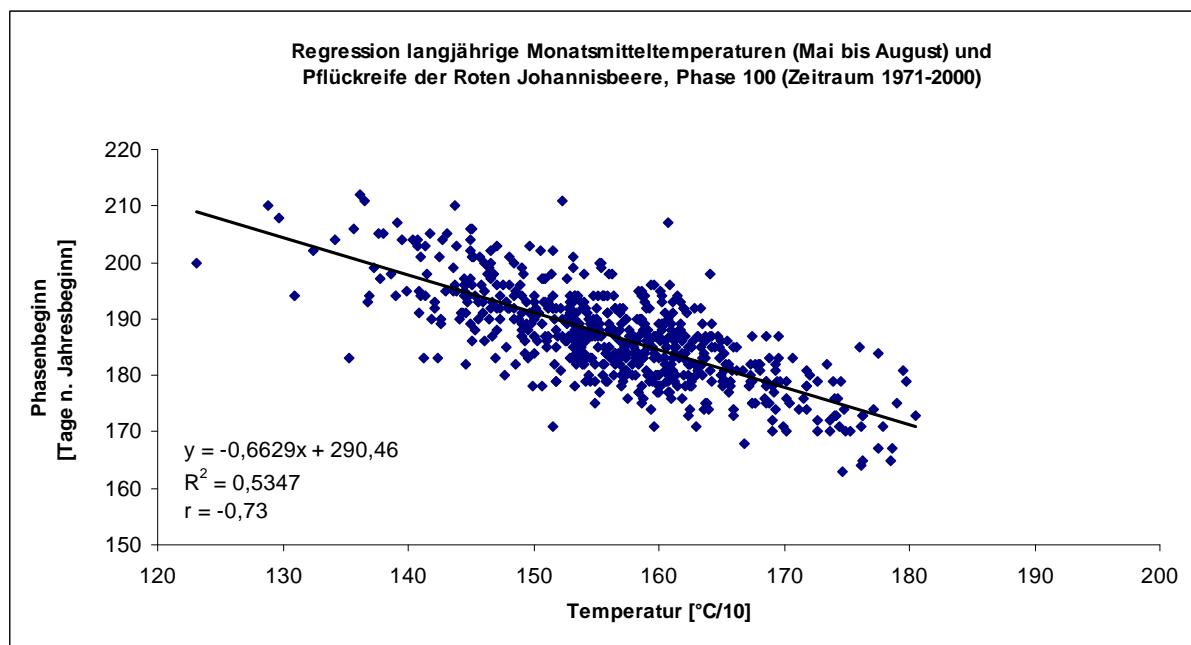
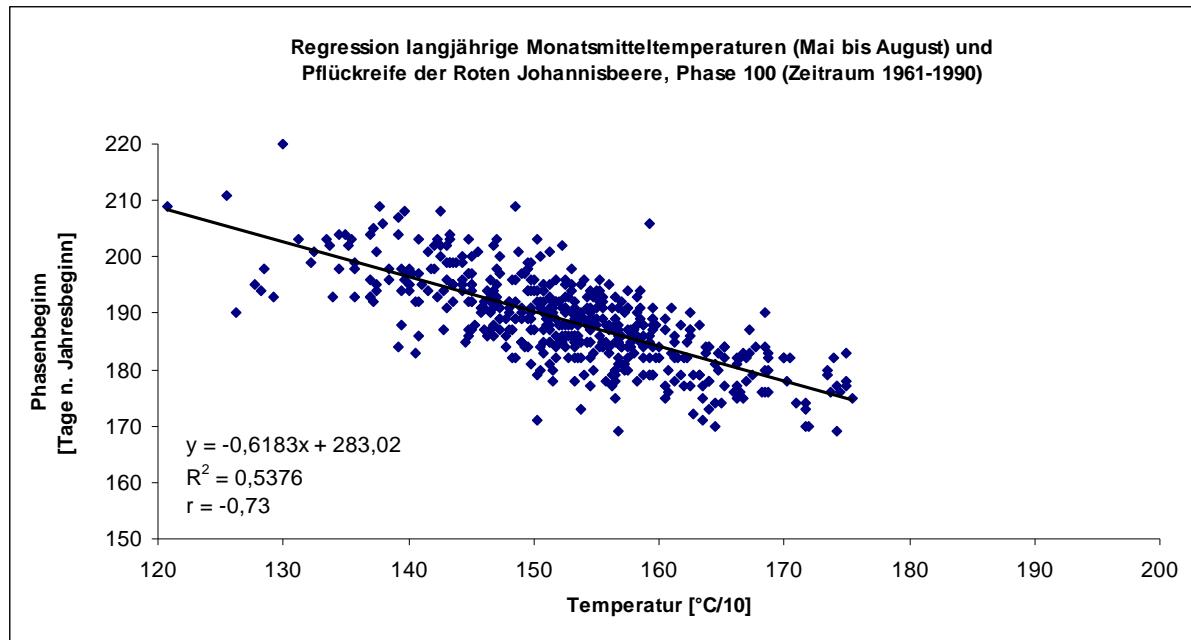


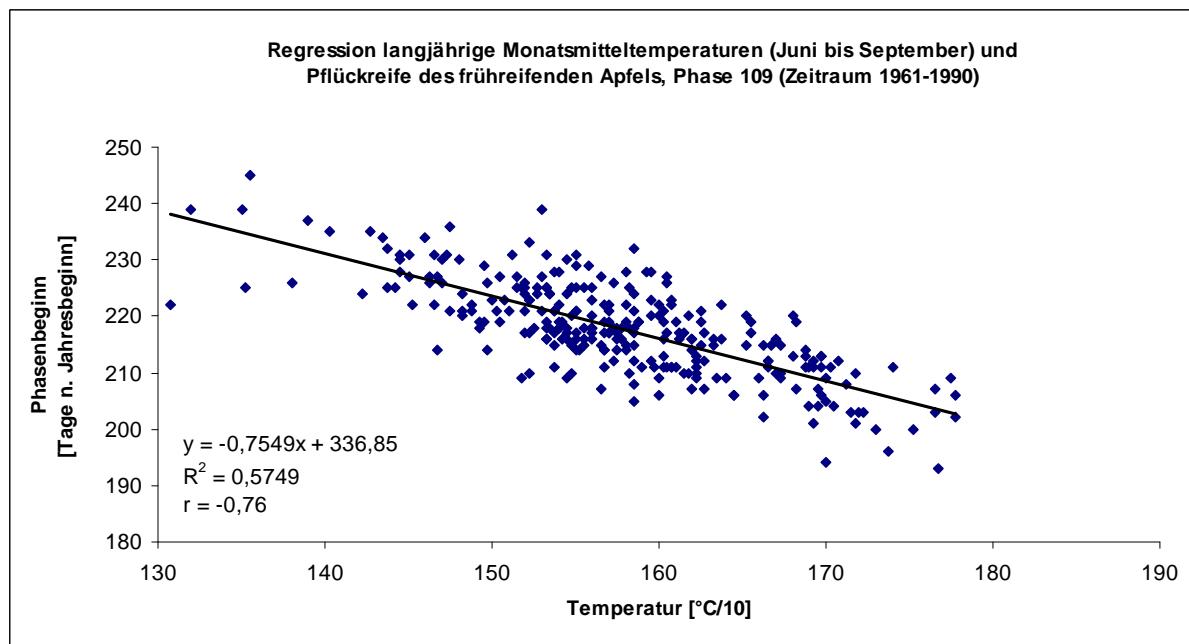
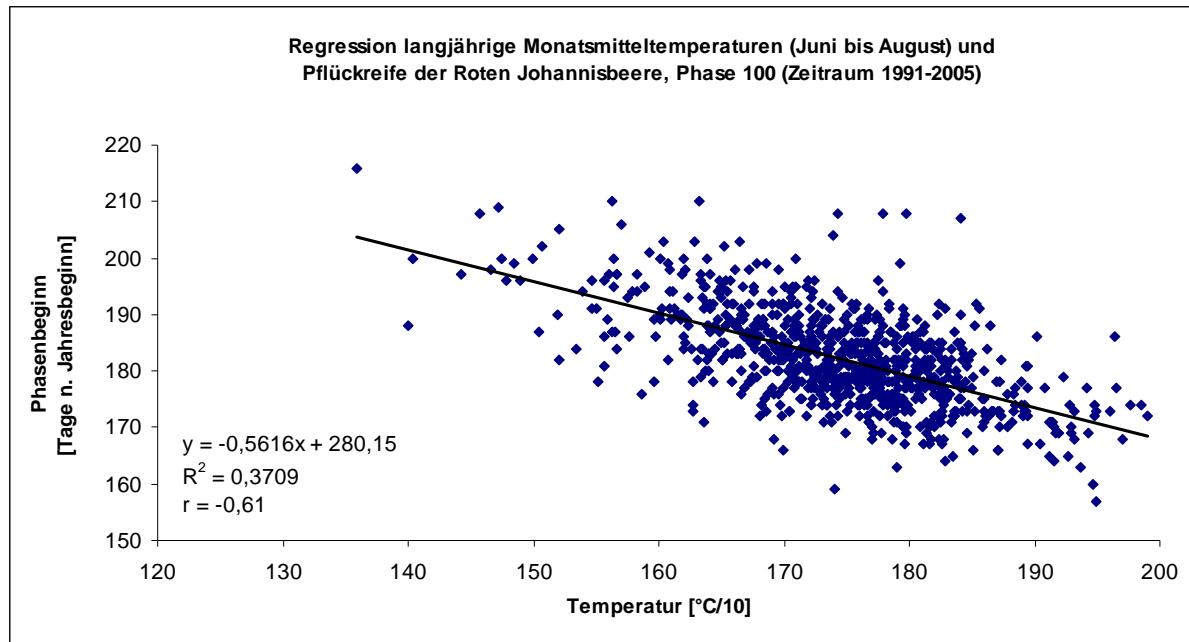


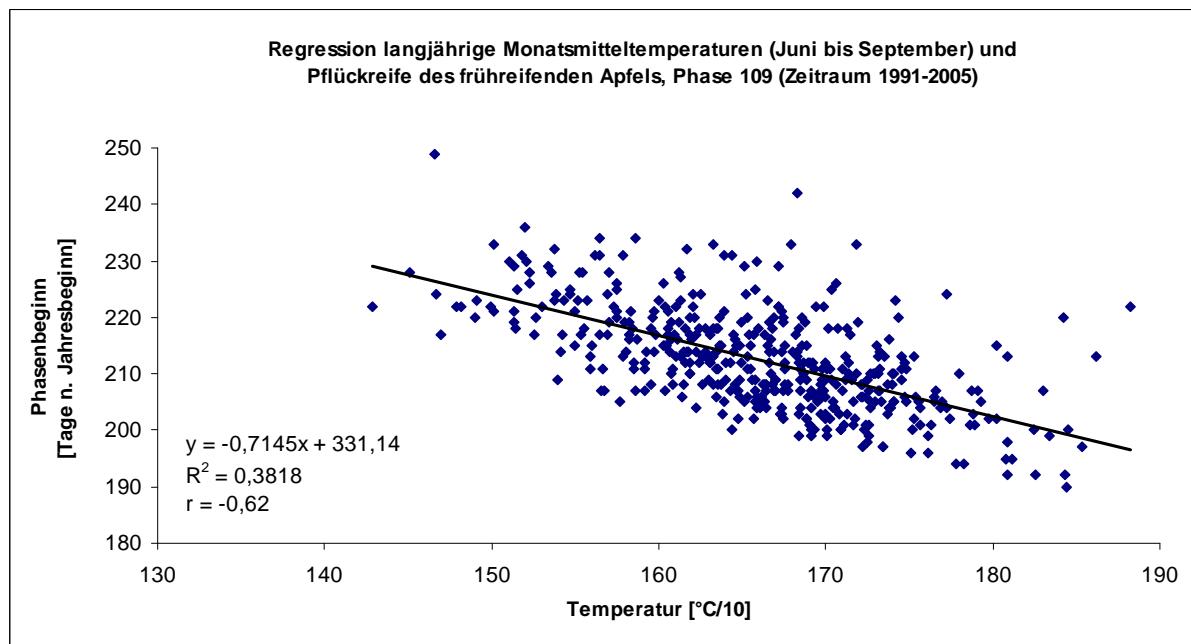
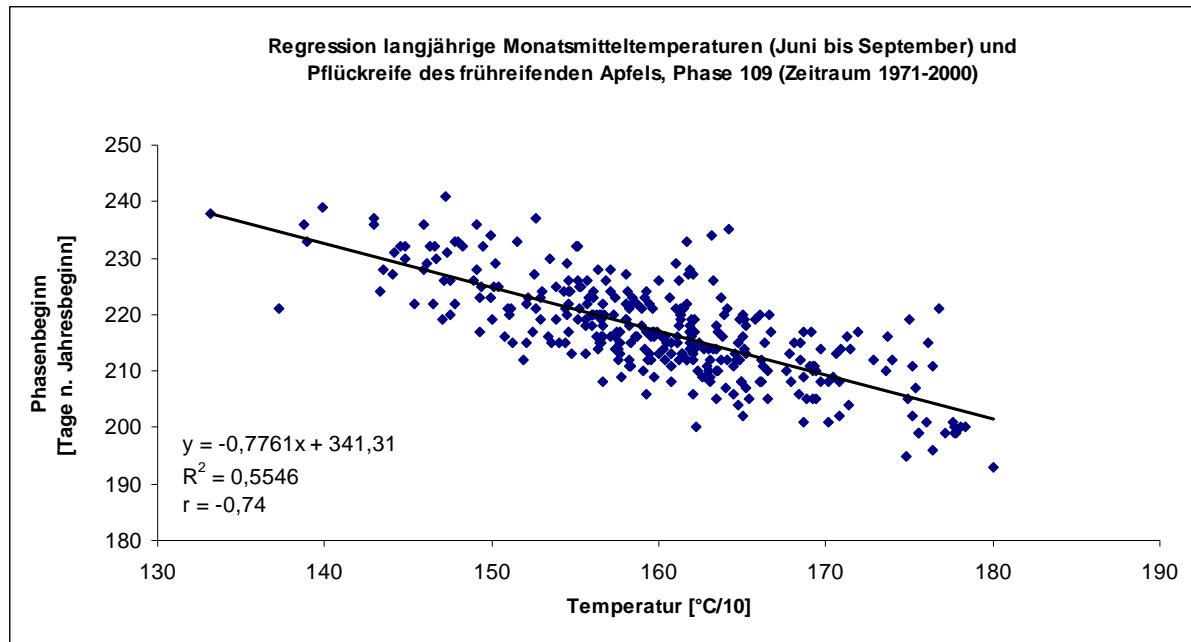


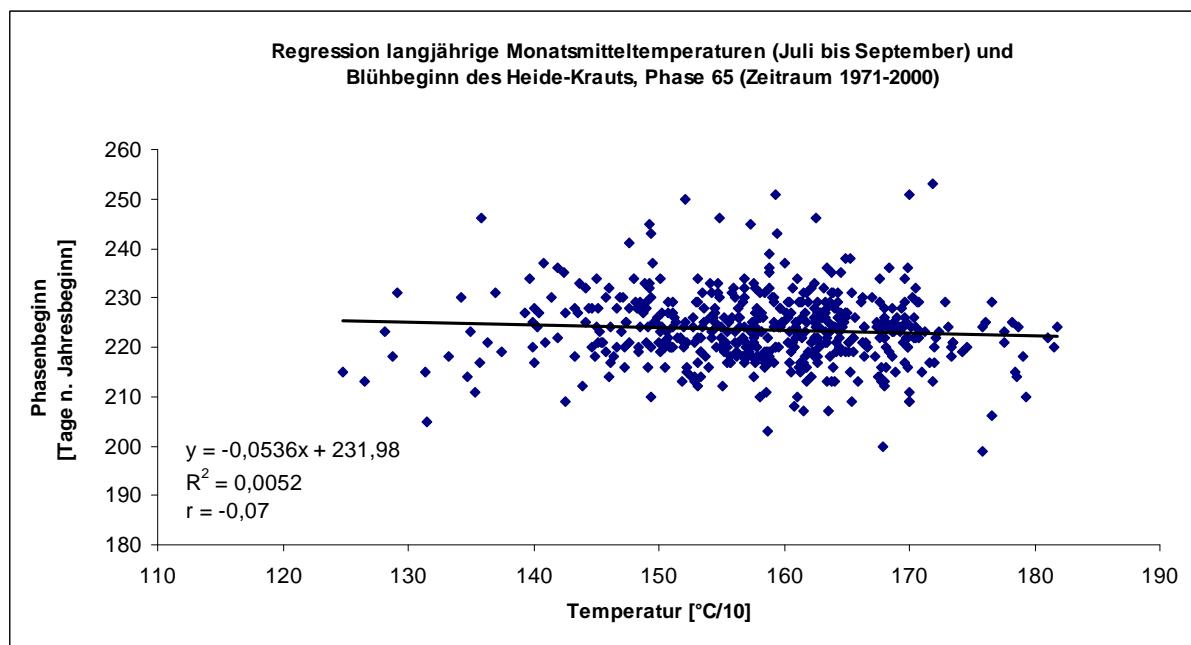
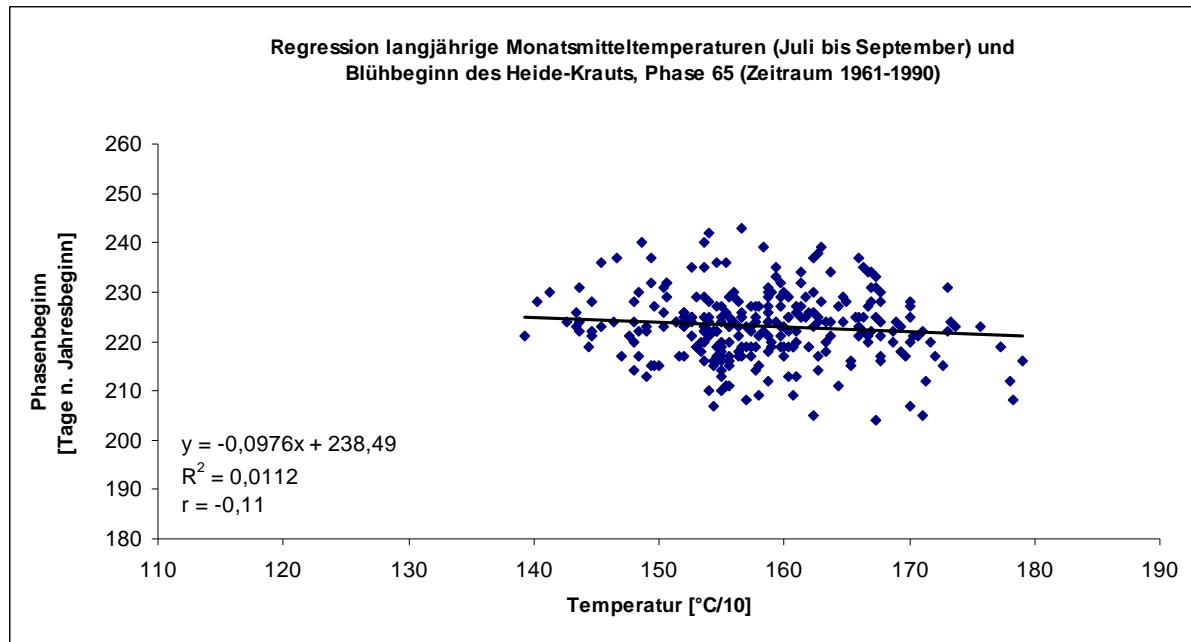


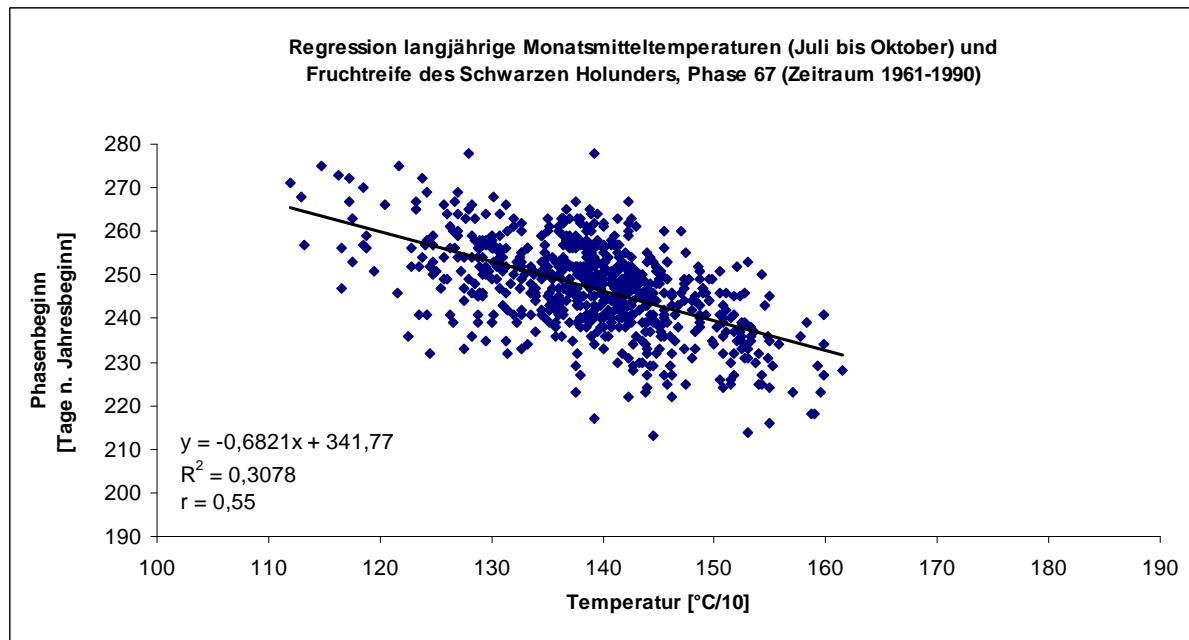
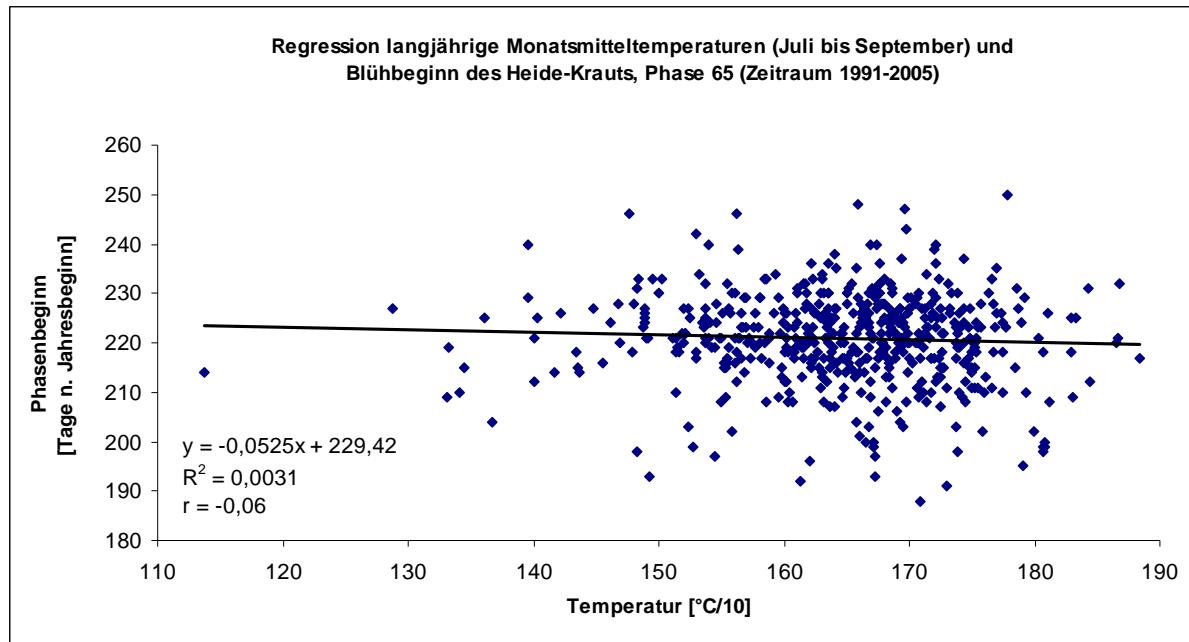


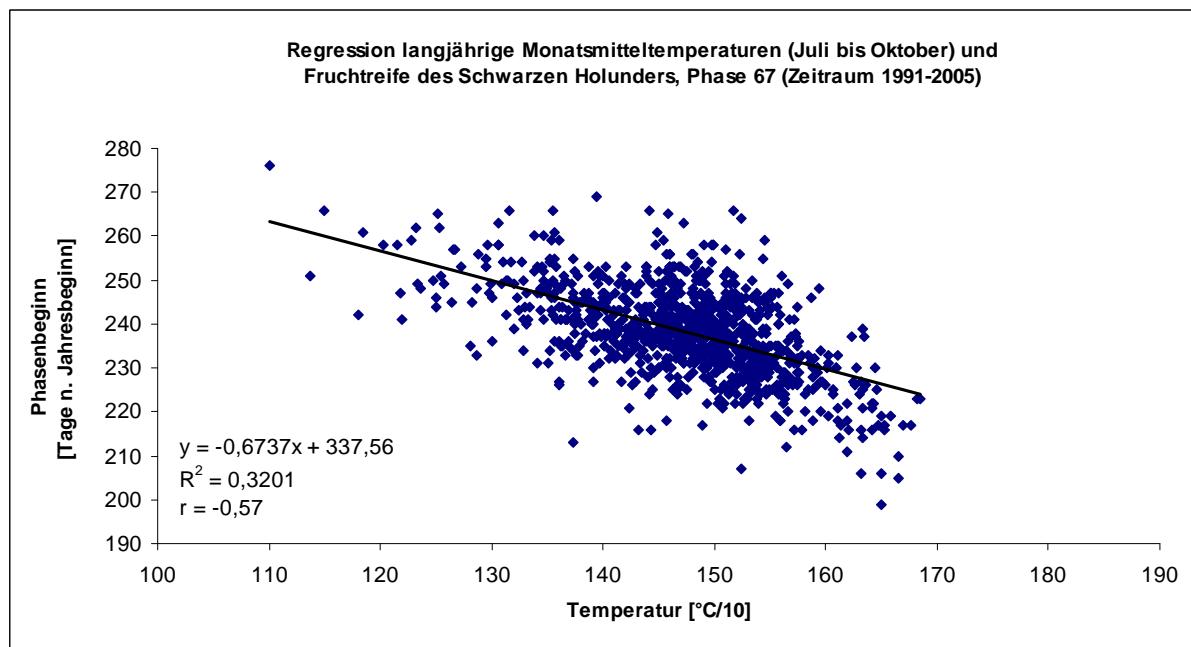
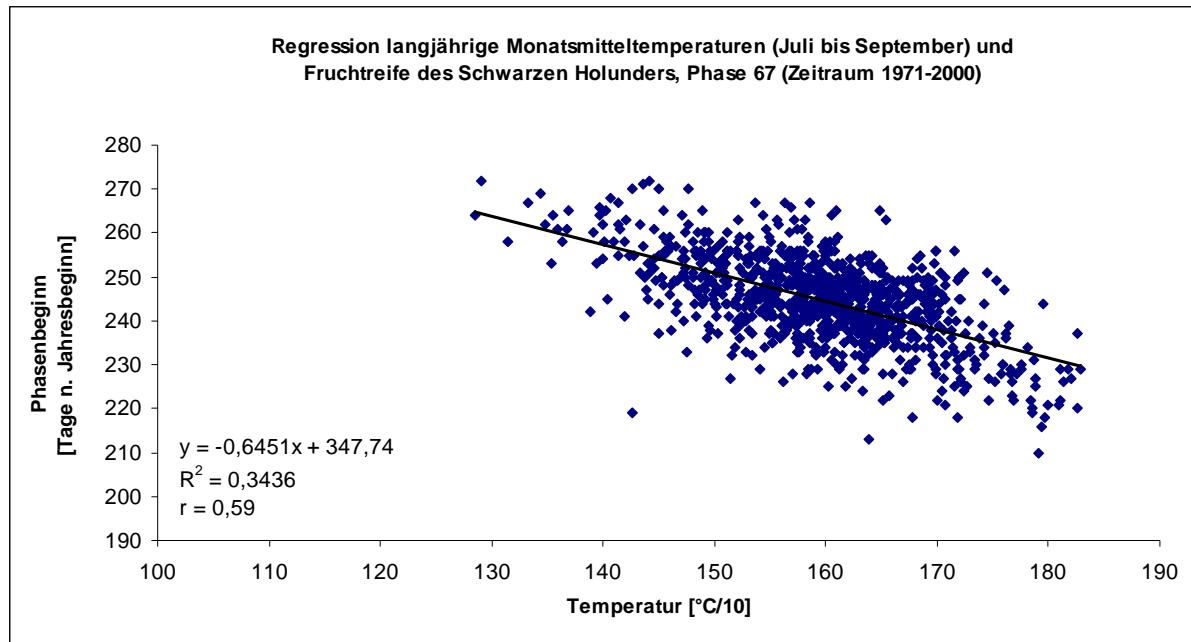


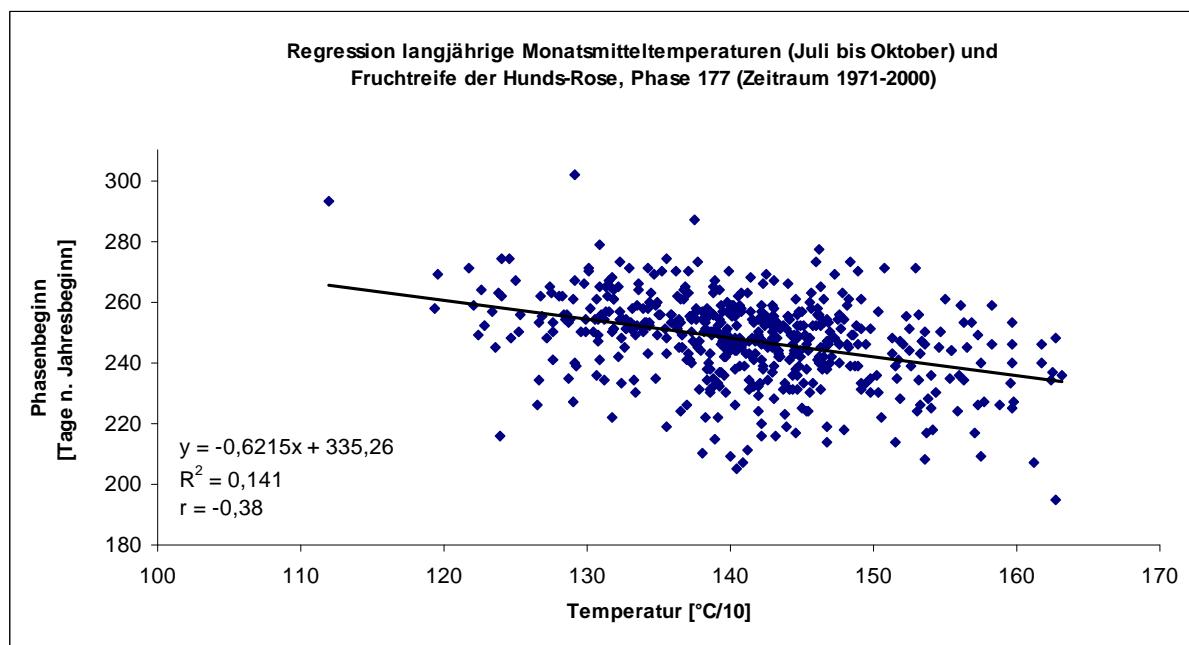
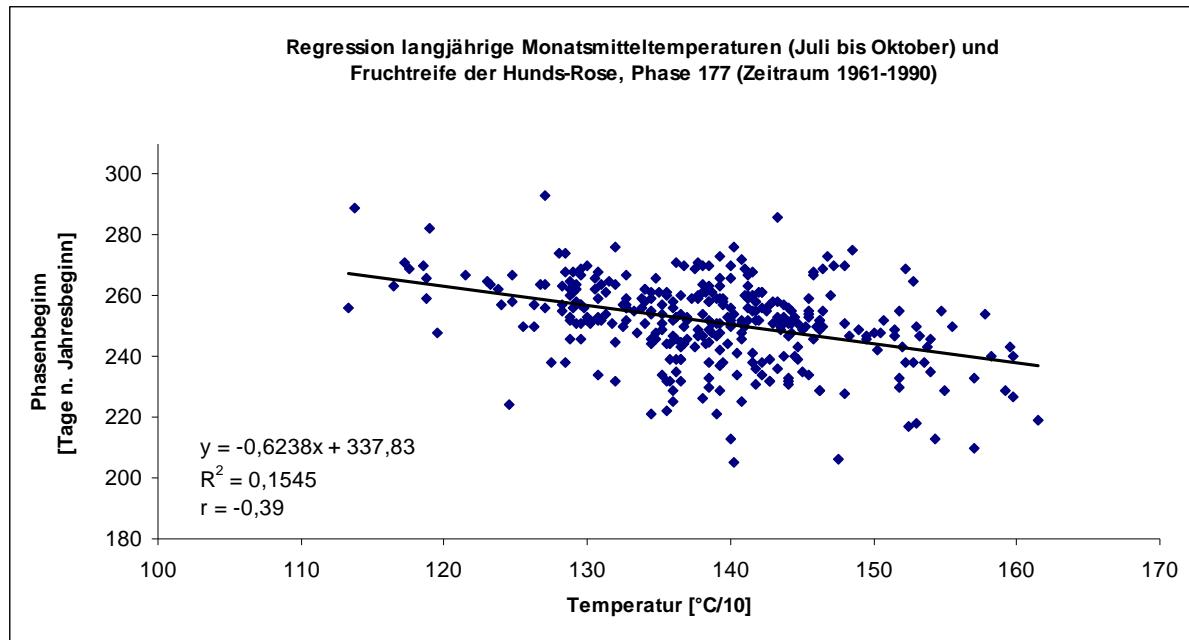


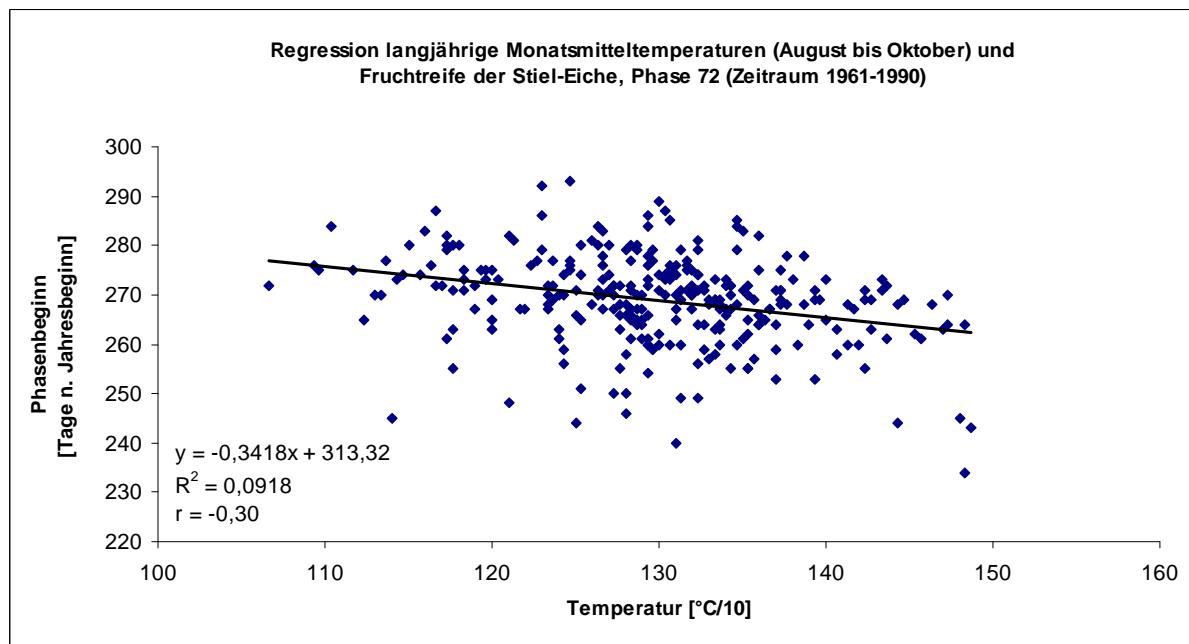
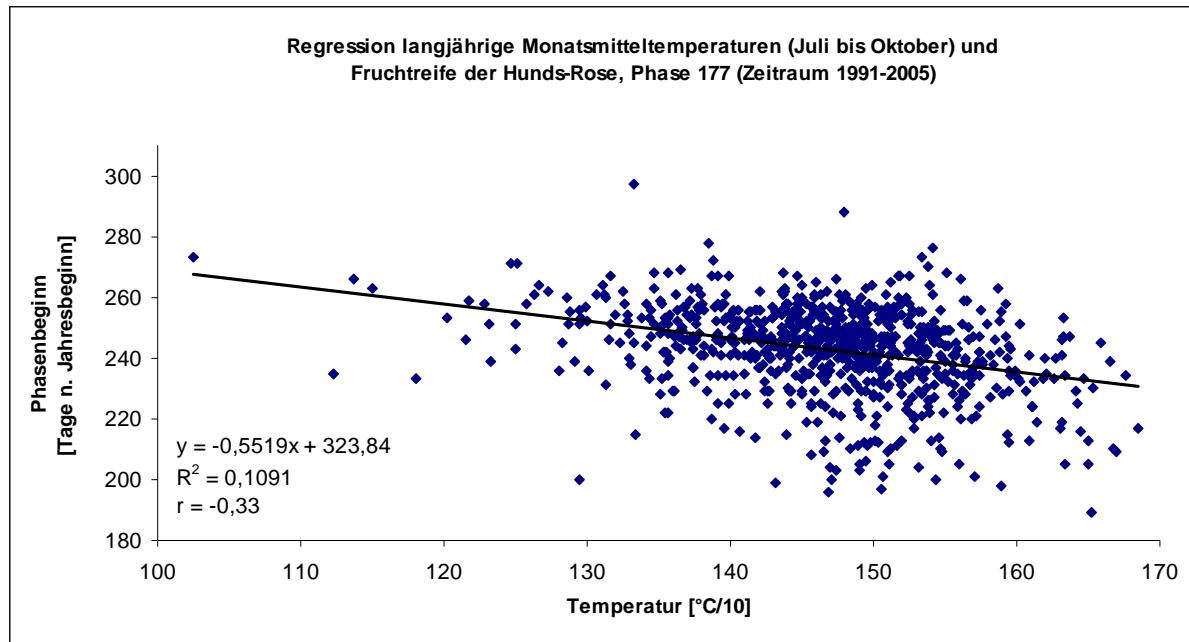


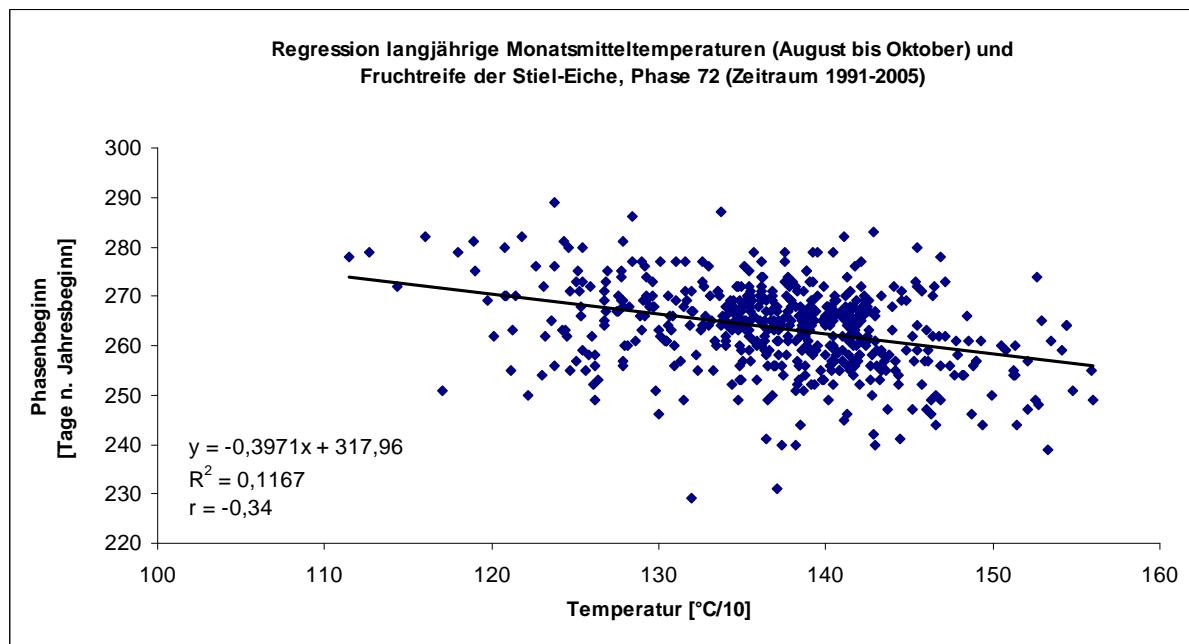
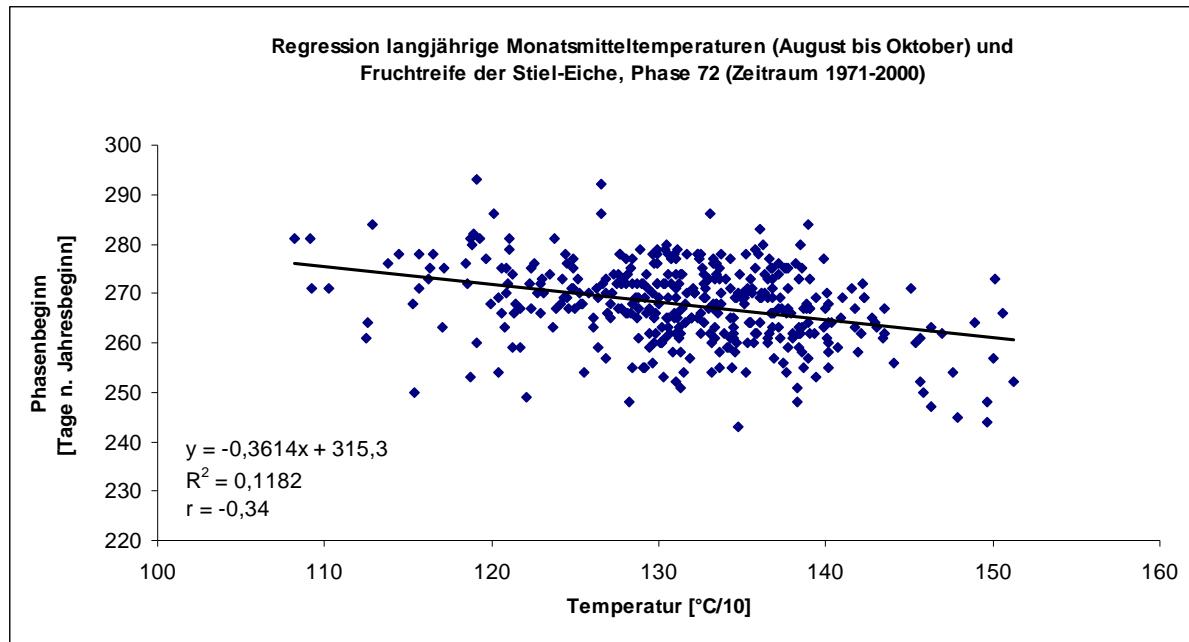


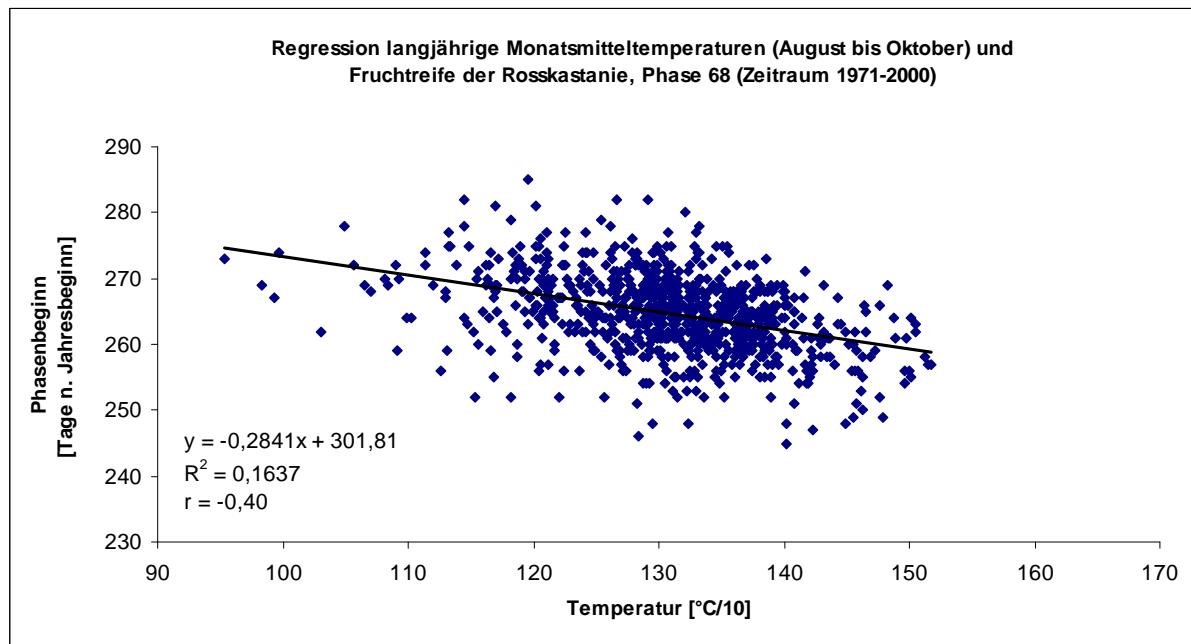
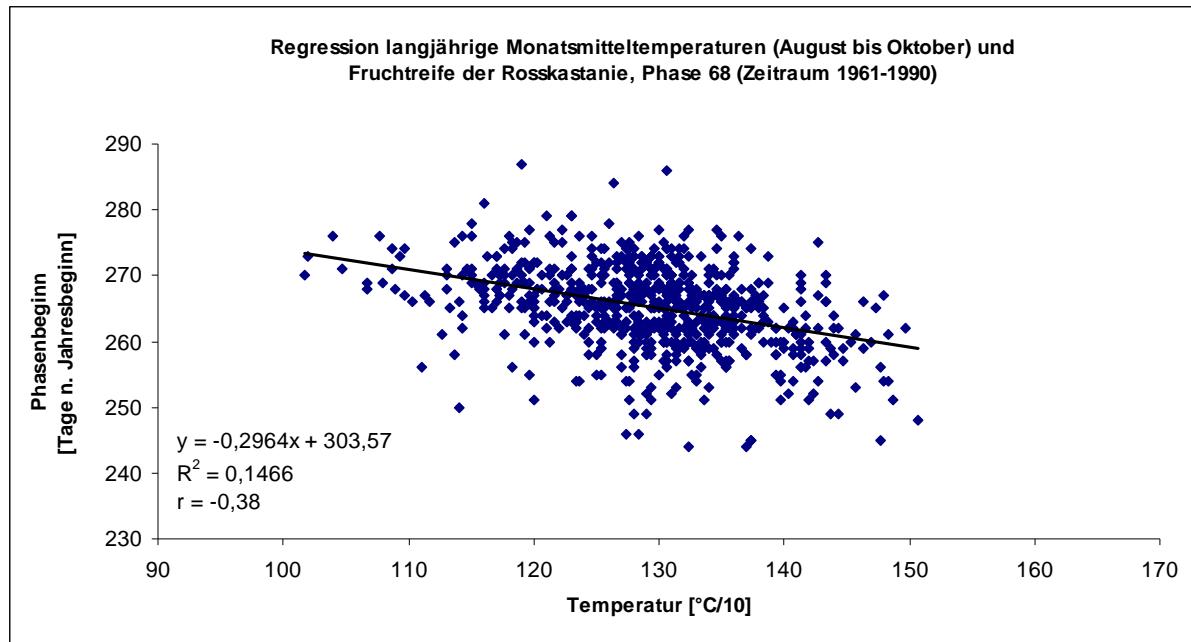


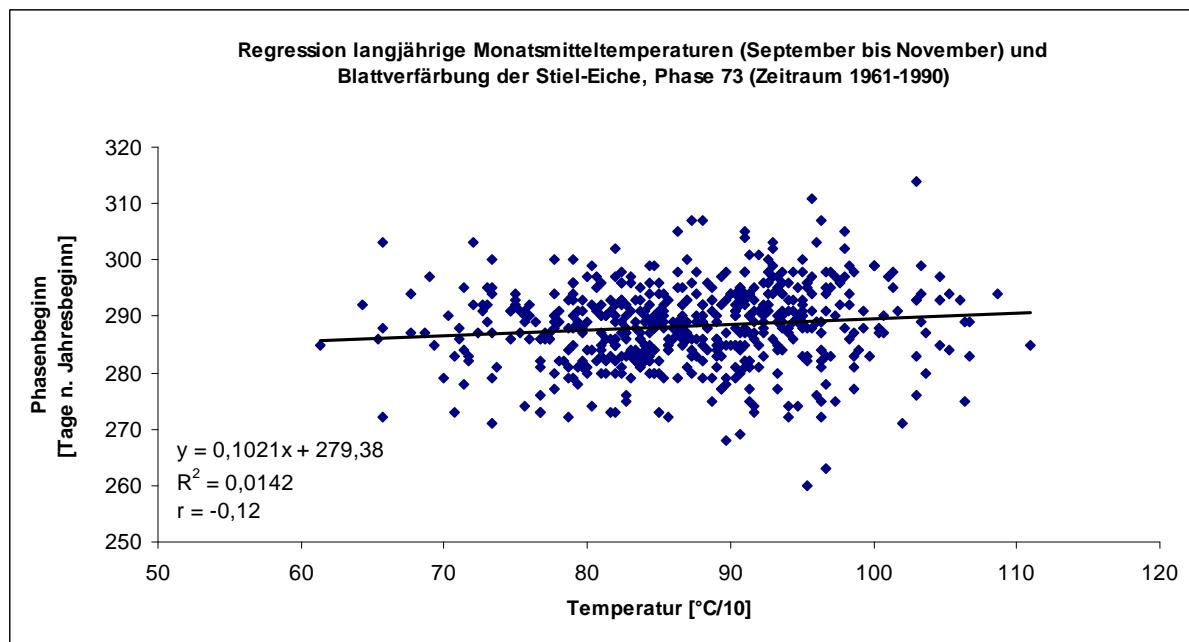
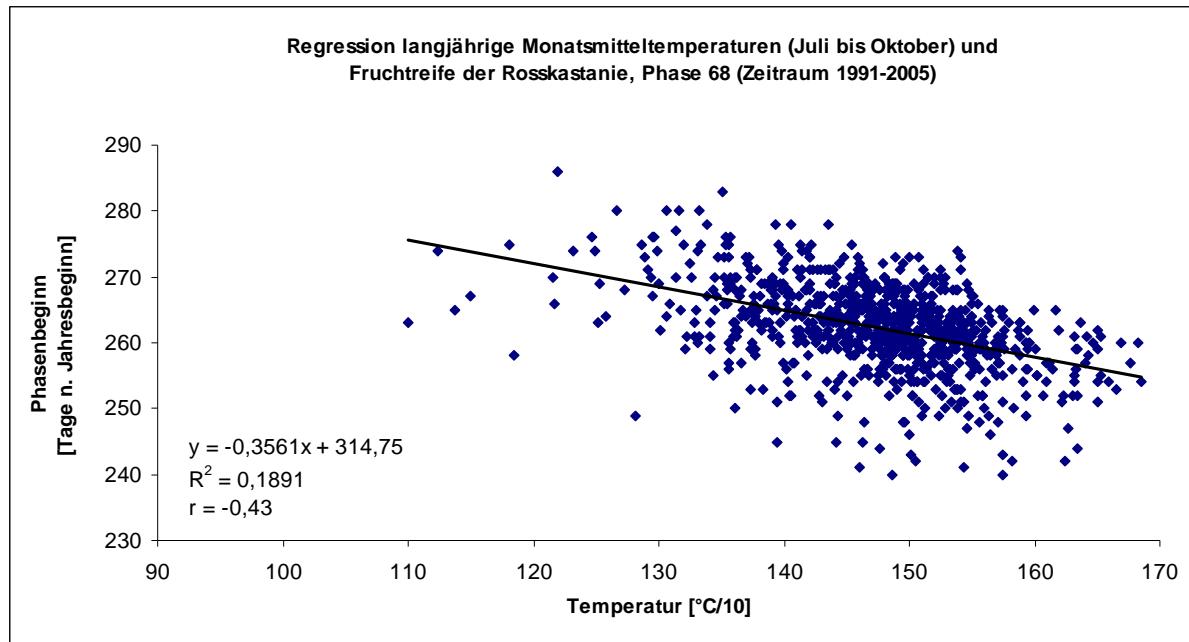


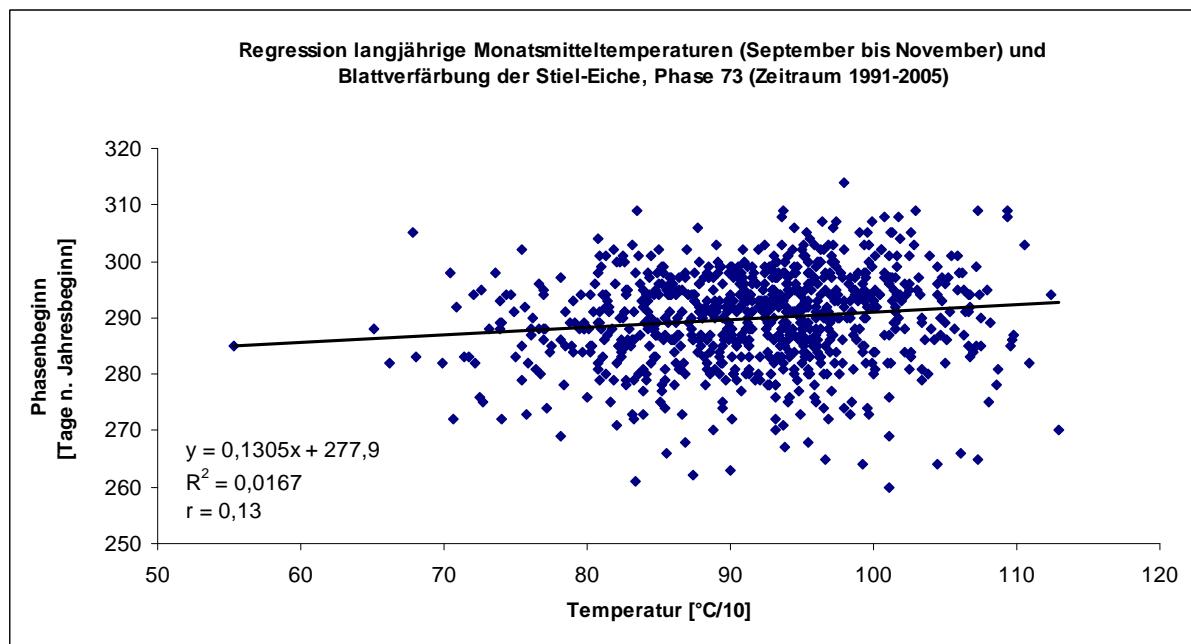
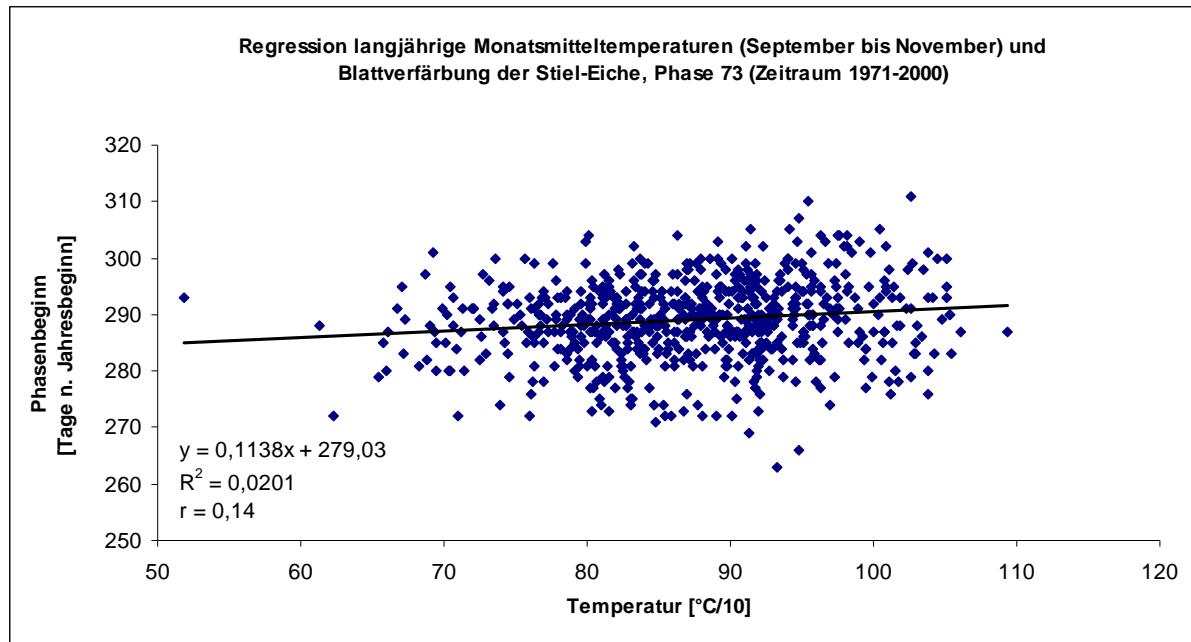


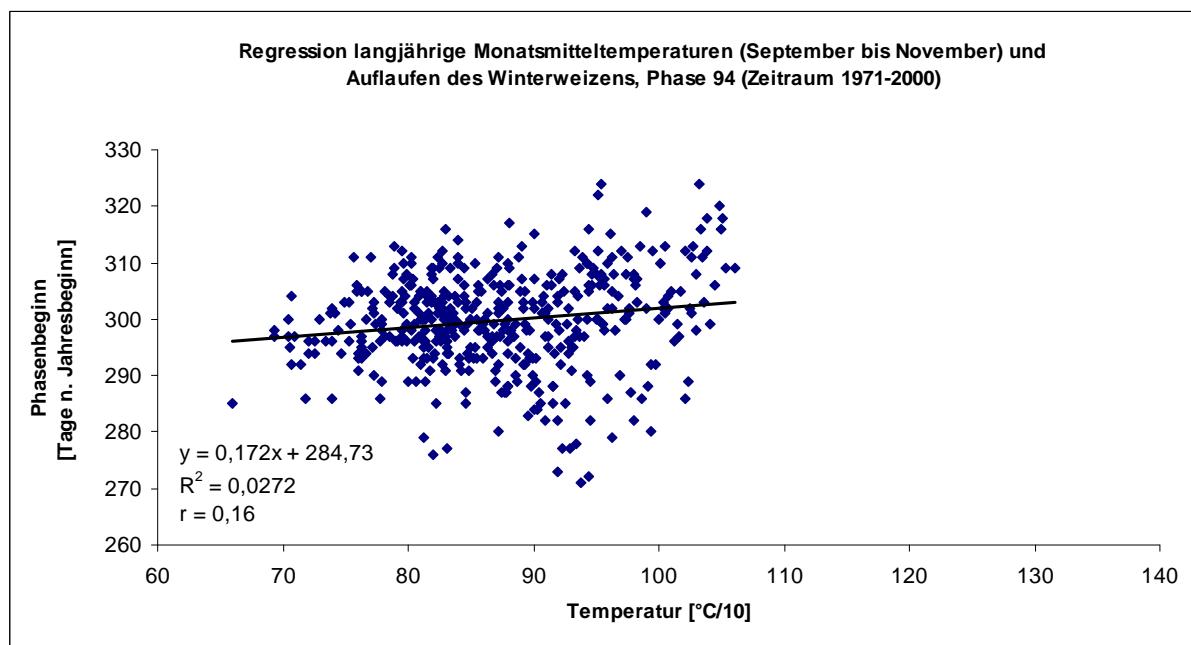
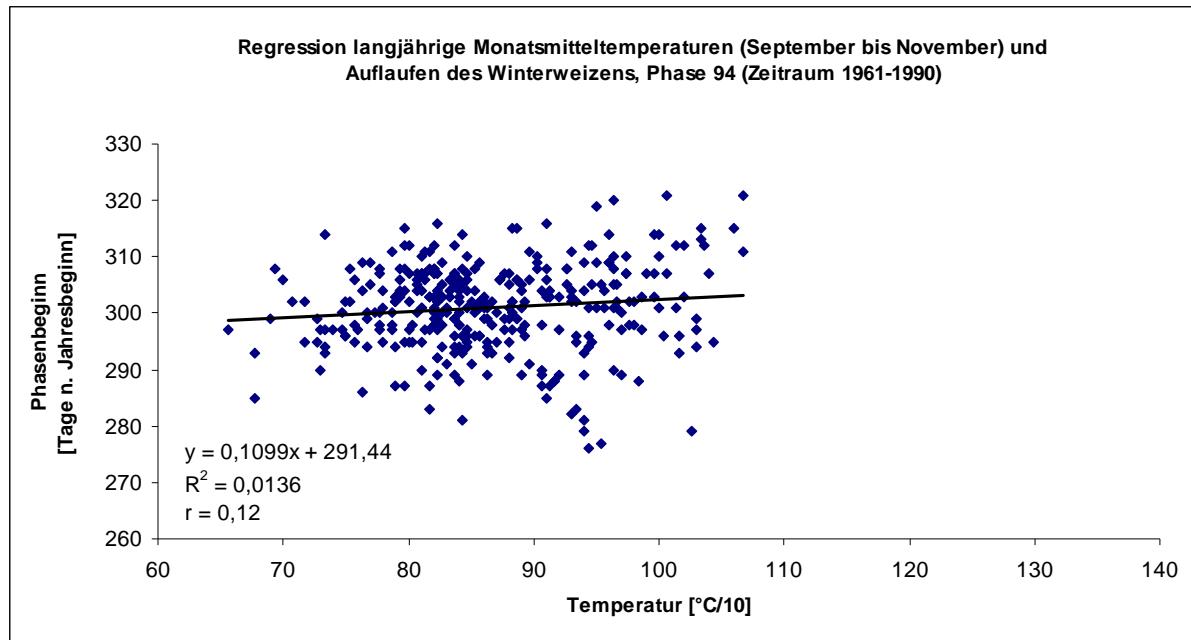


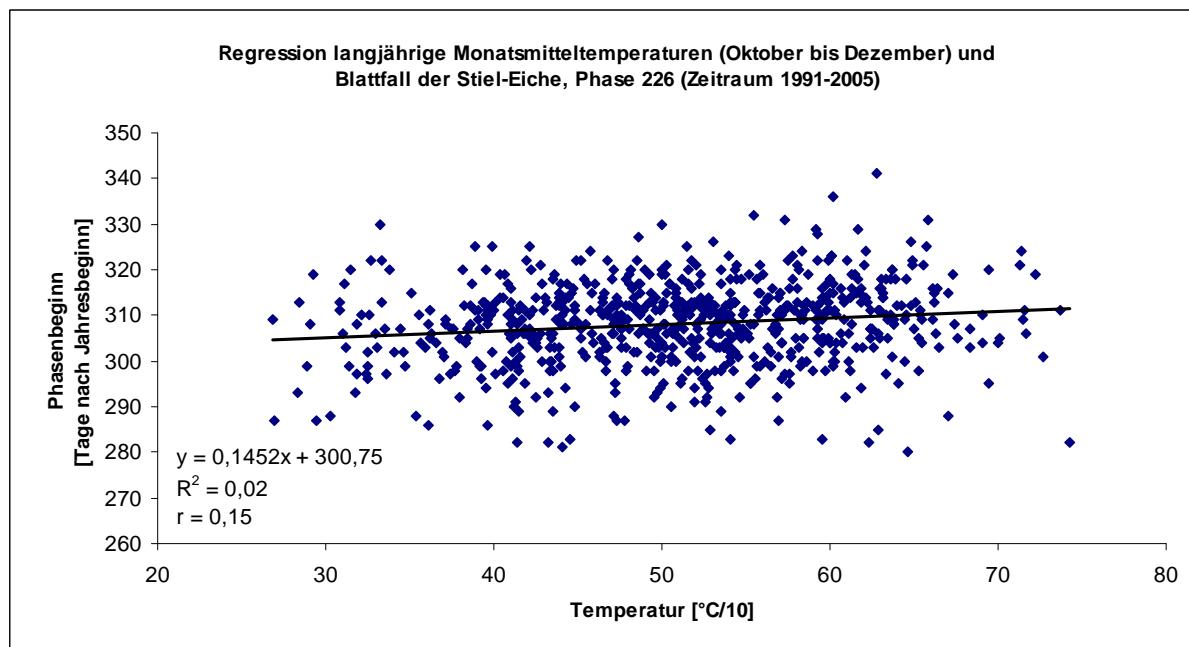
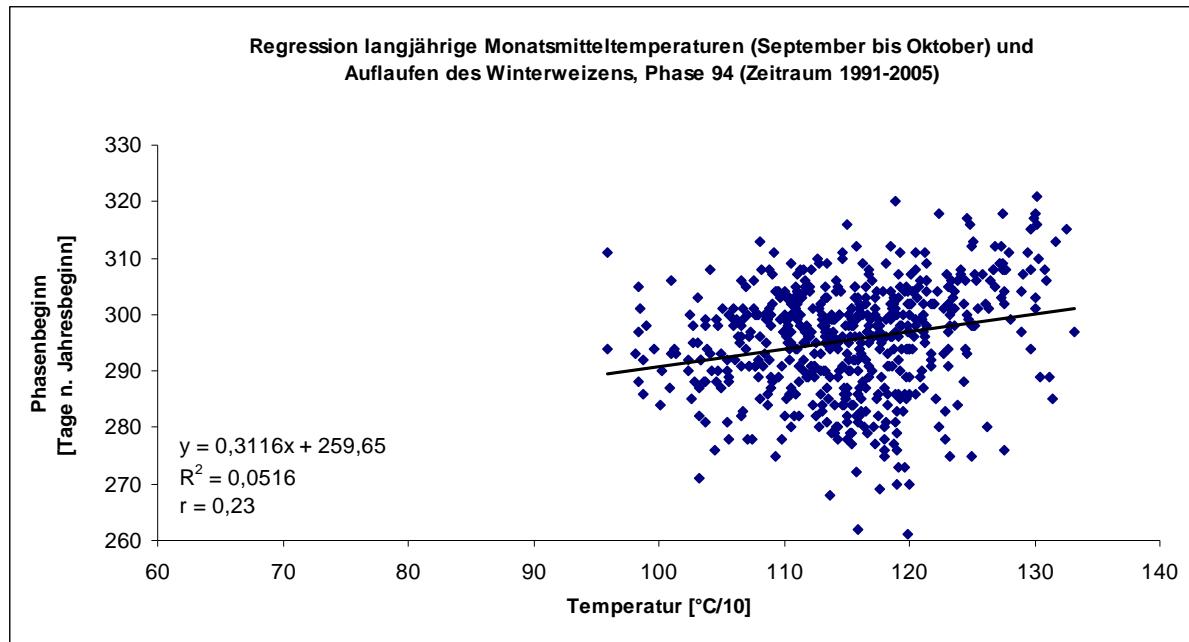


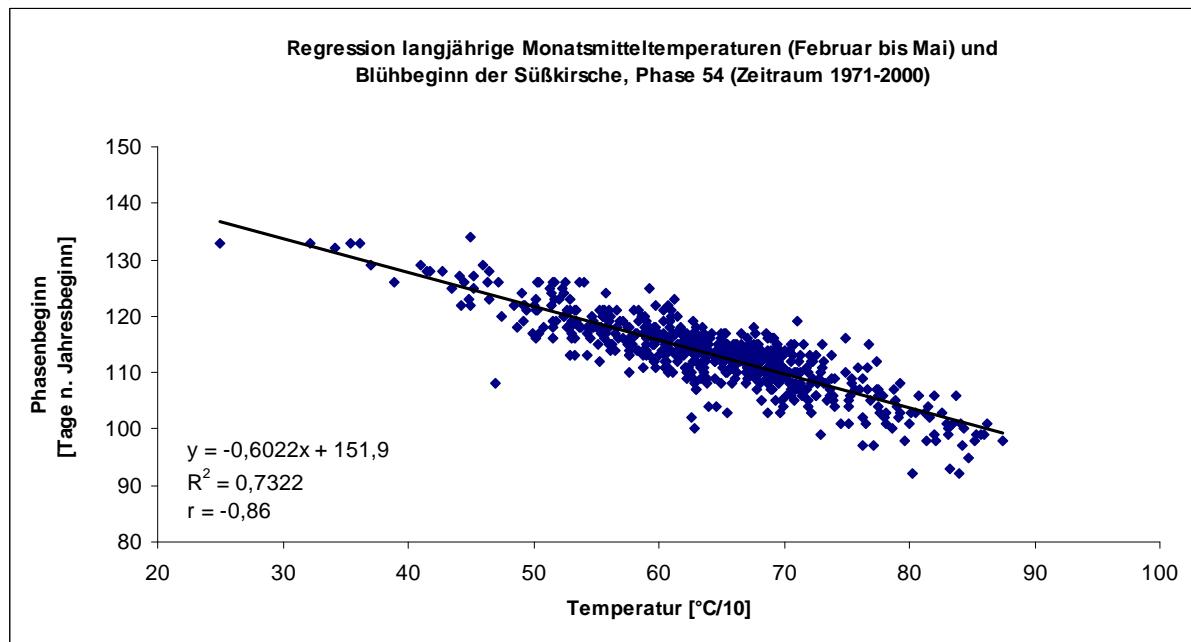
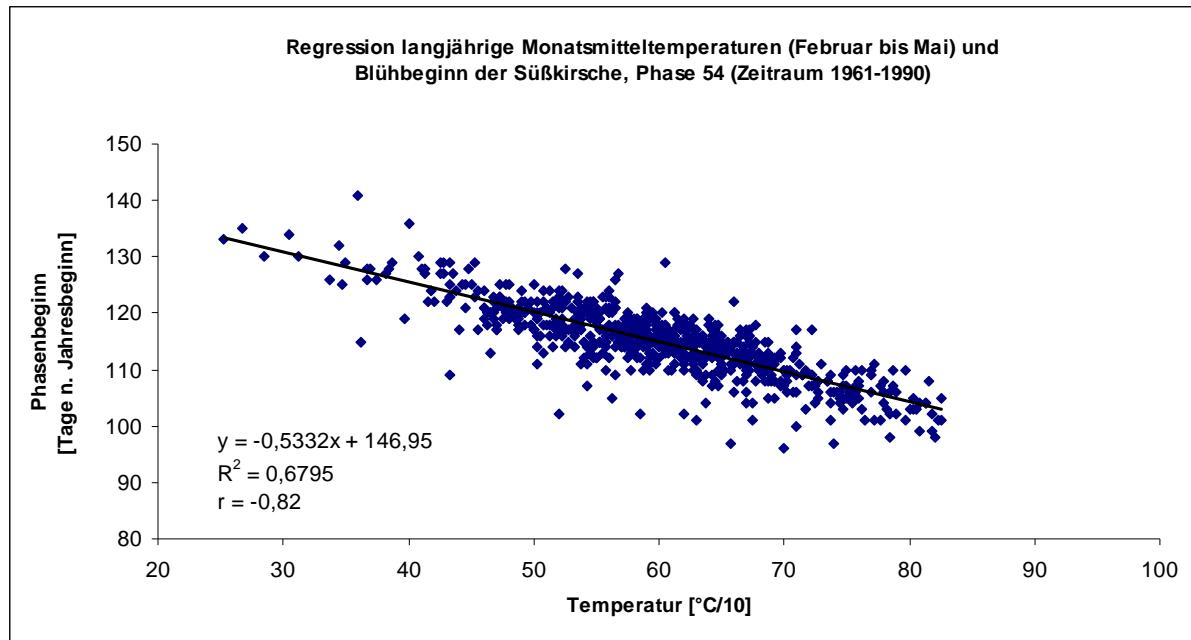


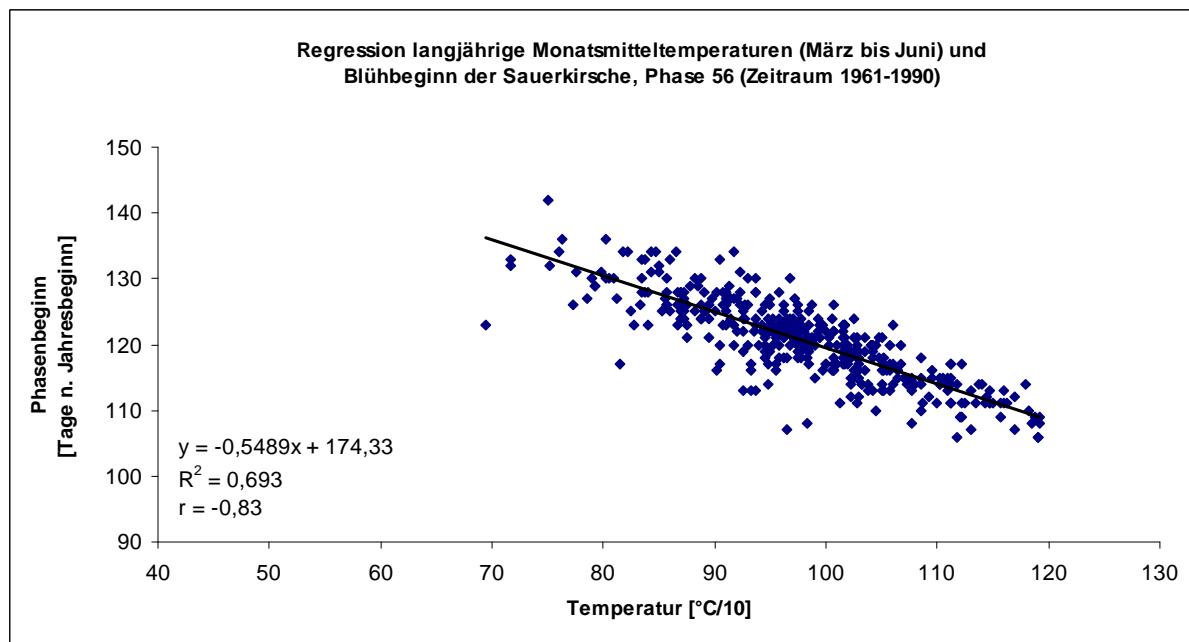
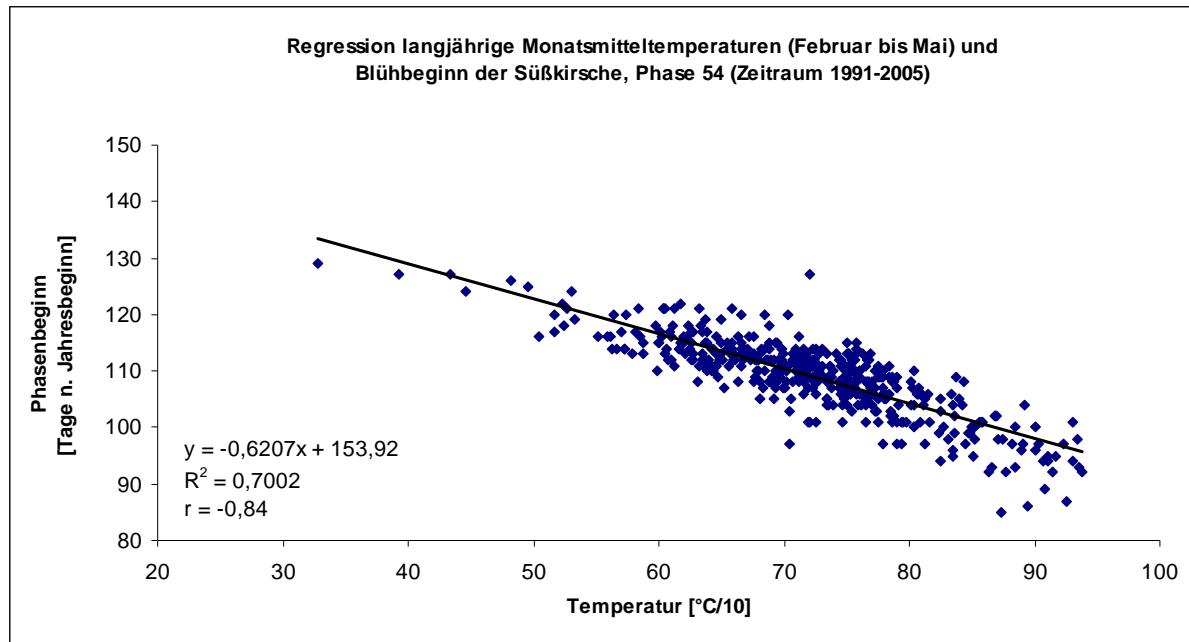


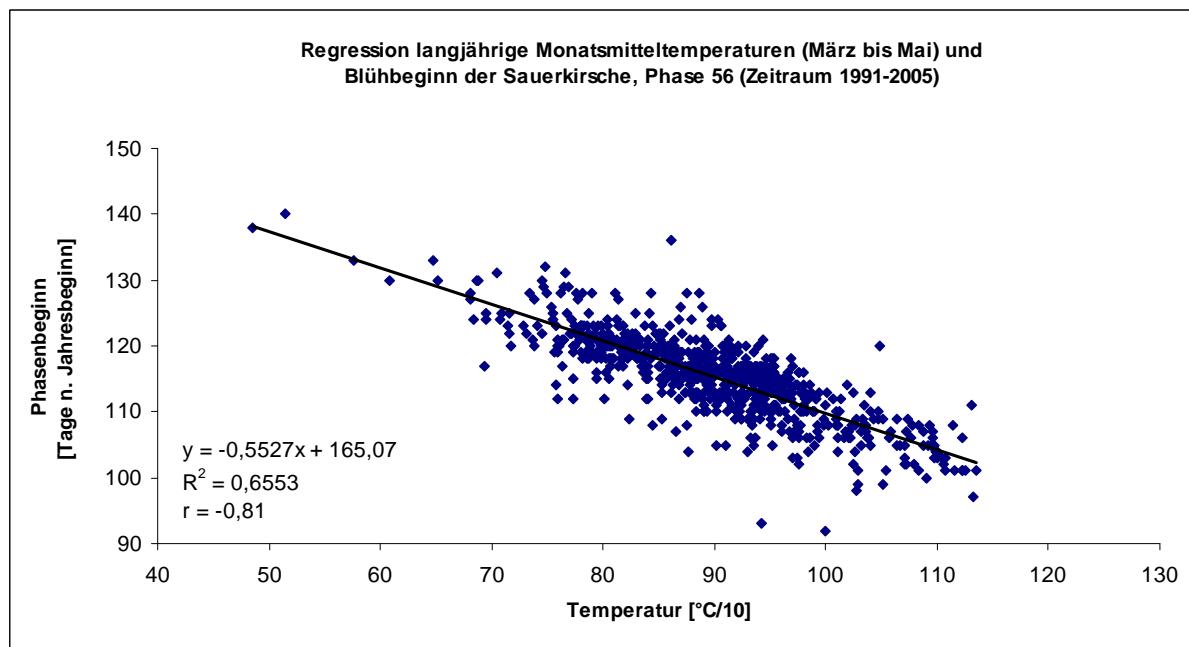
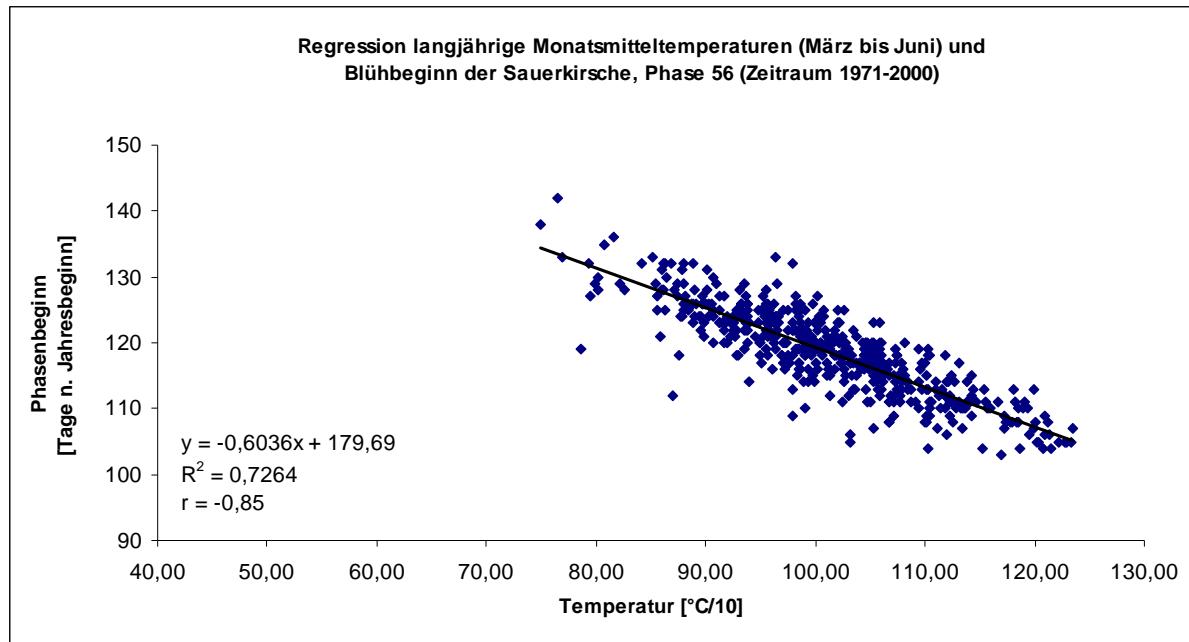


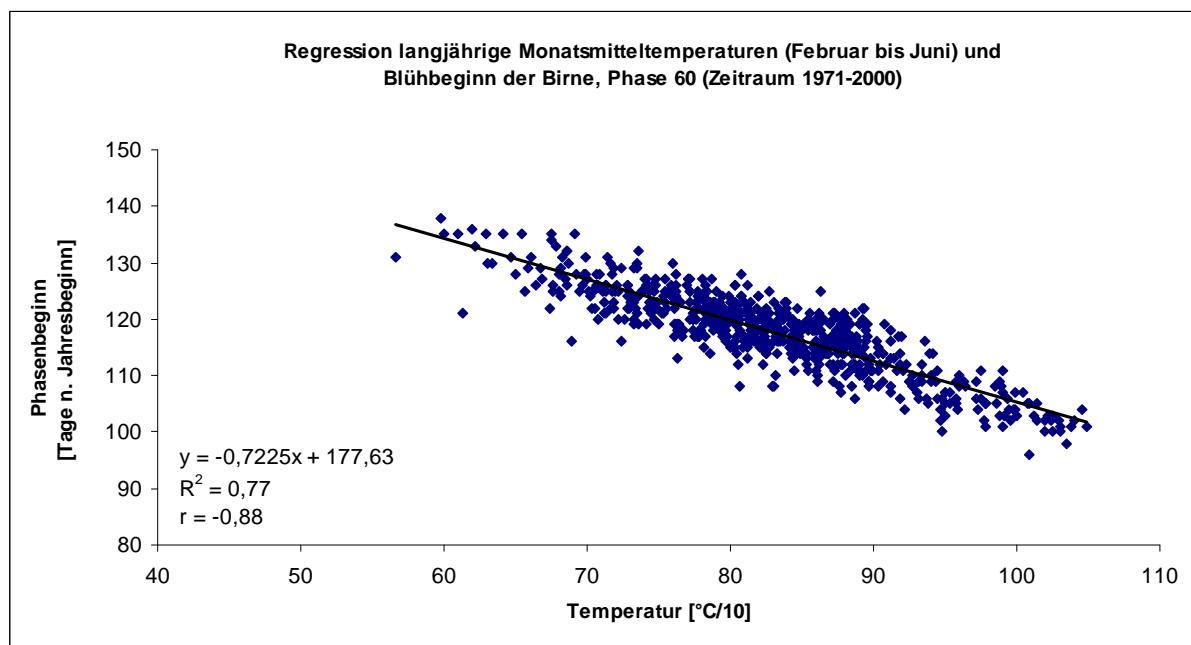
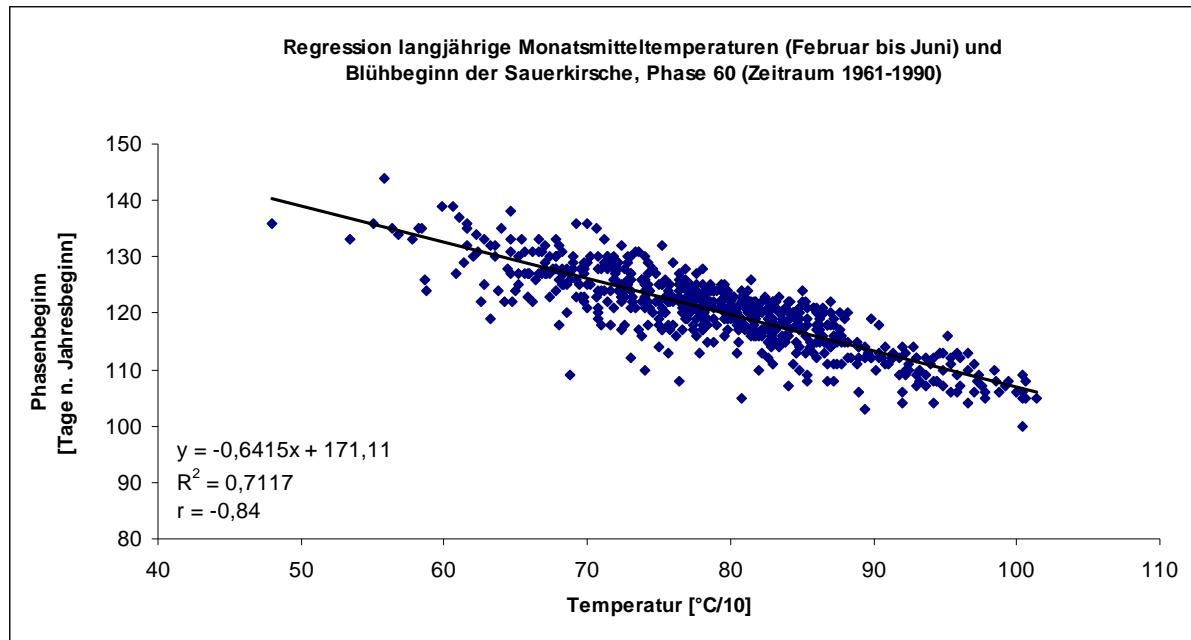


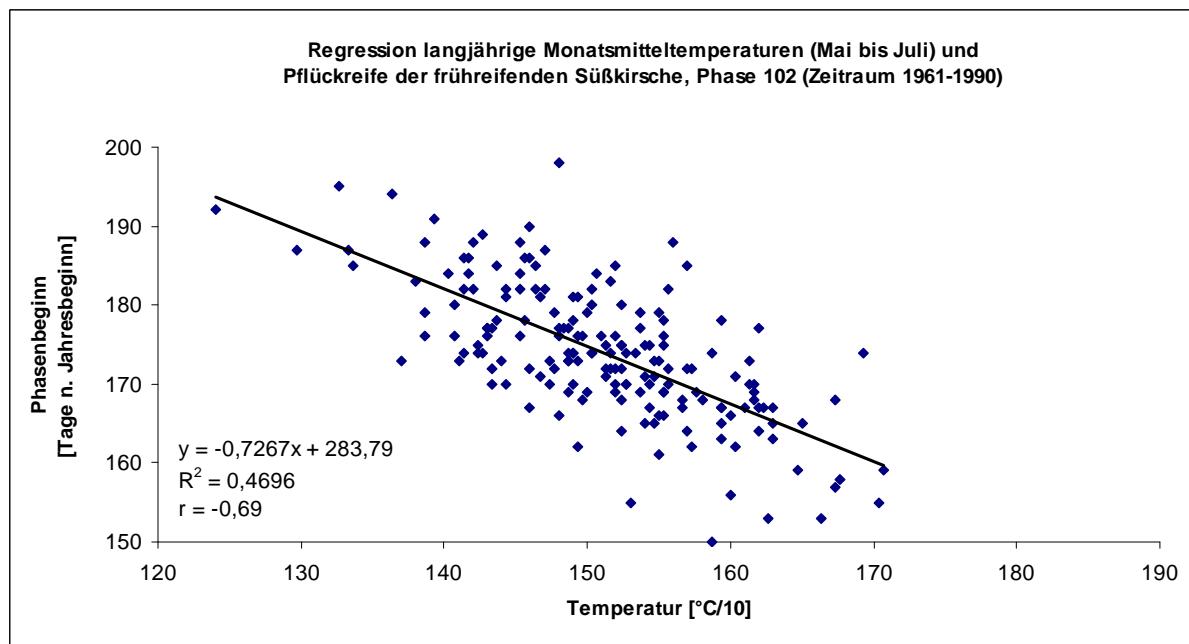
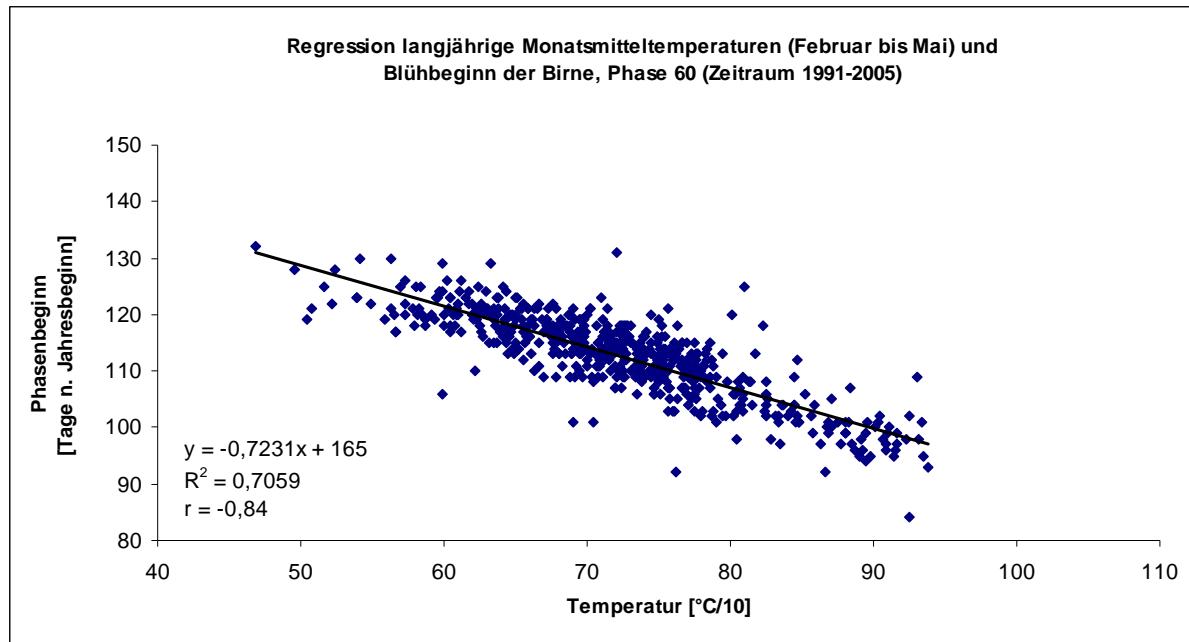


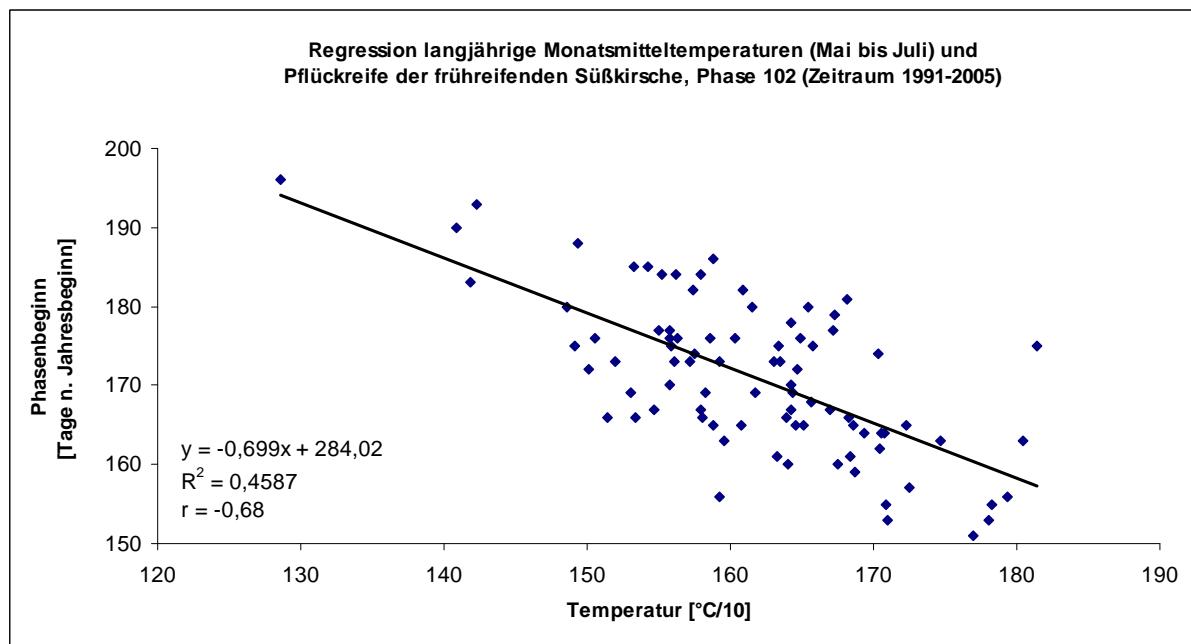
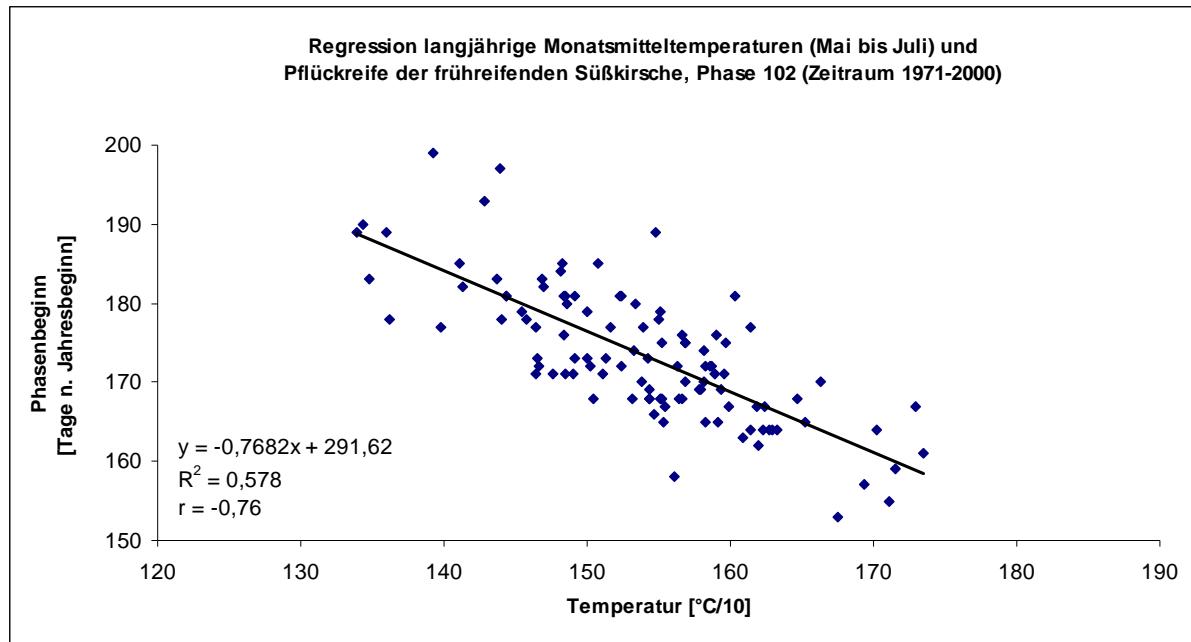


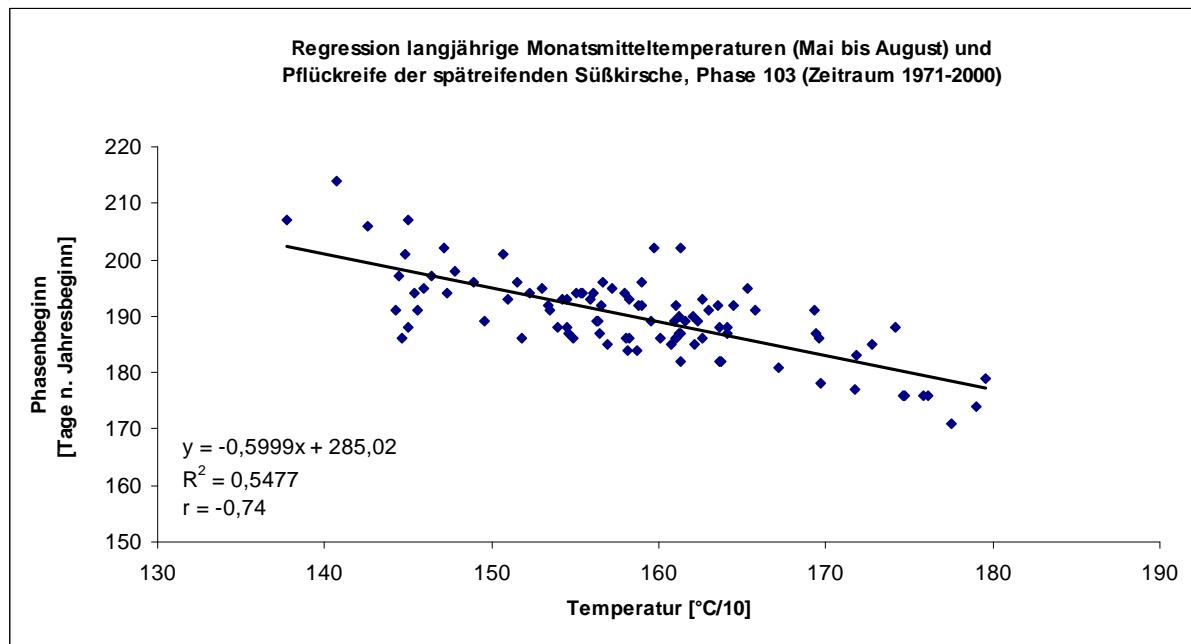
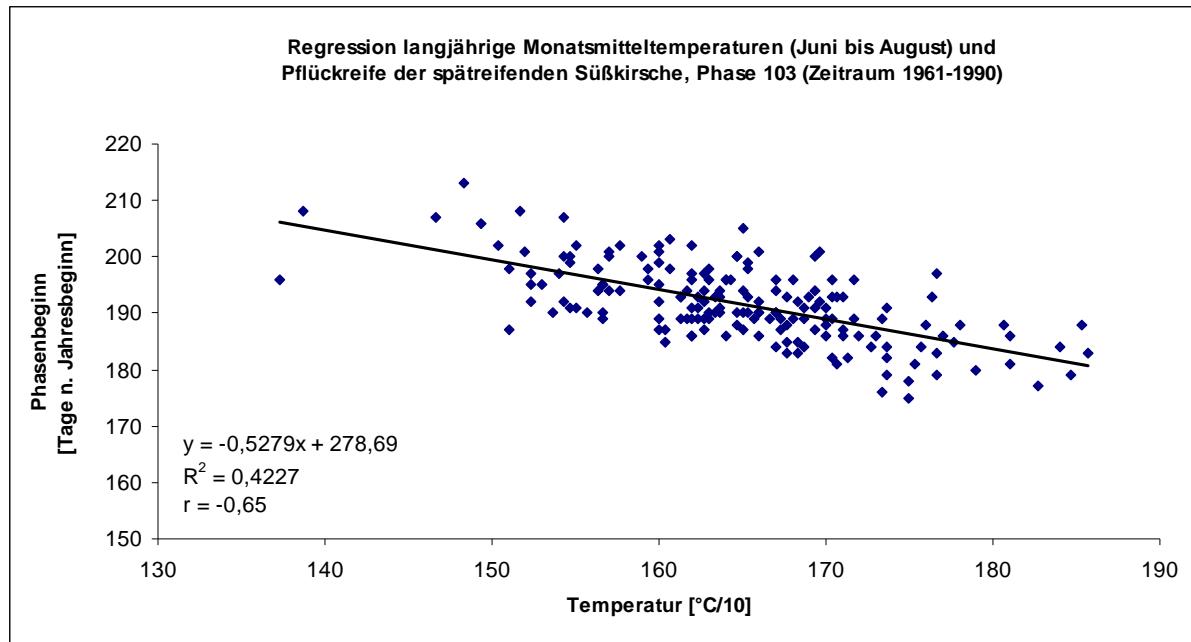


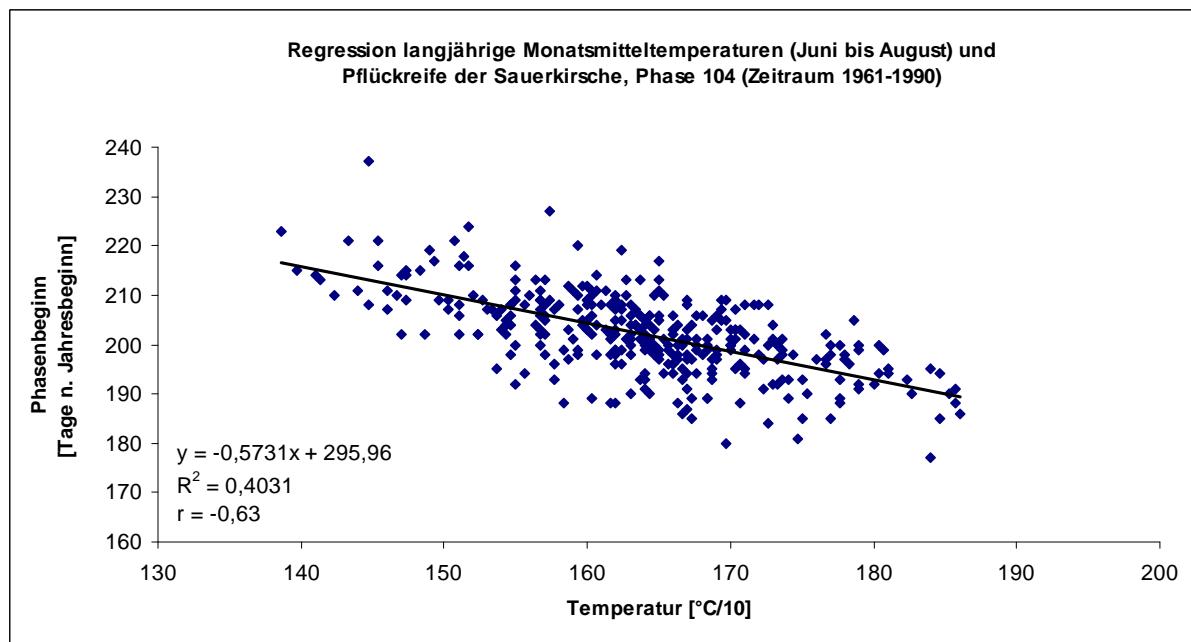
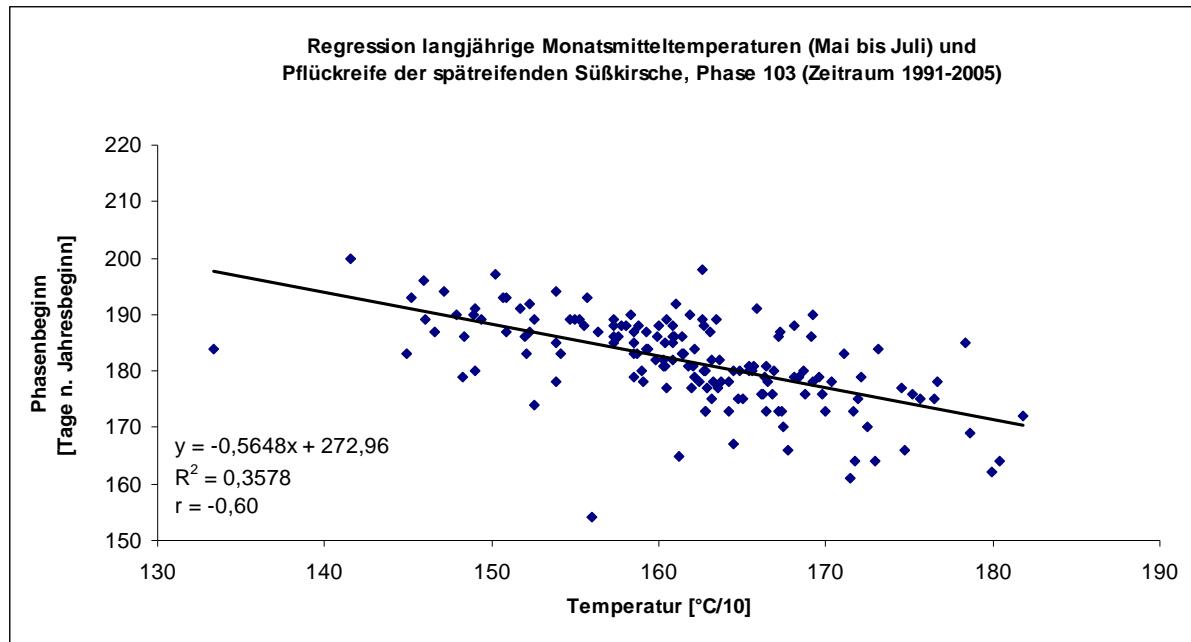


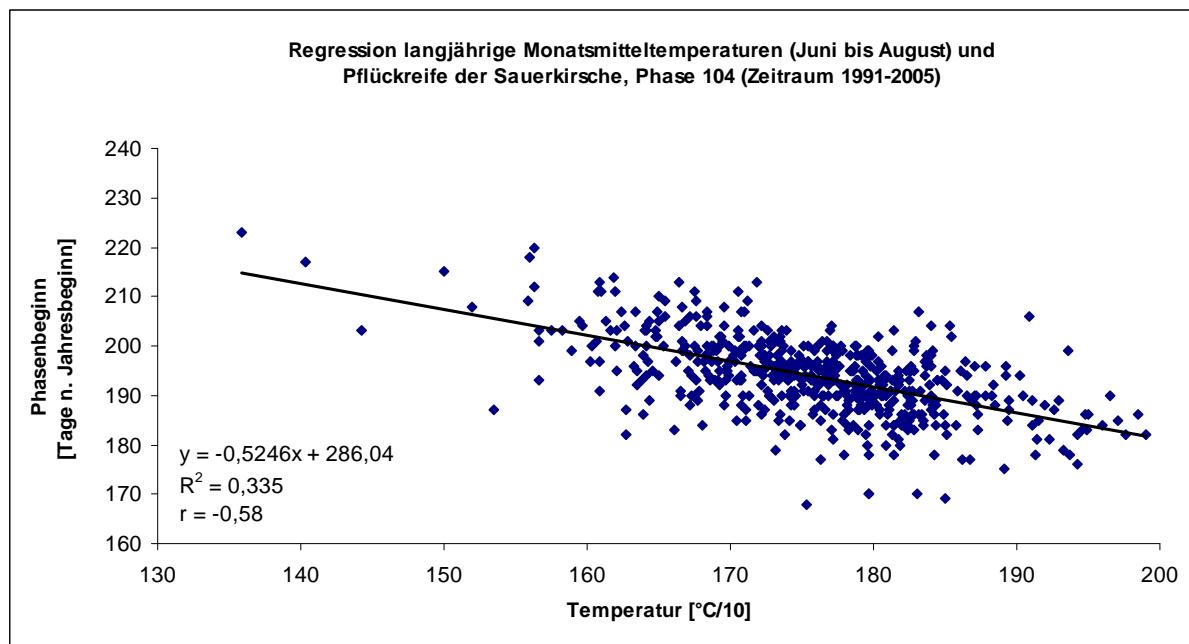
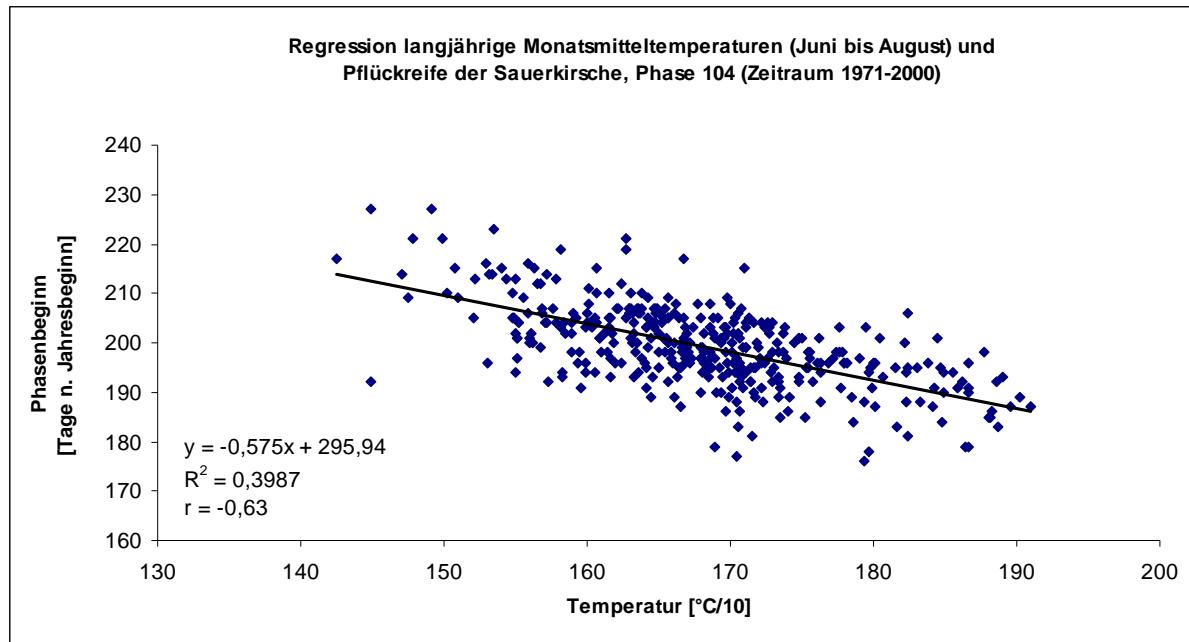


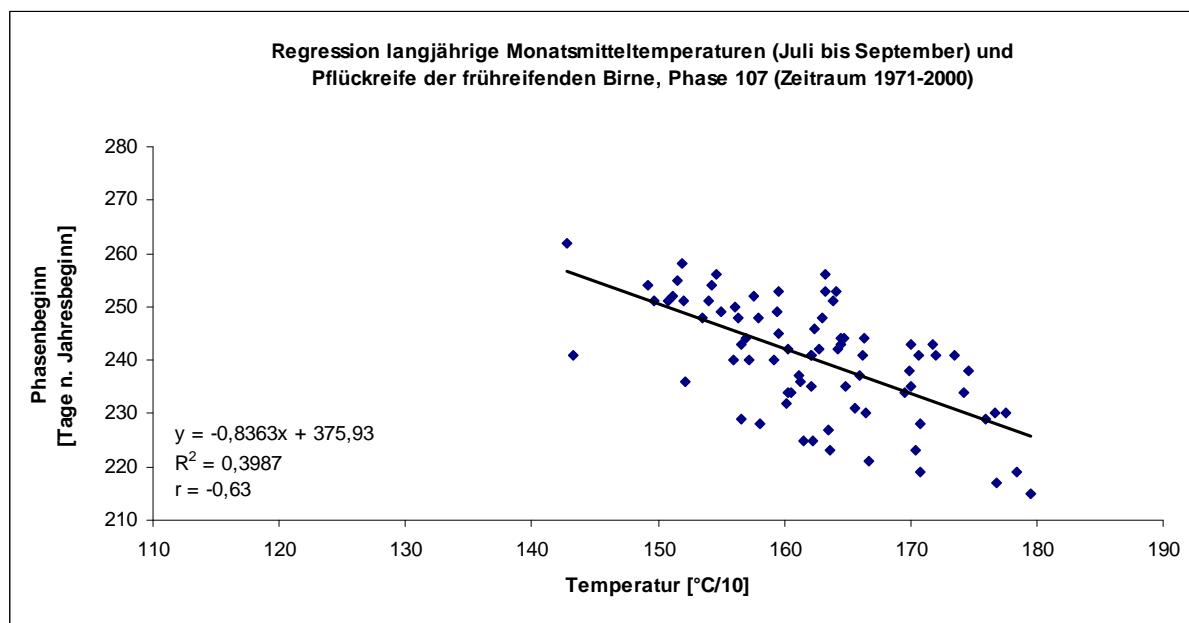
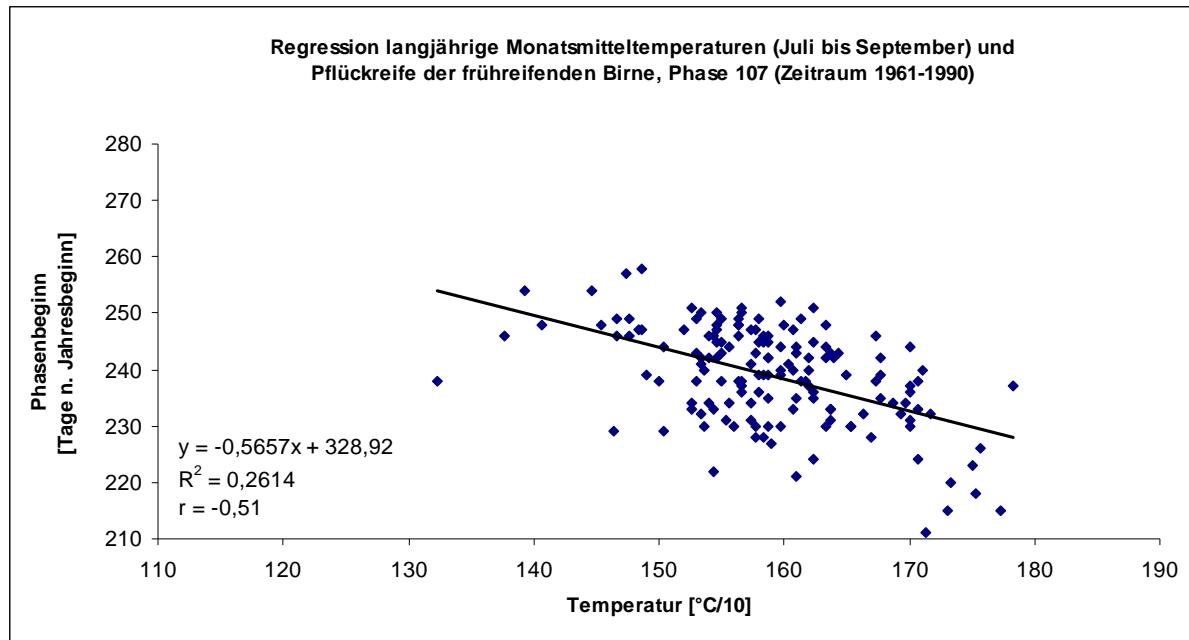


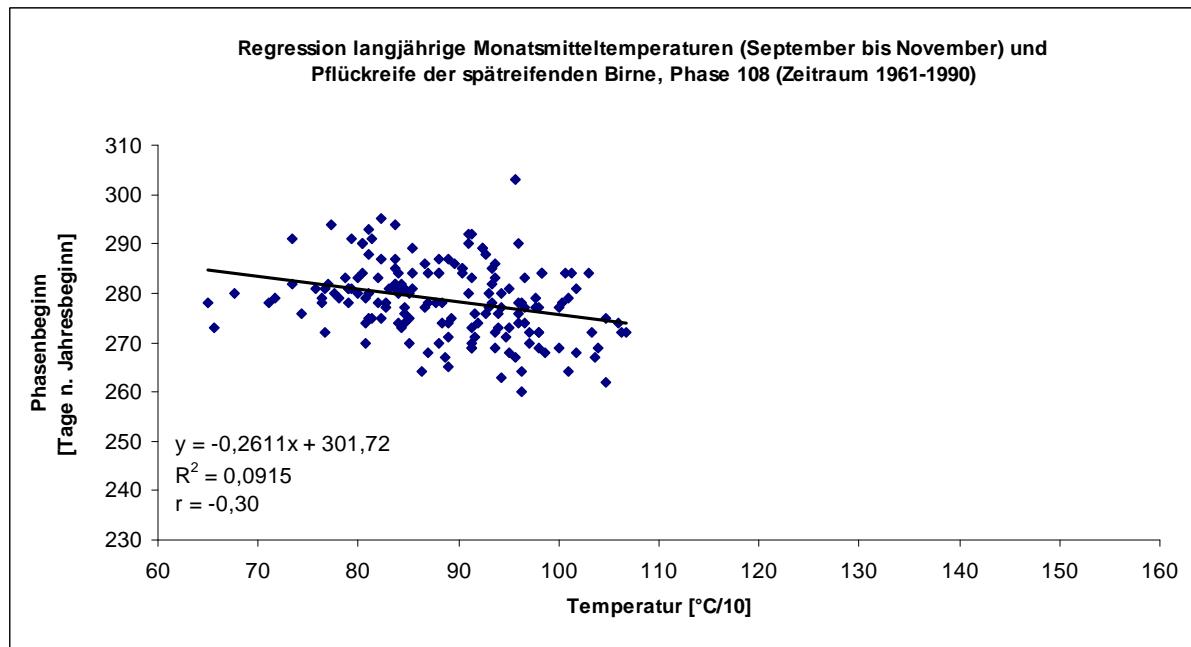
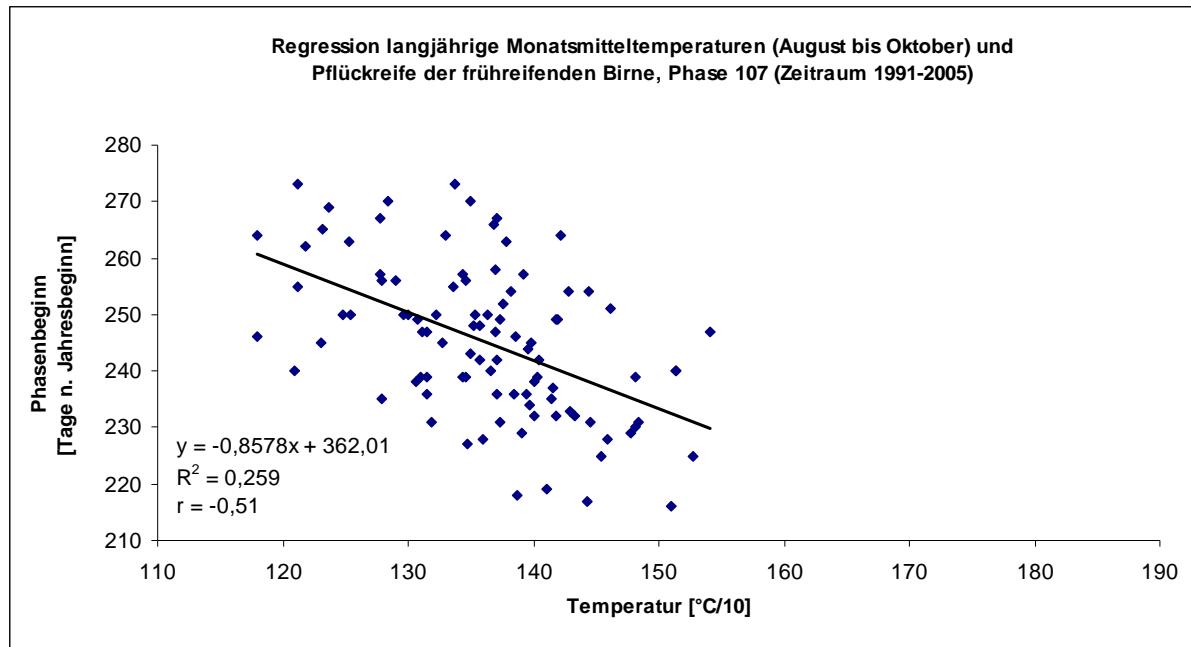


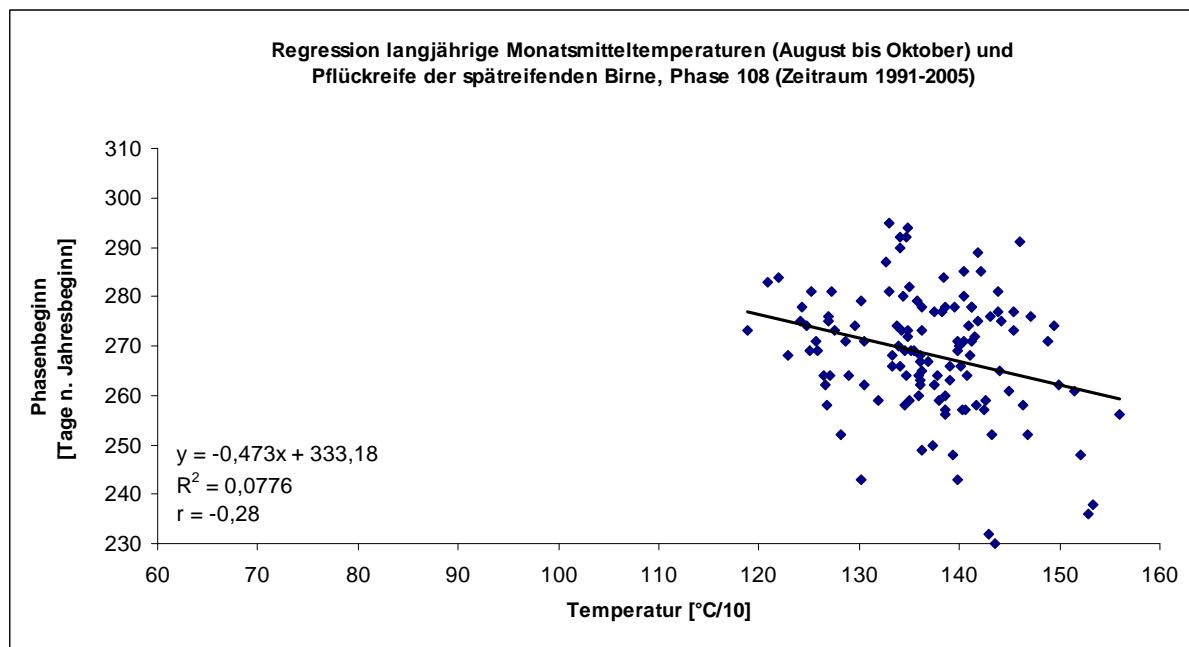
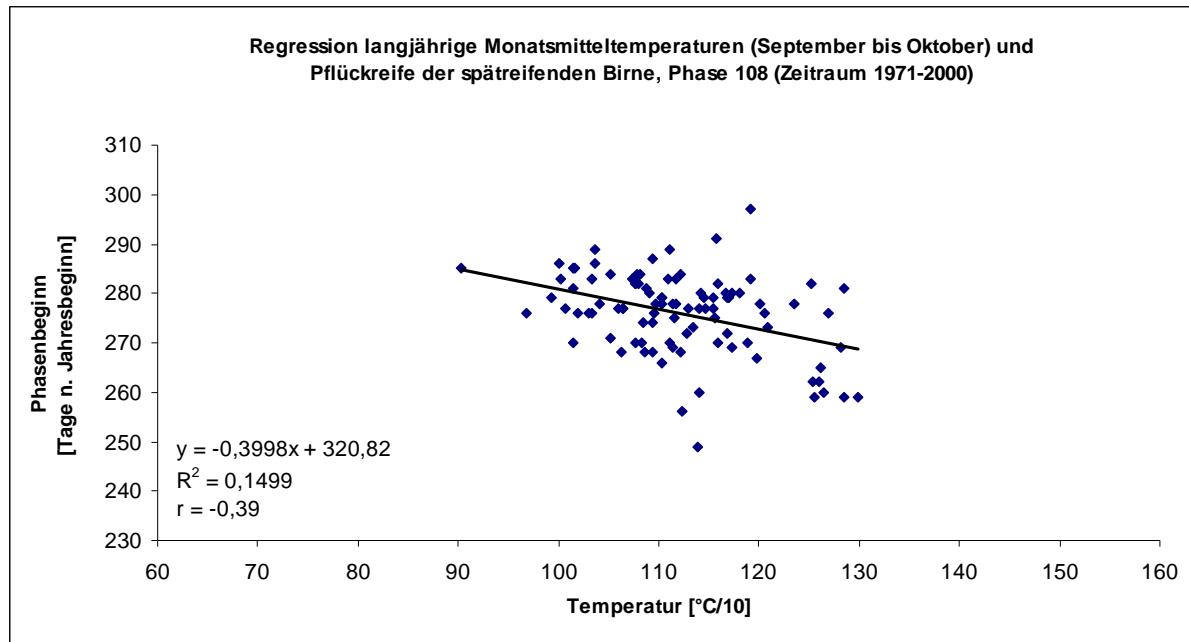


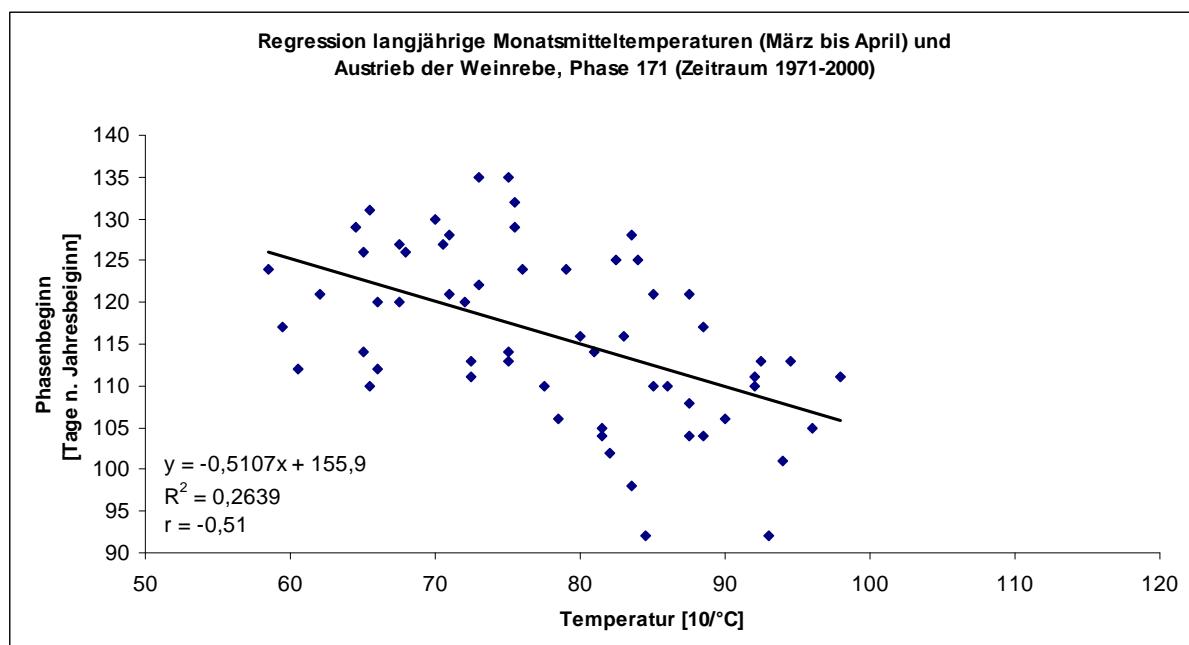
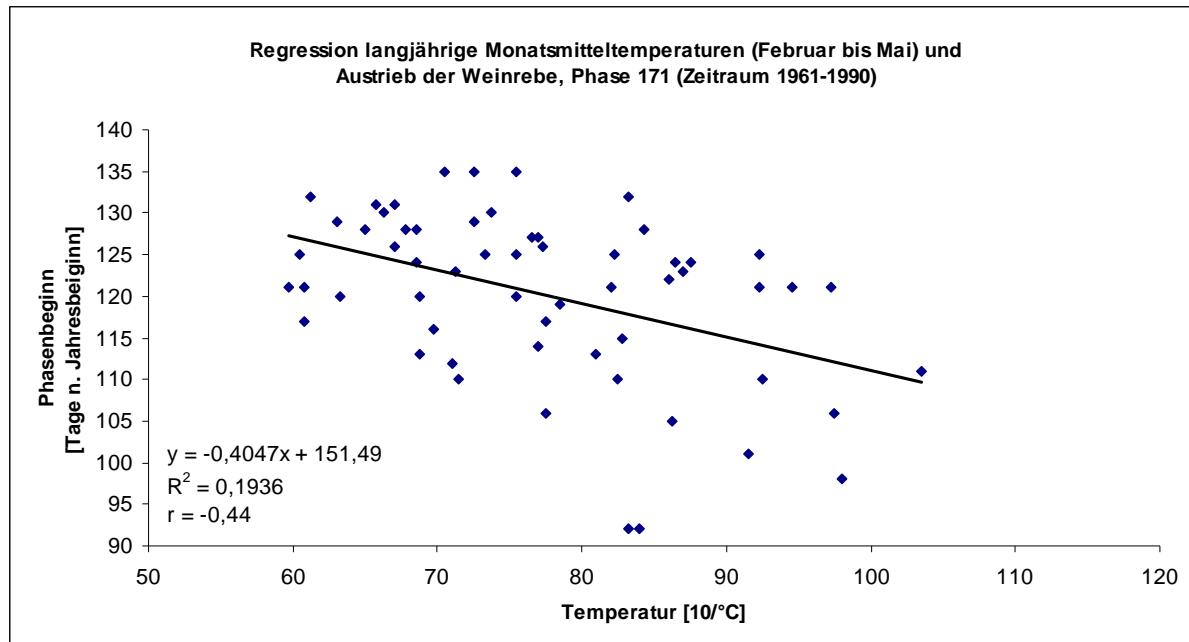


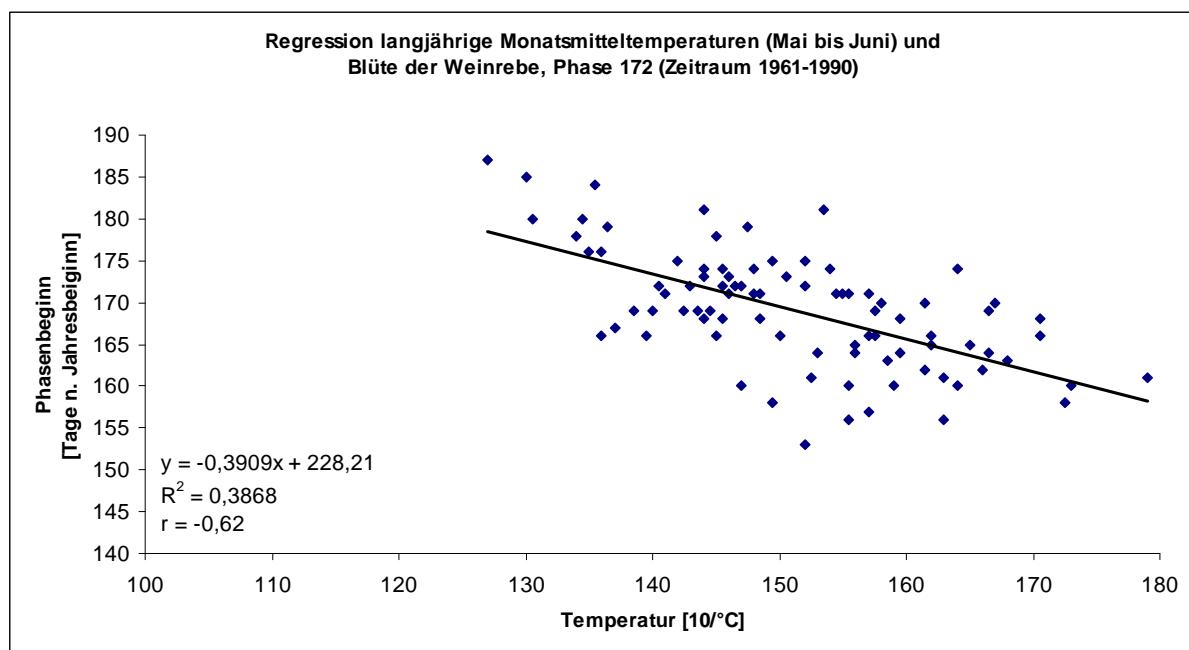
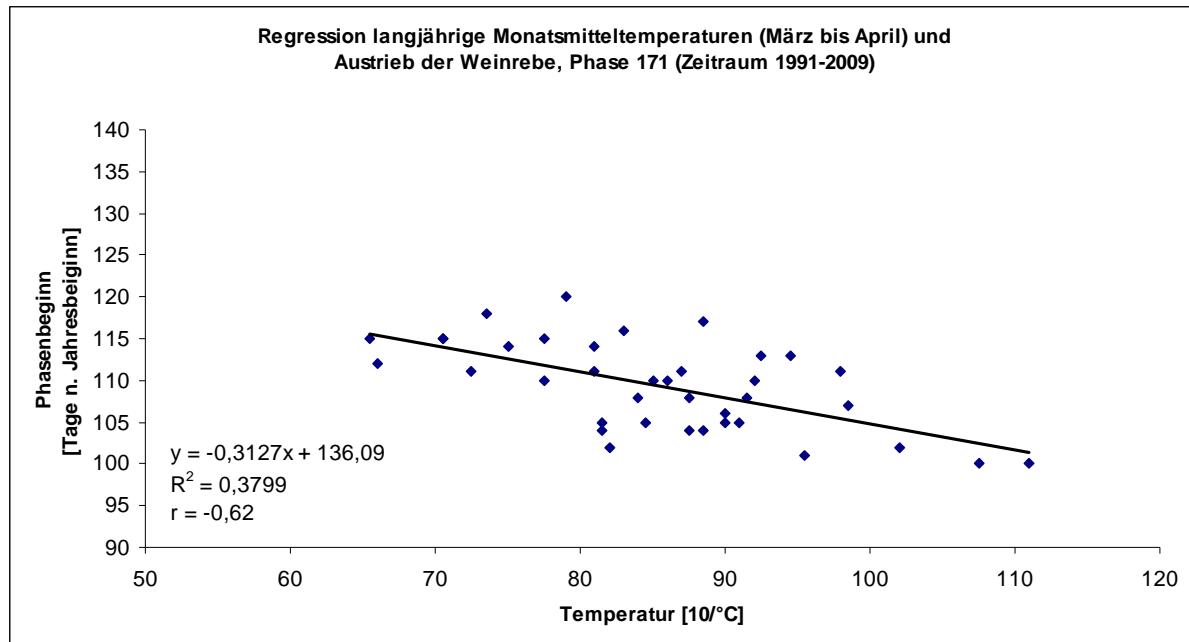


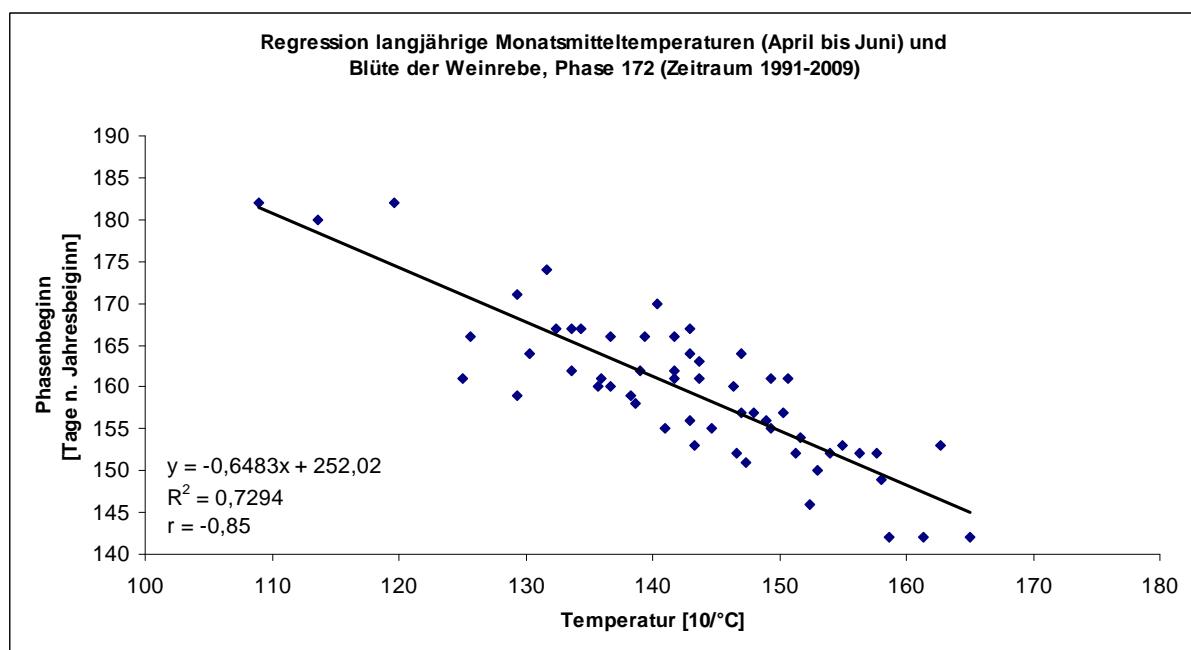
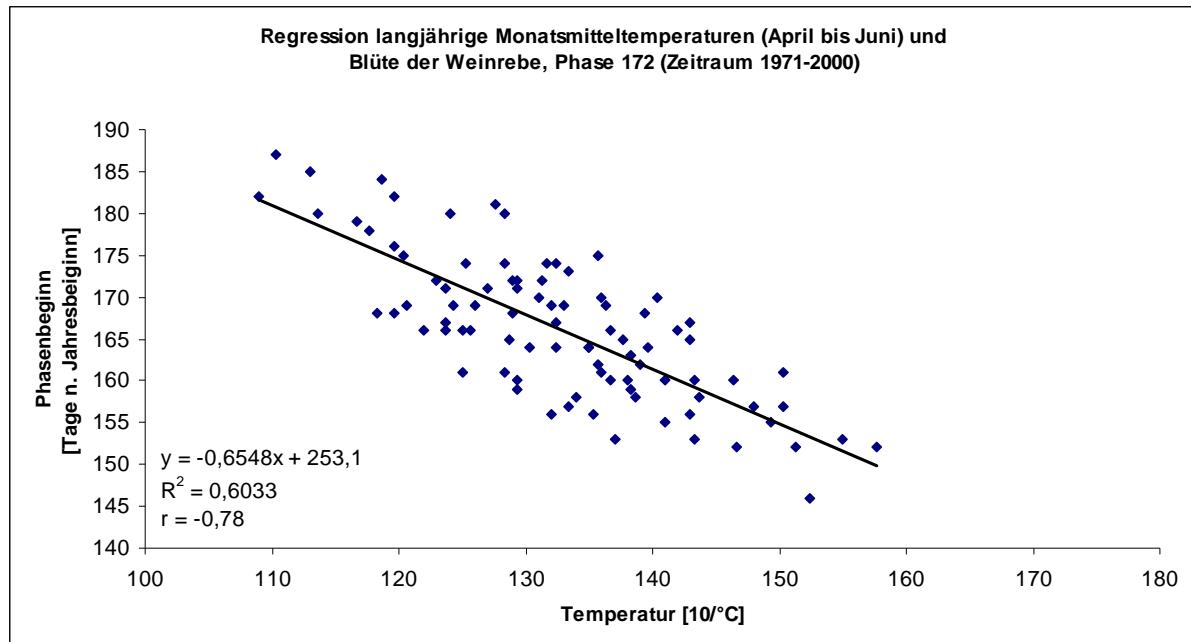


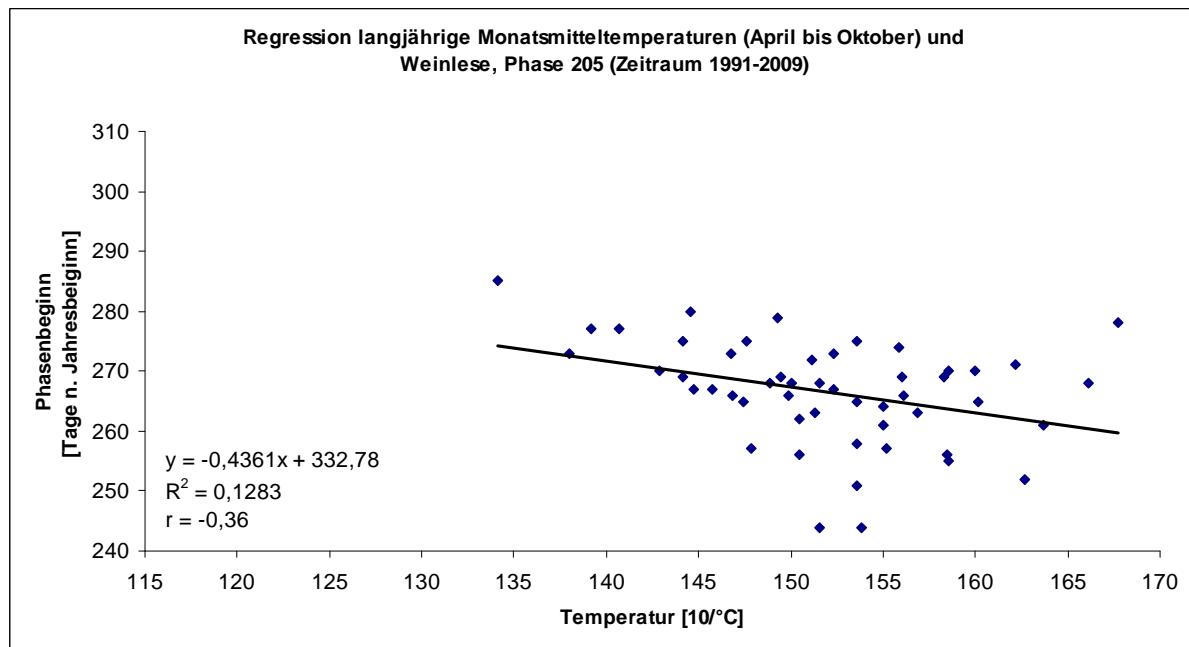
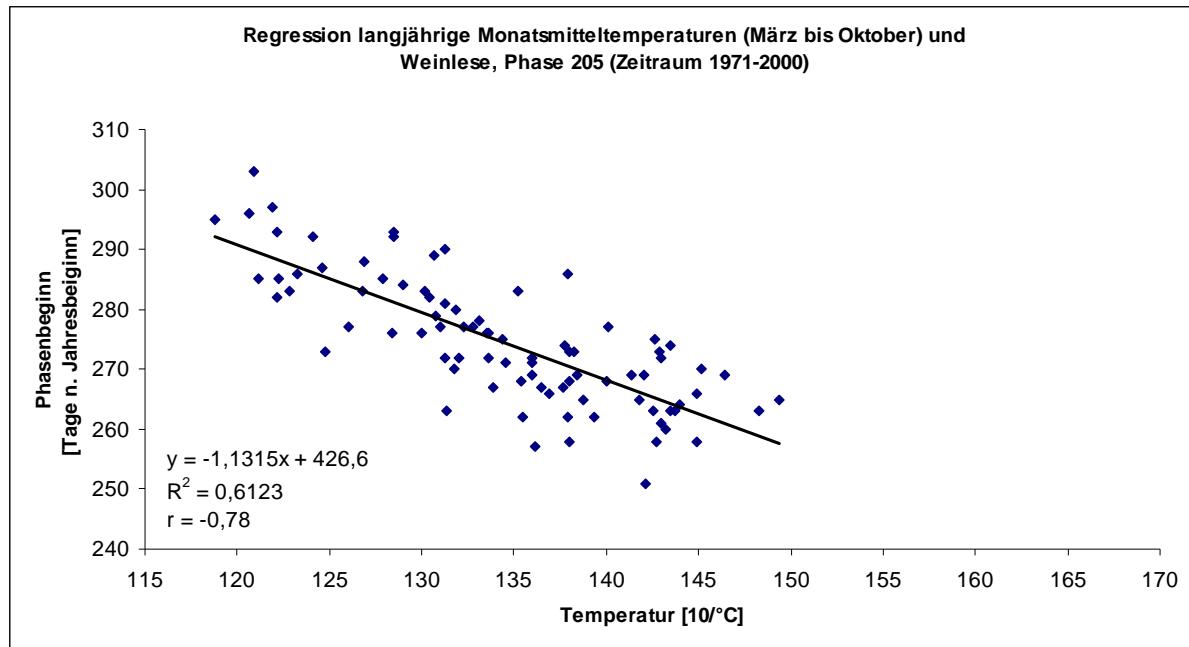






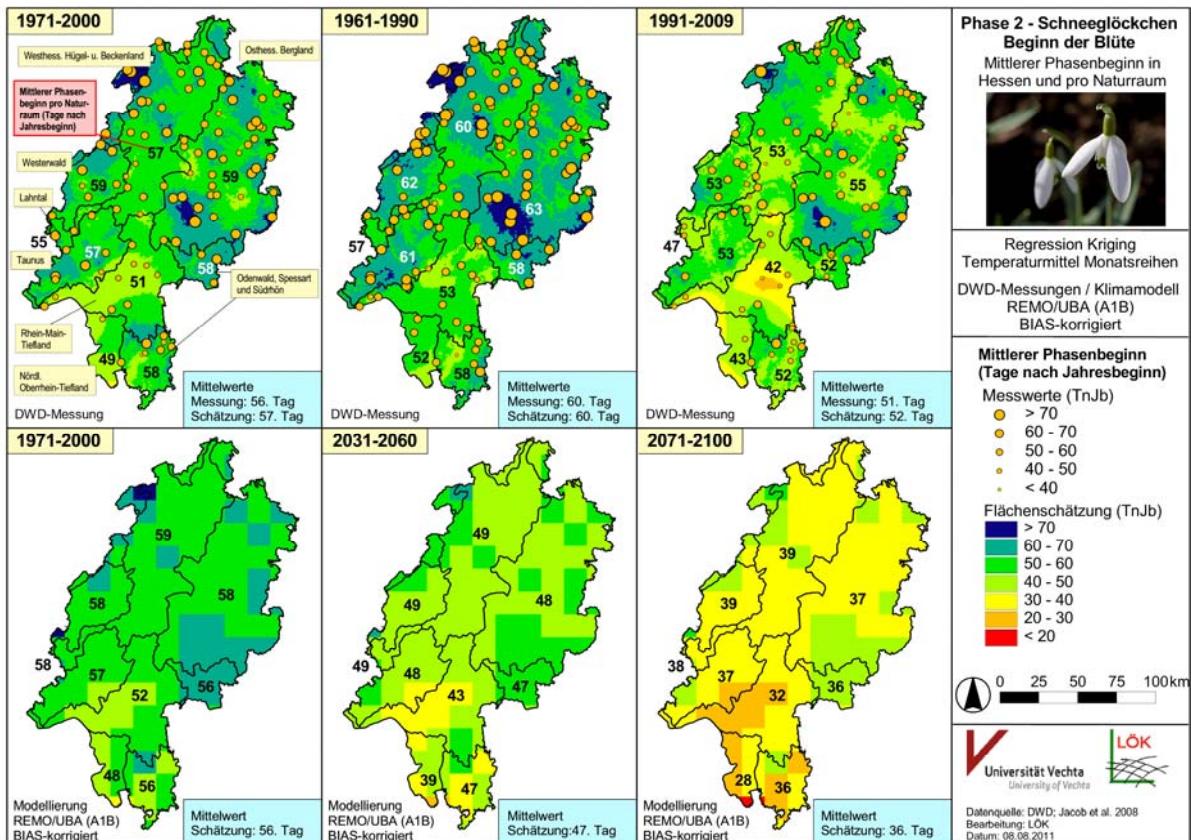
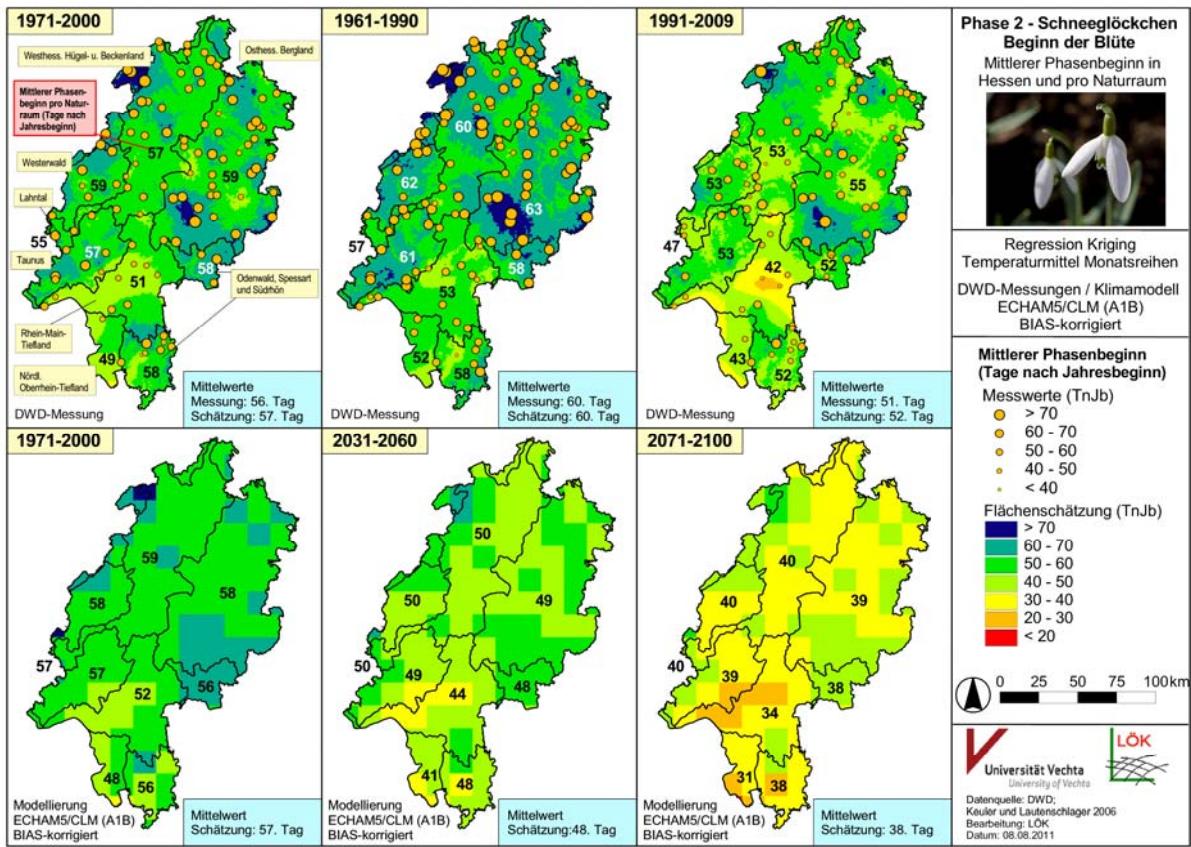


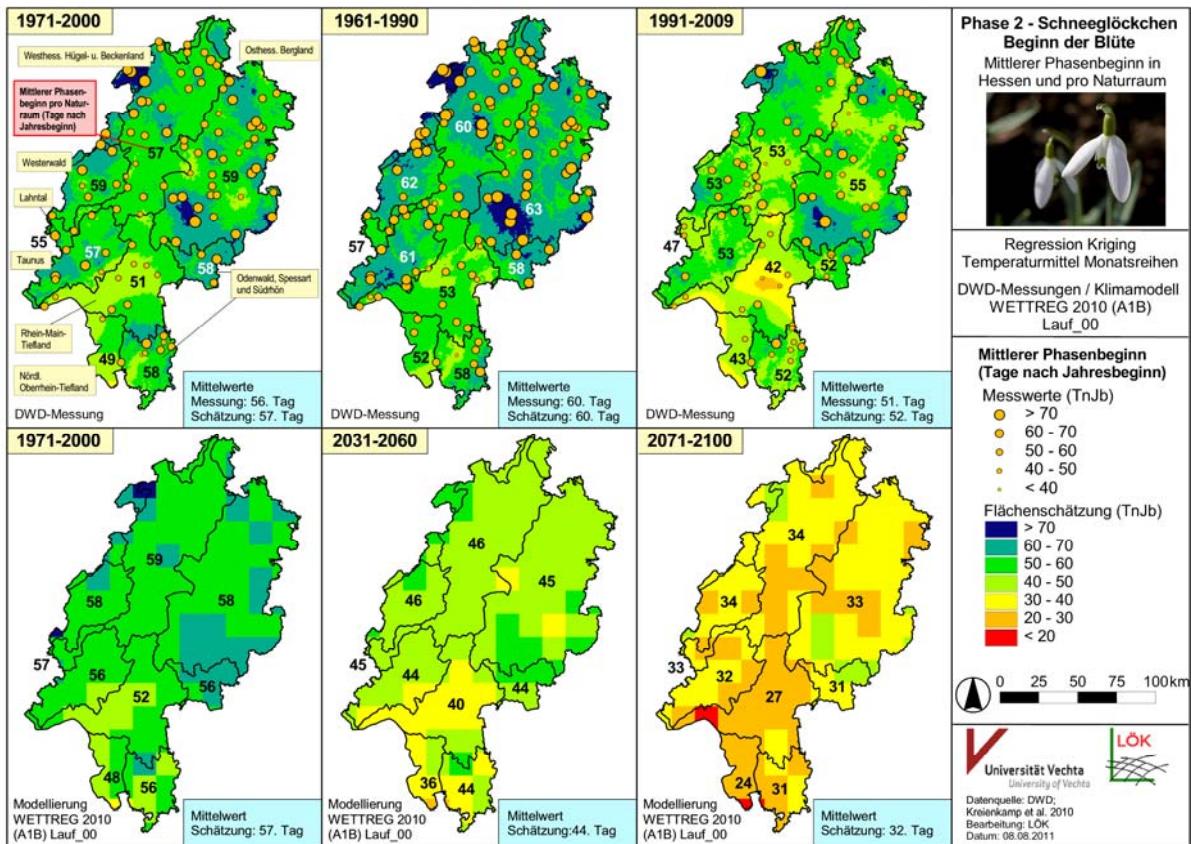
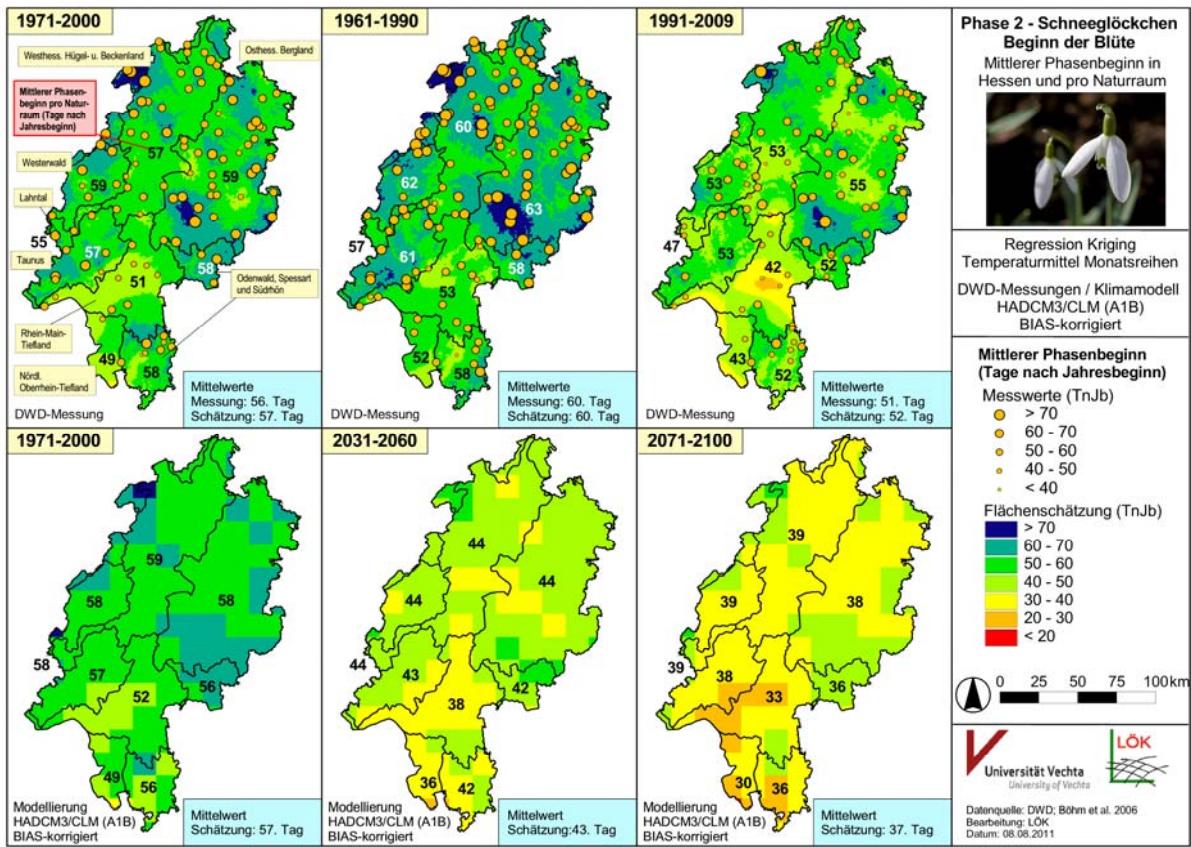


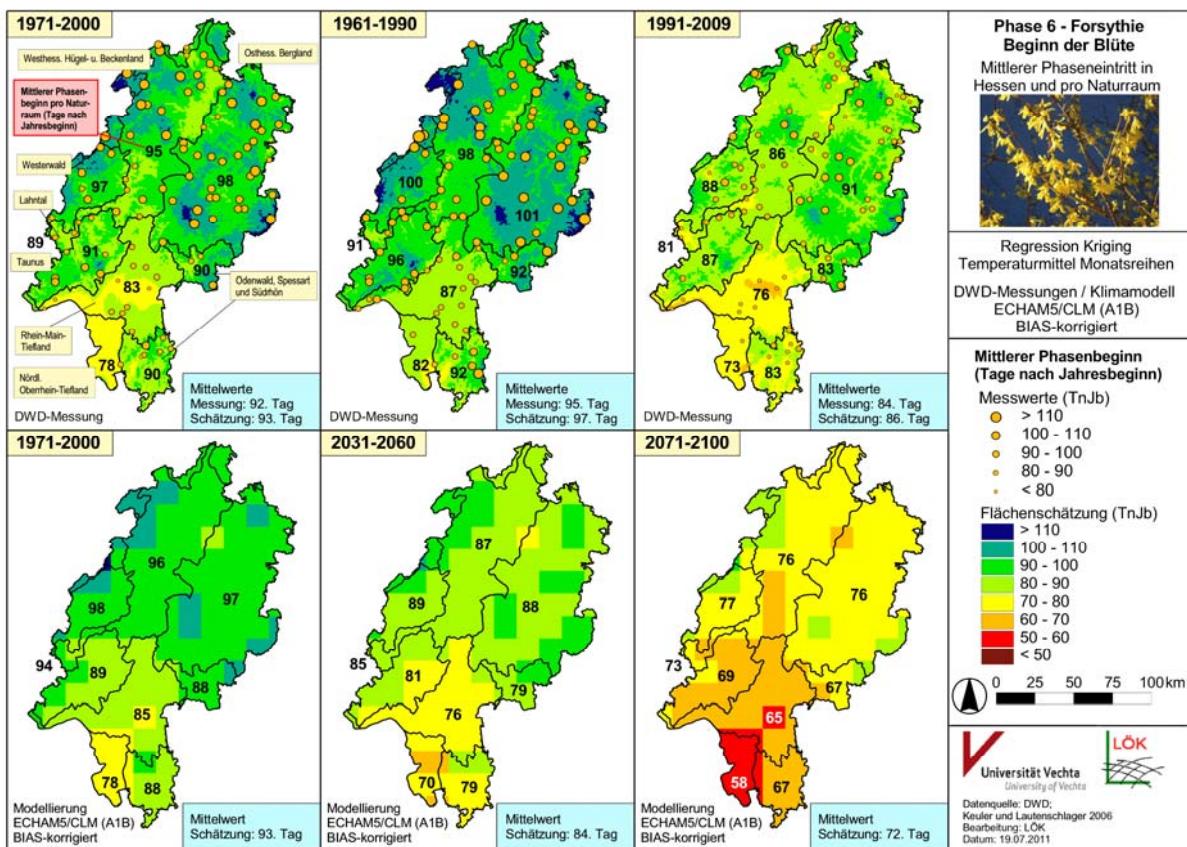
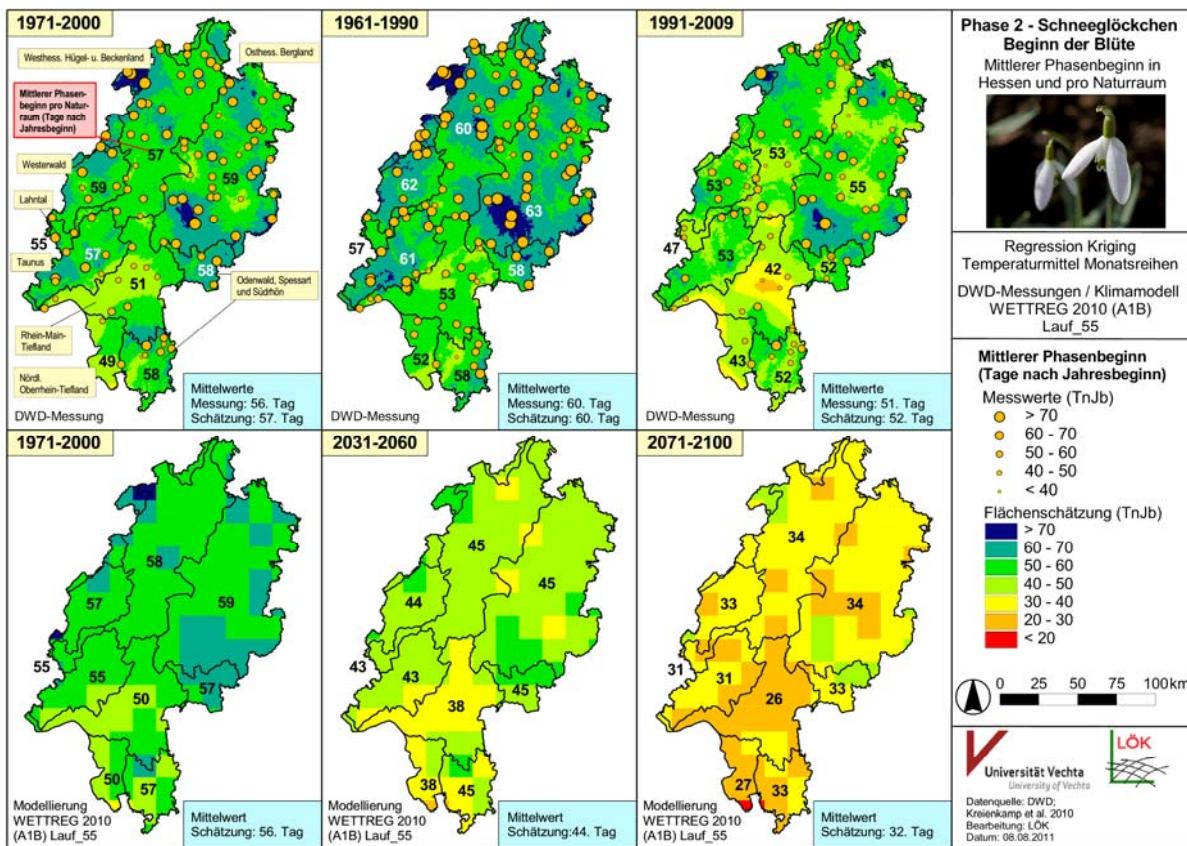


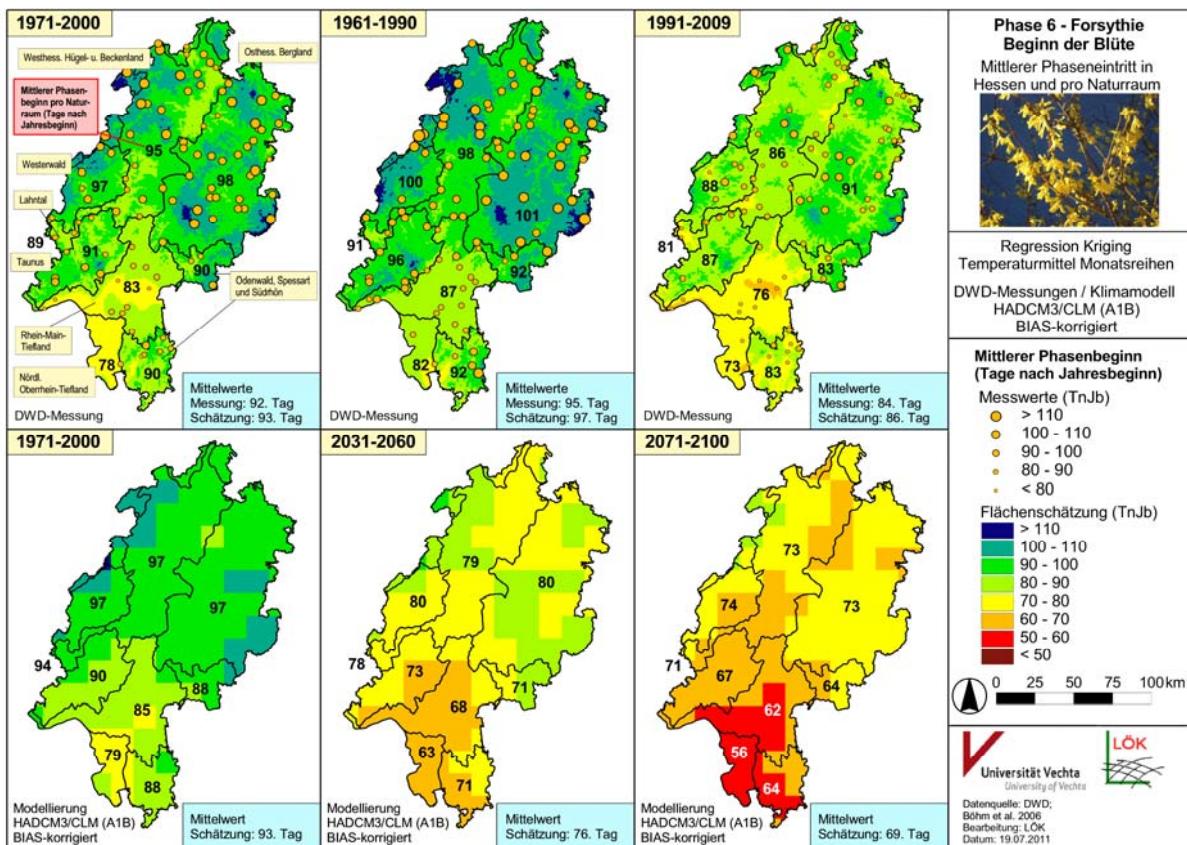
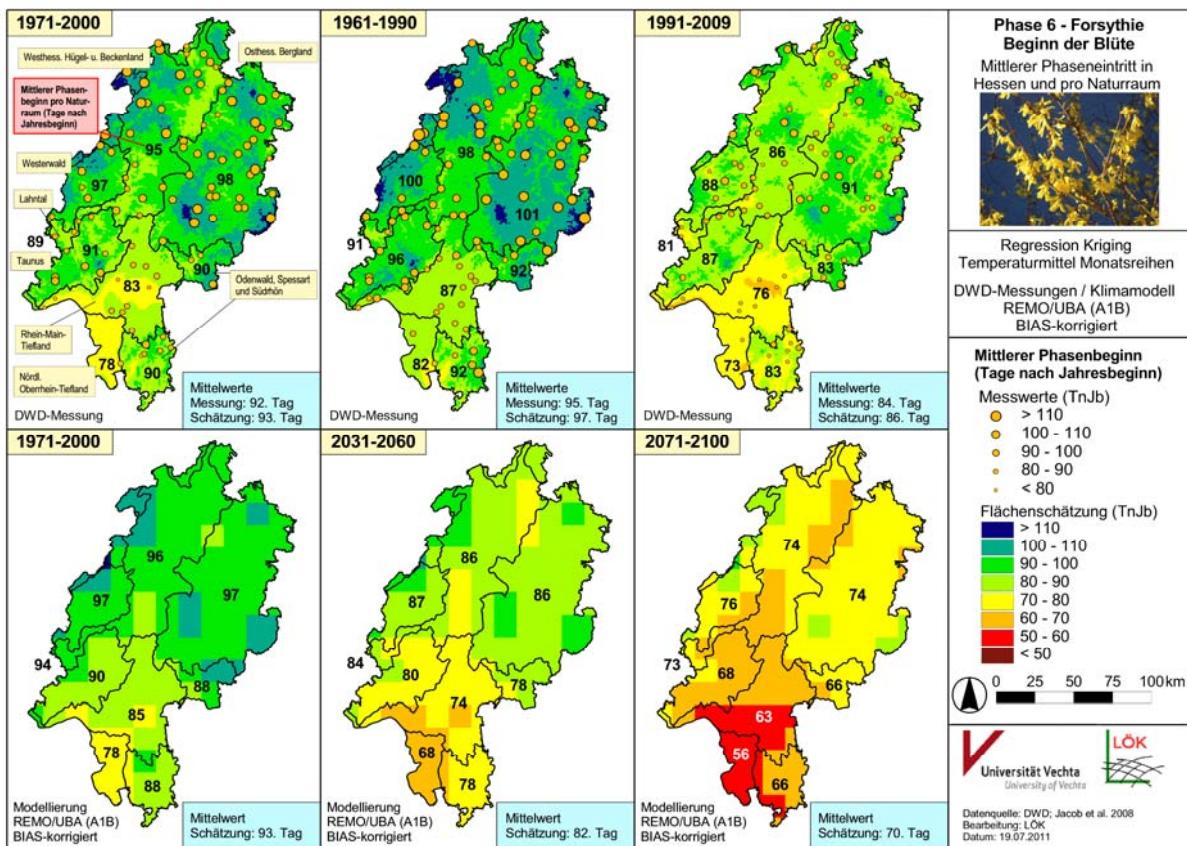
Anhang 8

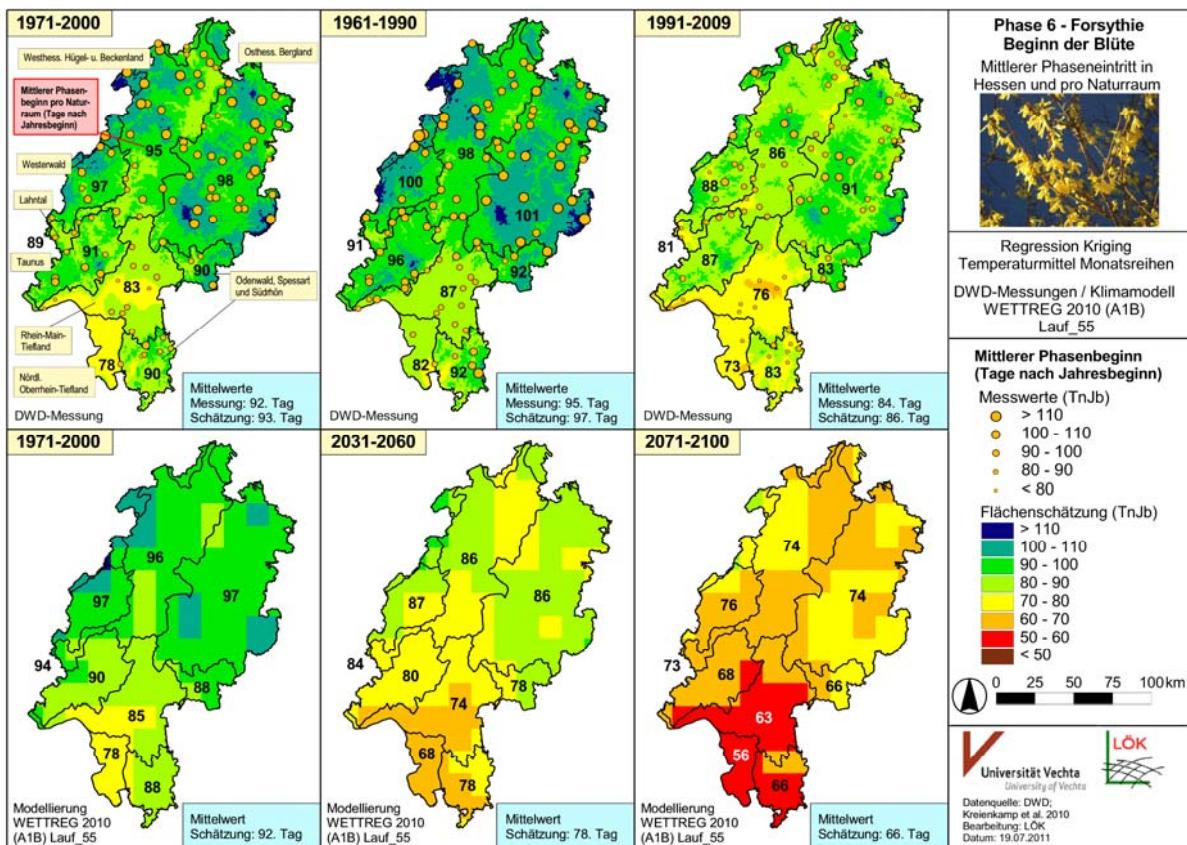
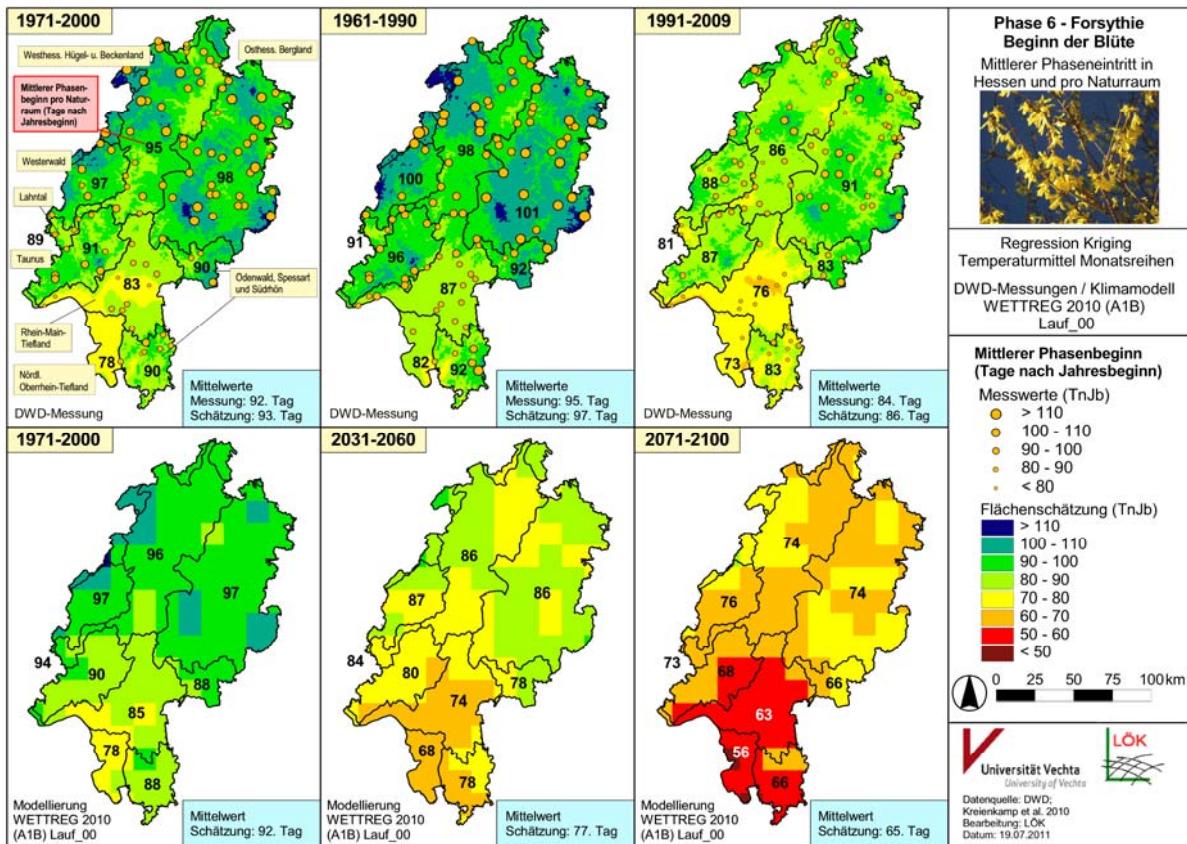
Regression Kriging:
Flächenhafte Darstellung der vergangenen und zukünftigen
pflanzenphänologischen Entwicklung in Hessen

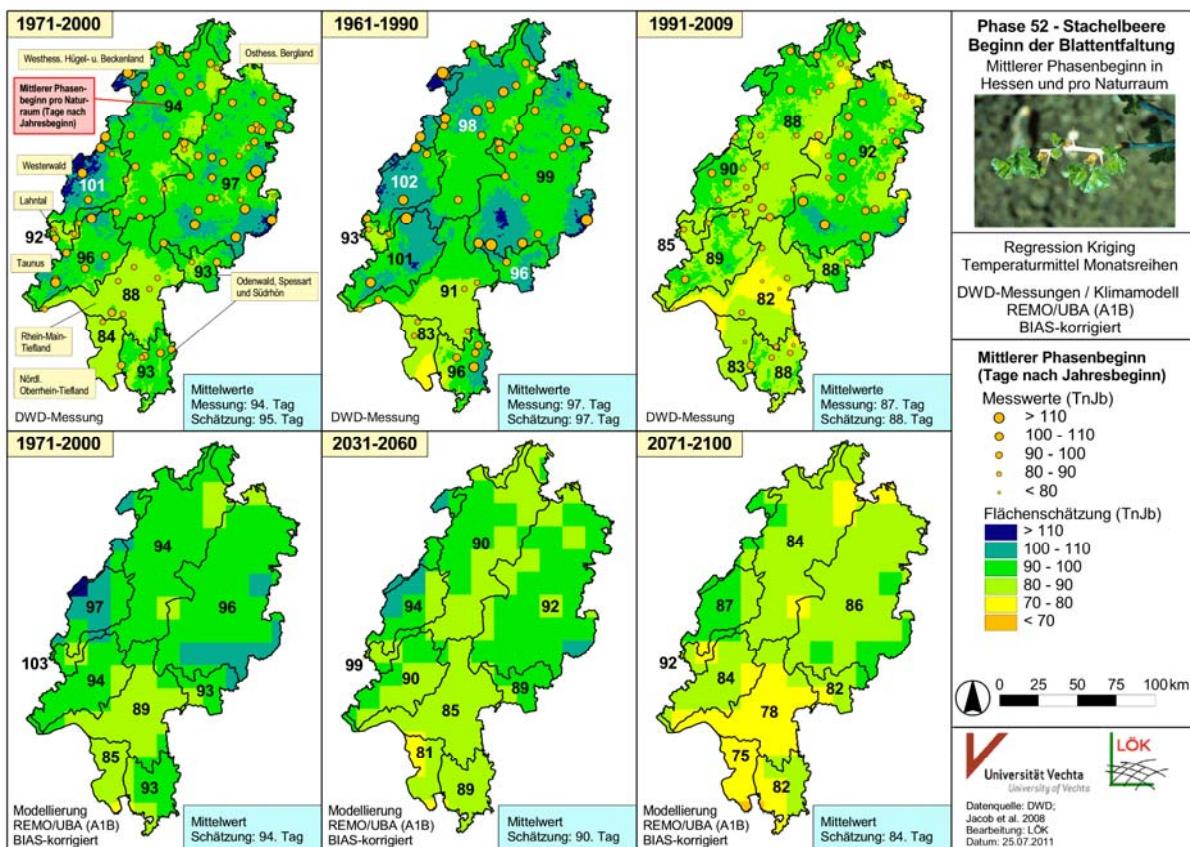
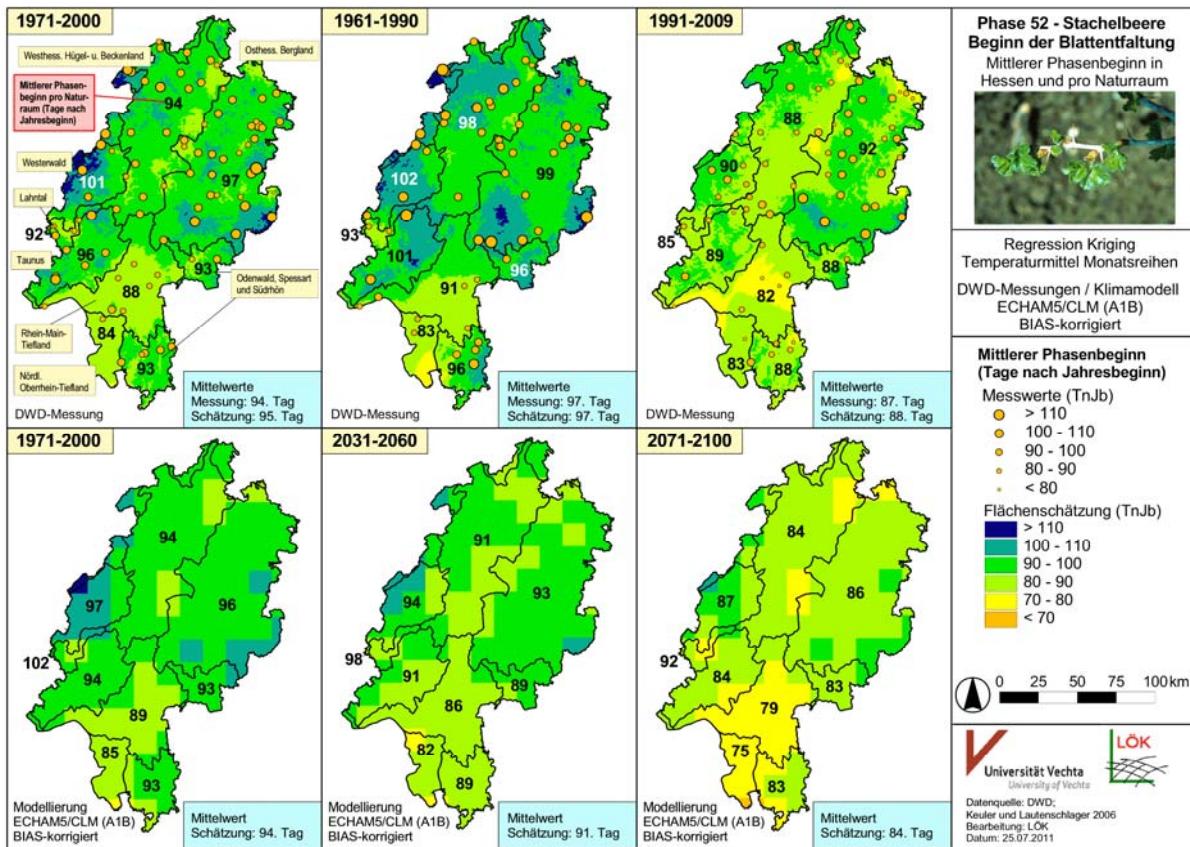


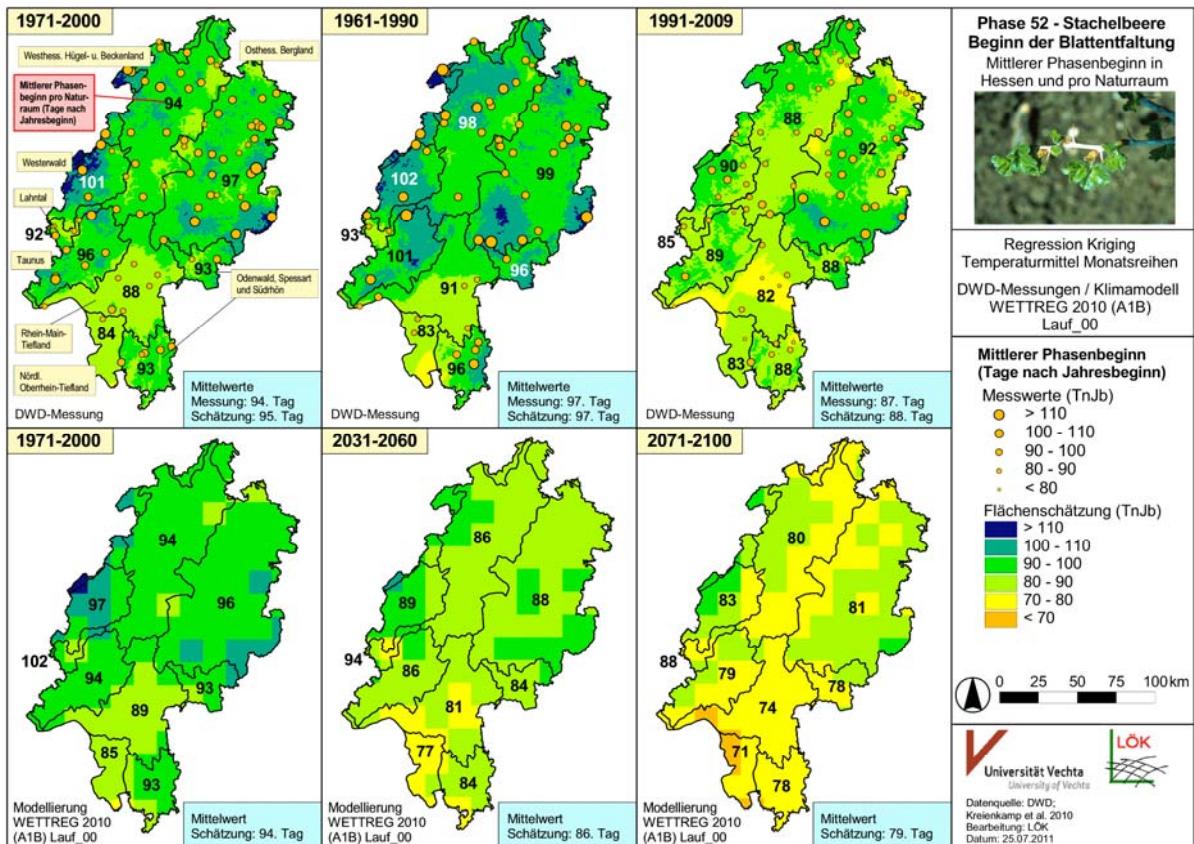
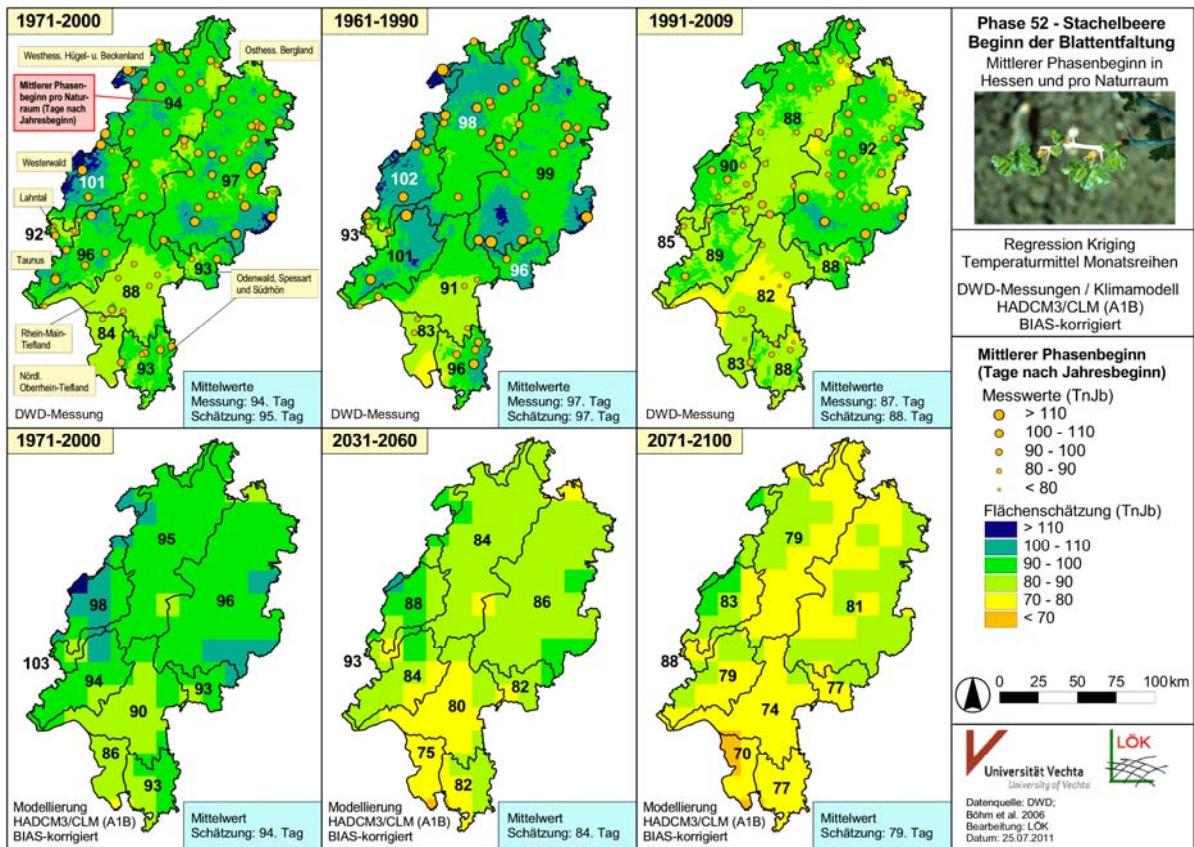


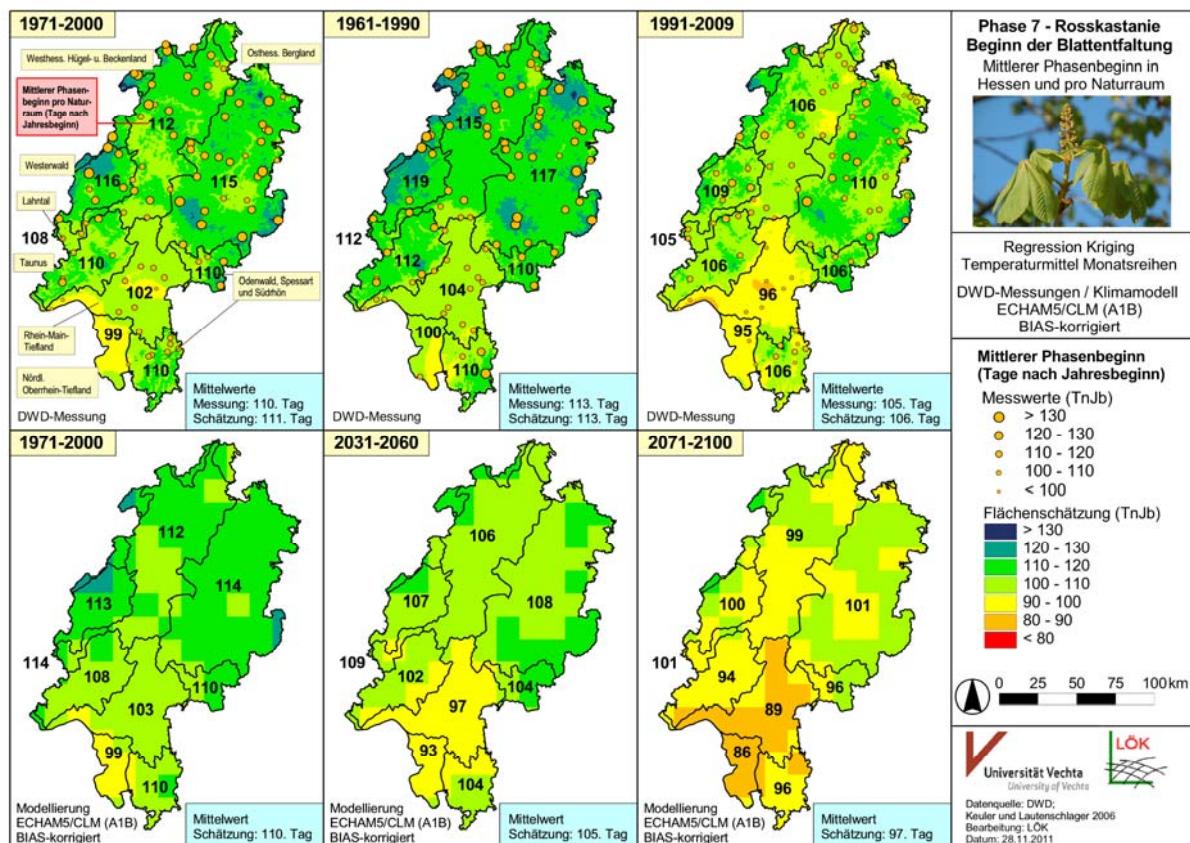
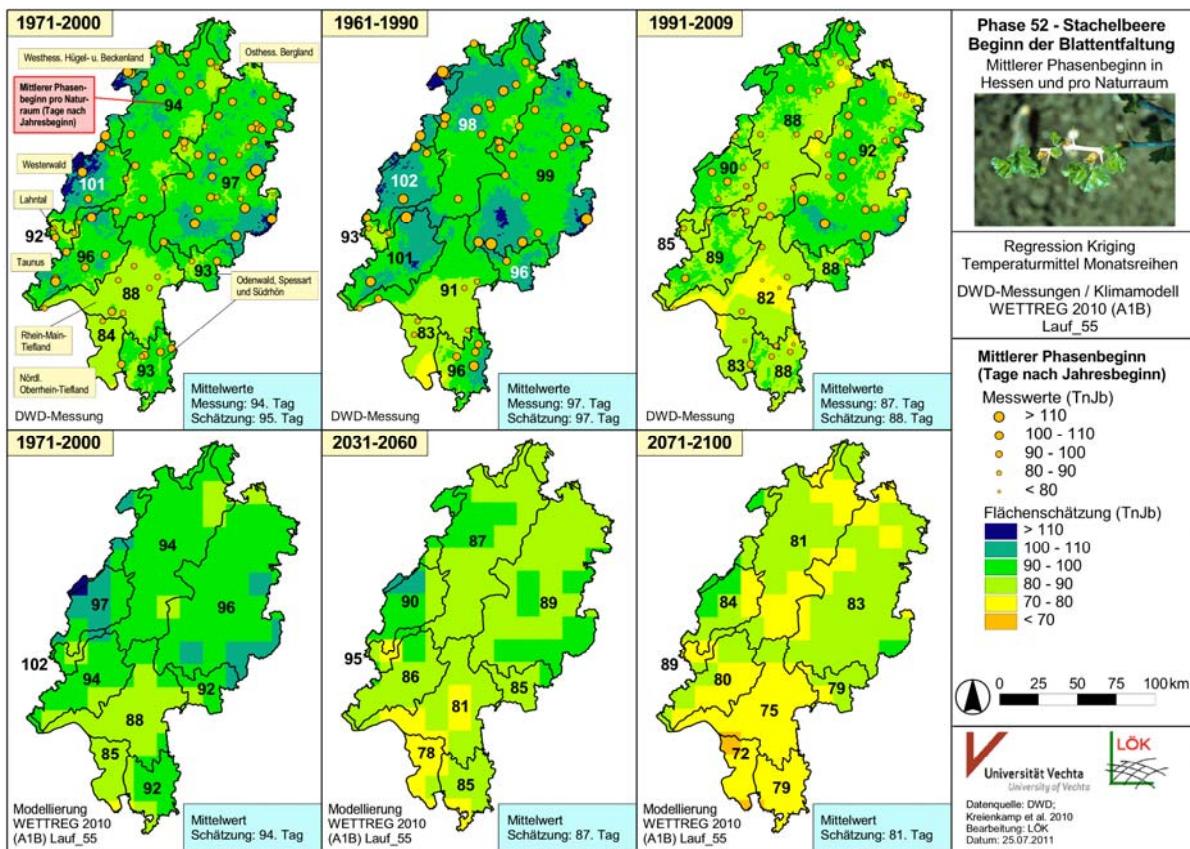


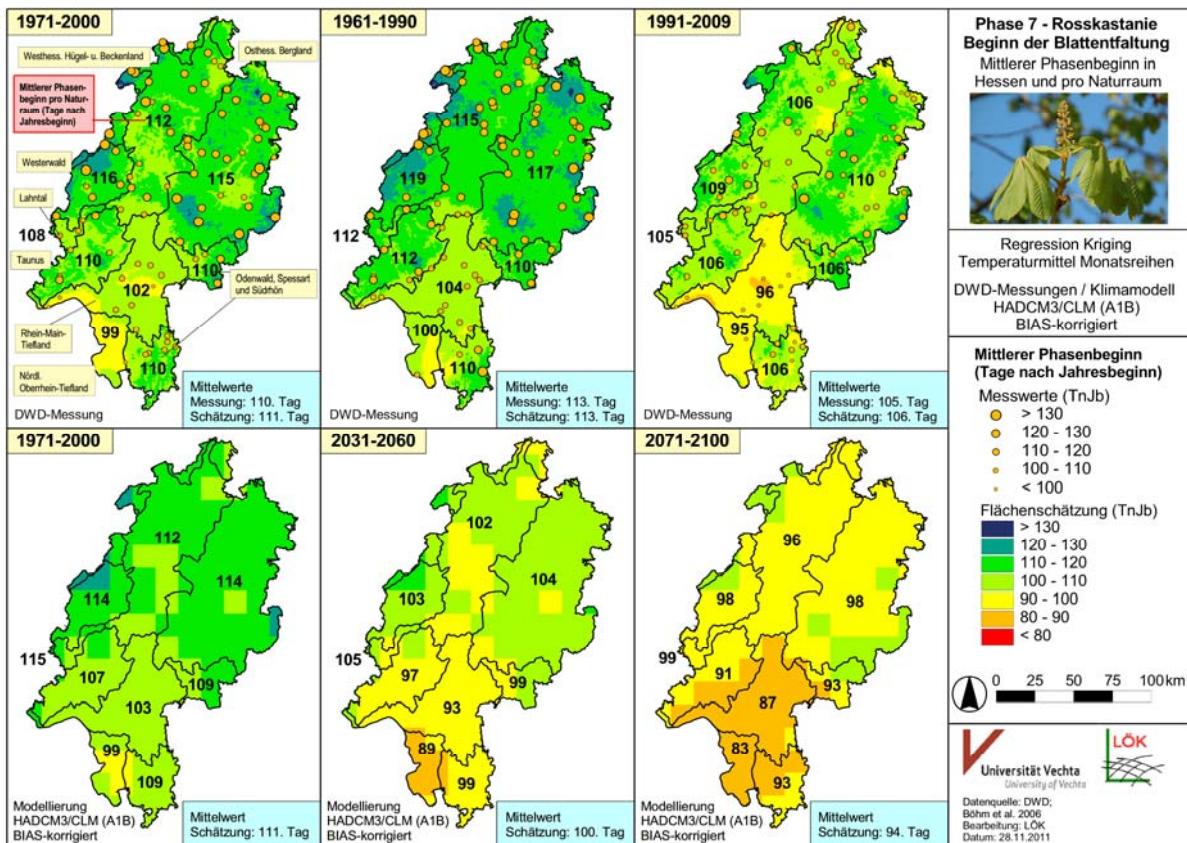
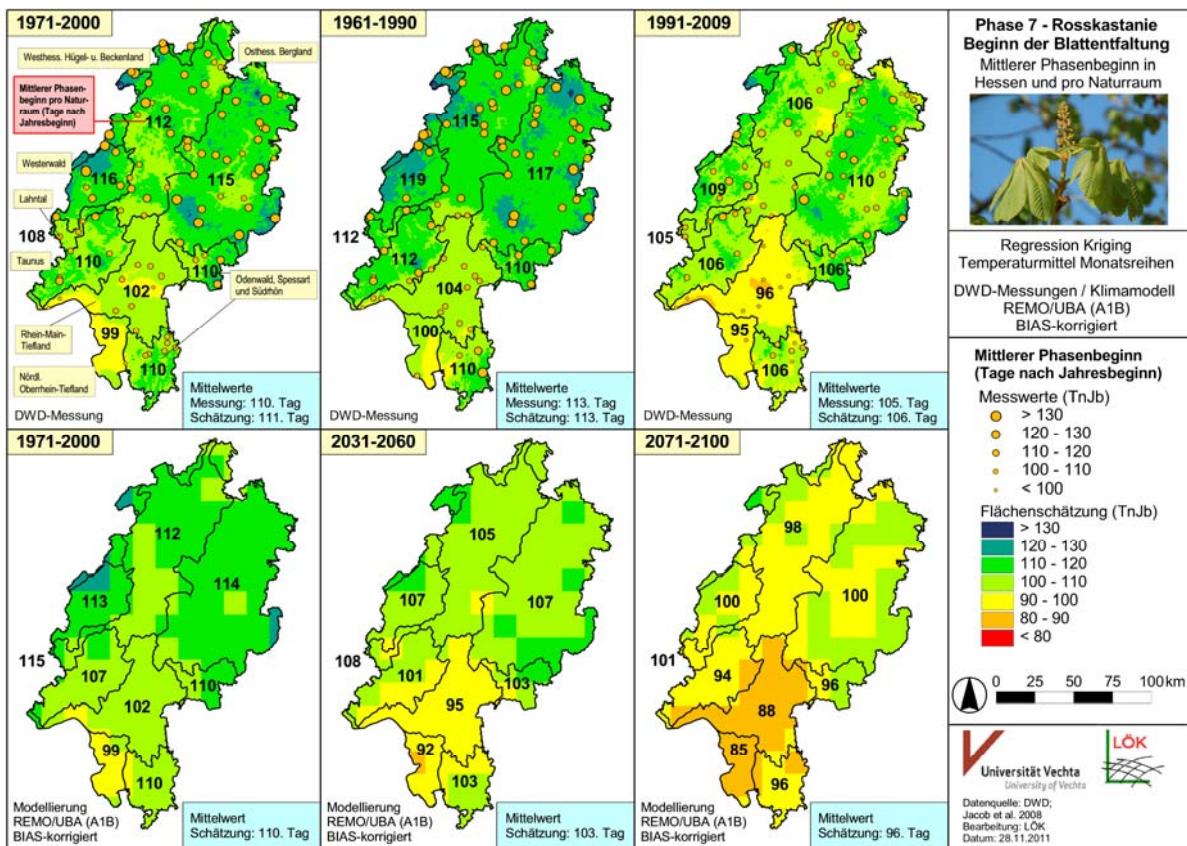


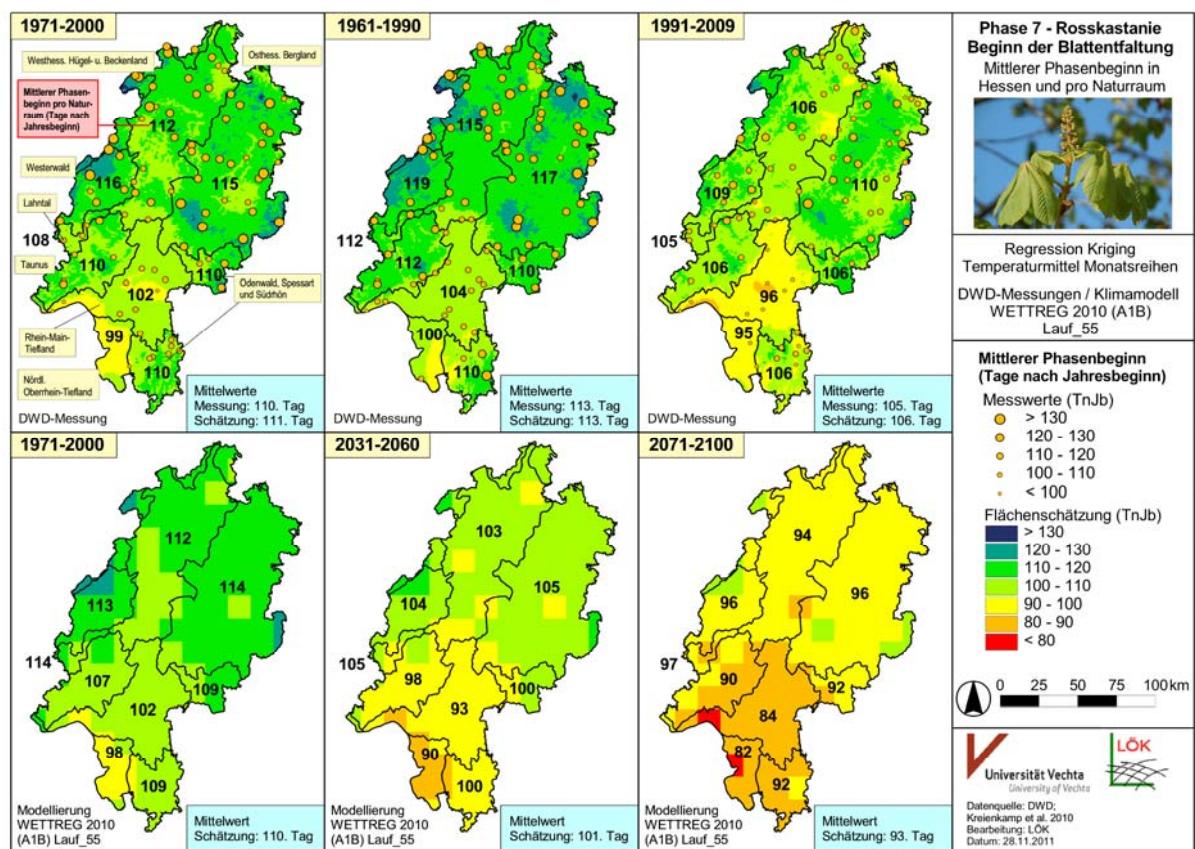
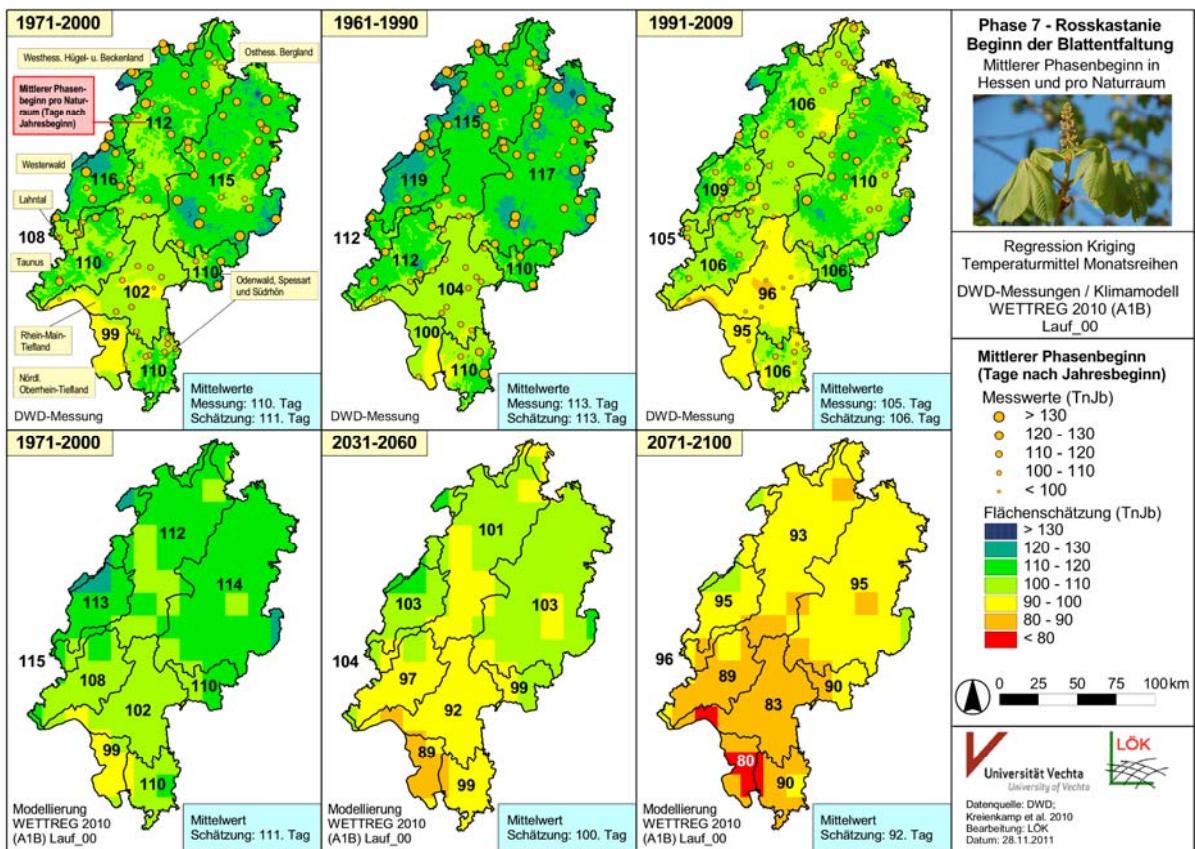


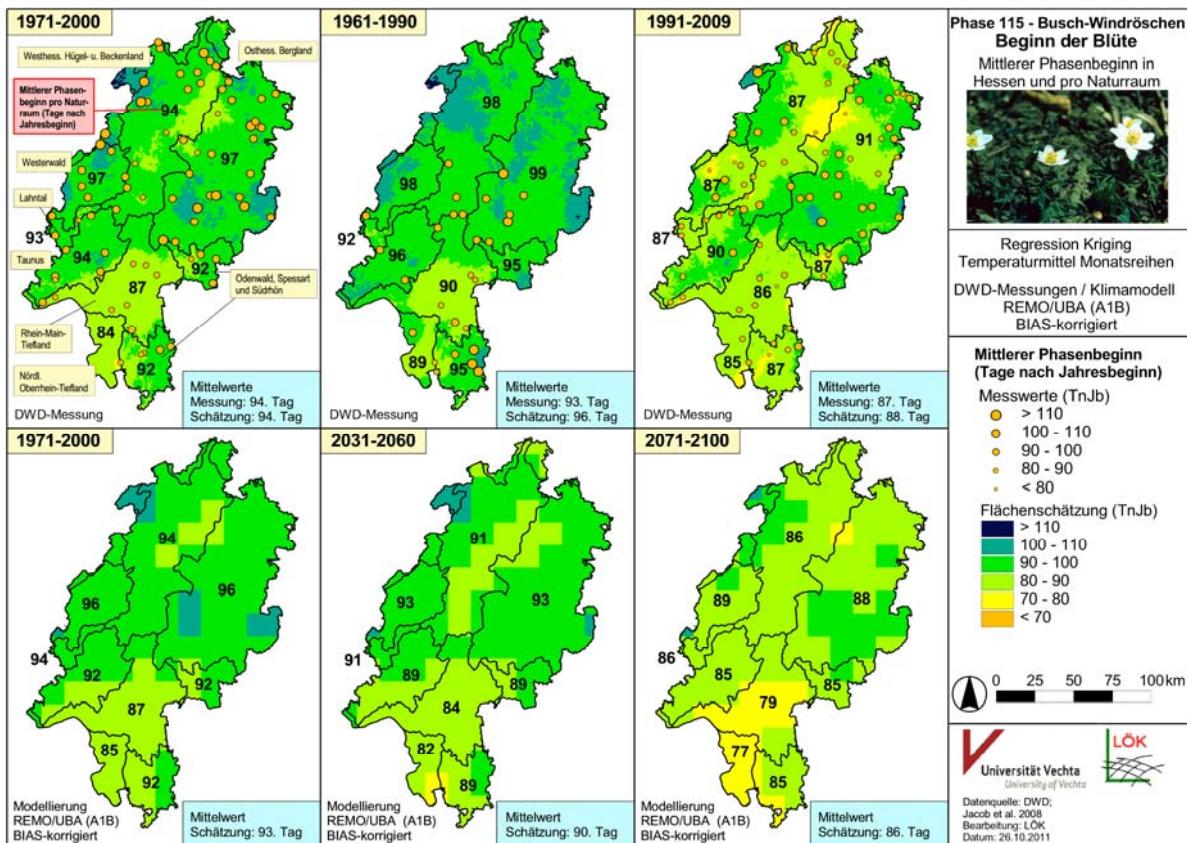
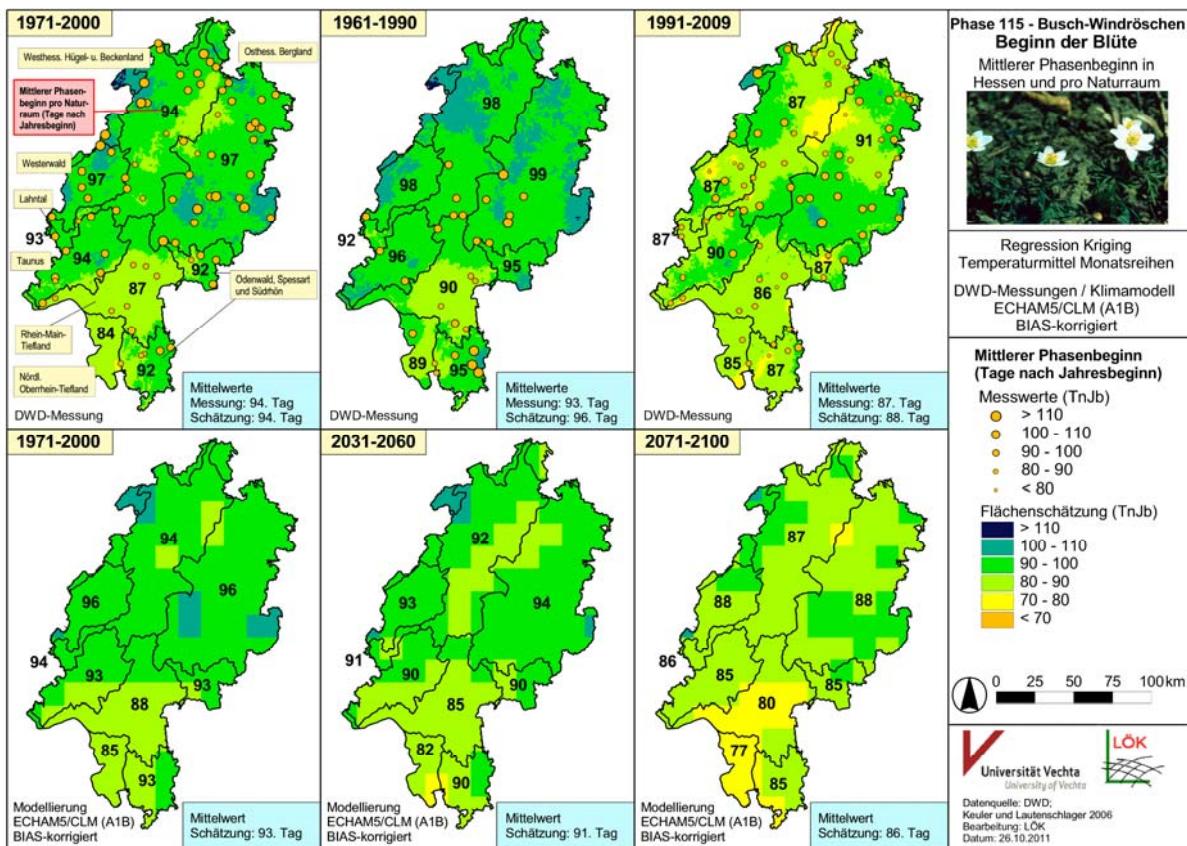


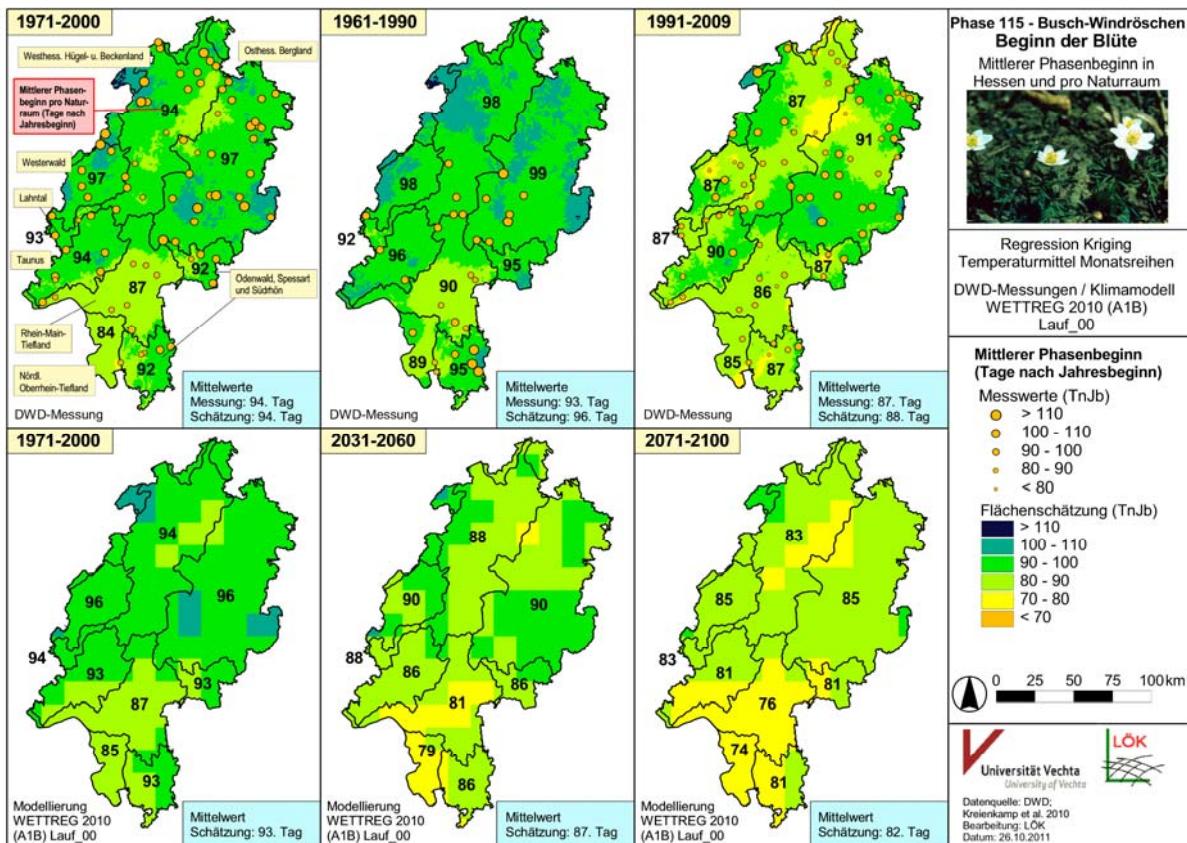
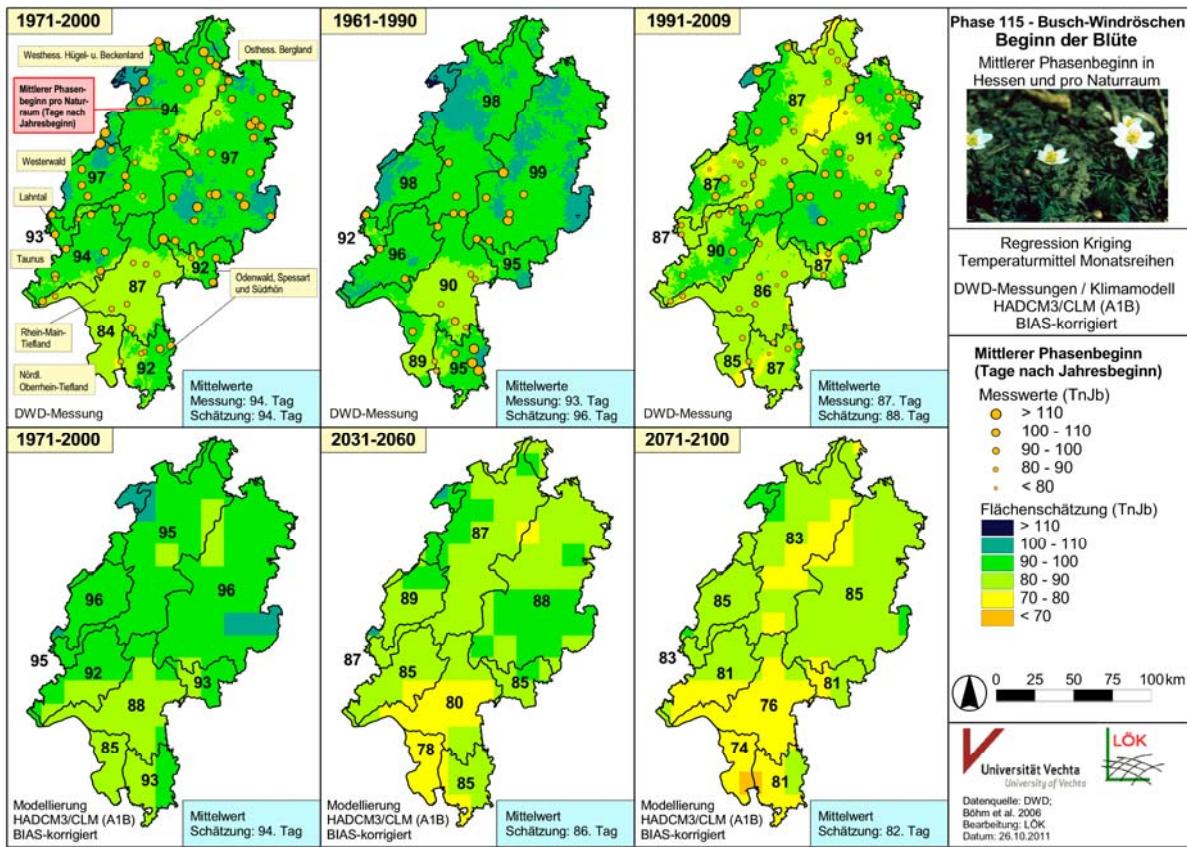


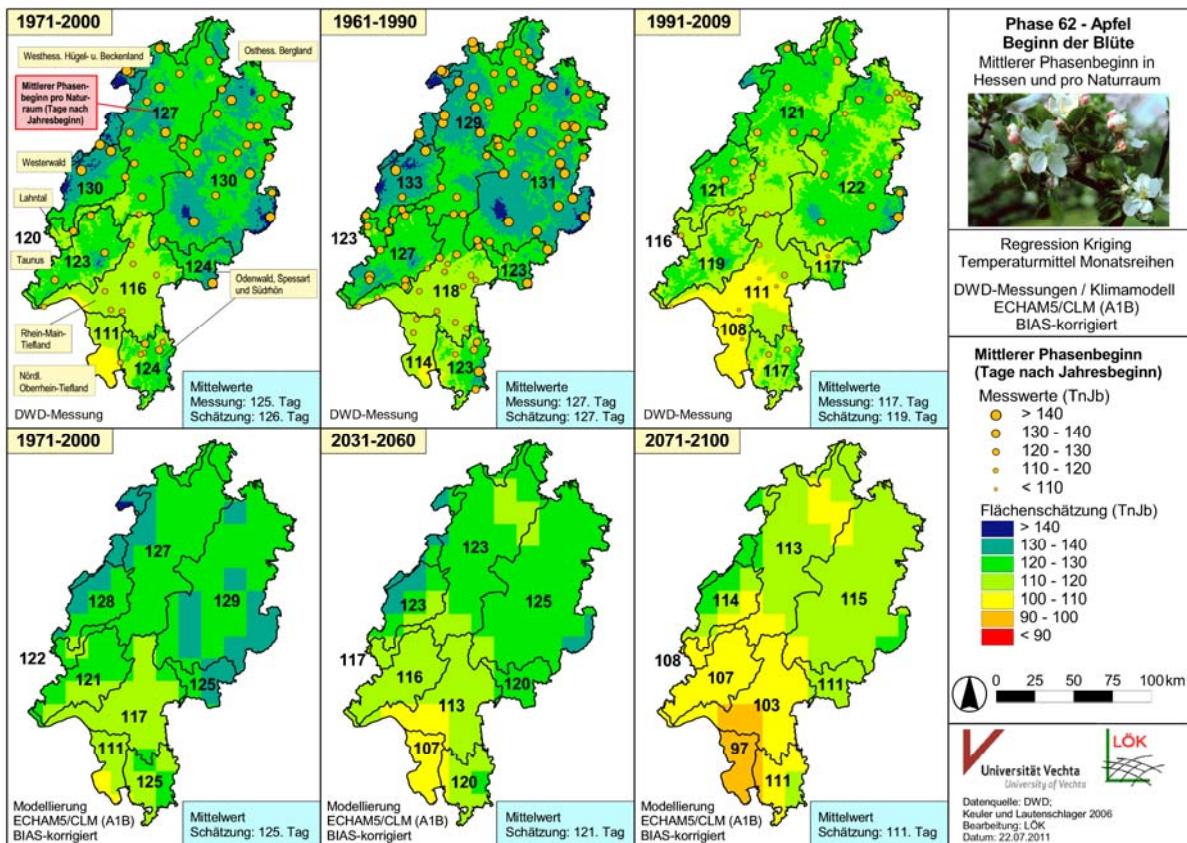
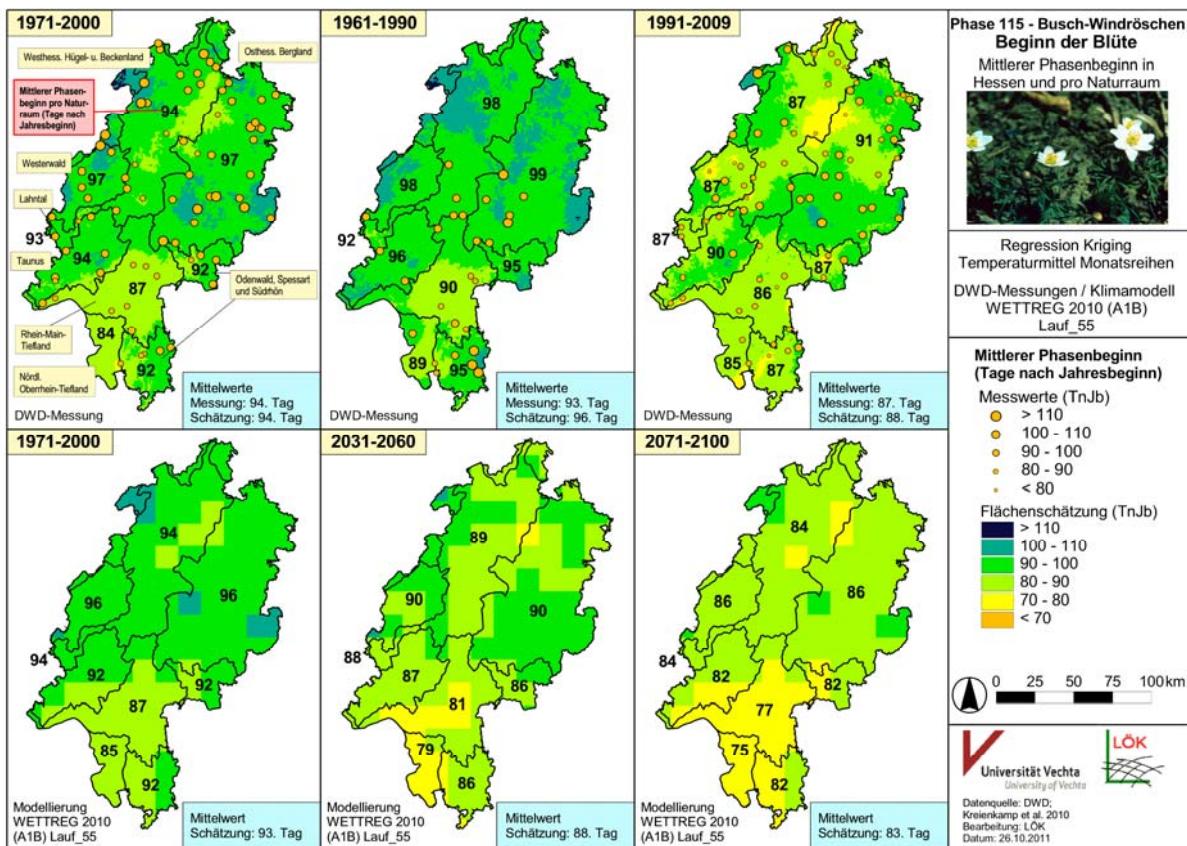


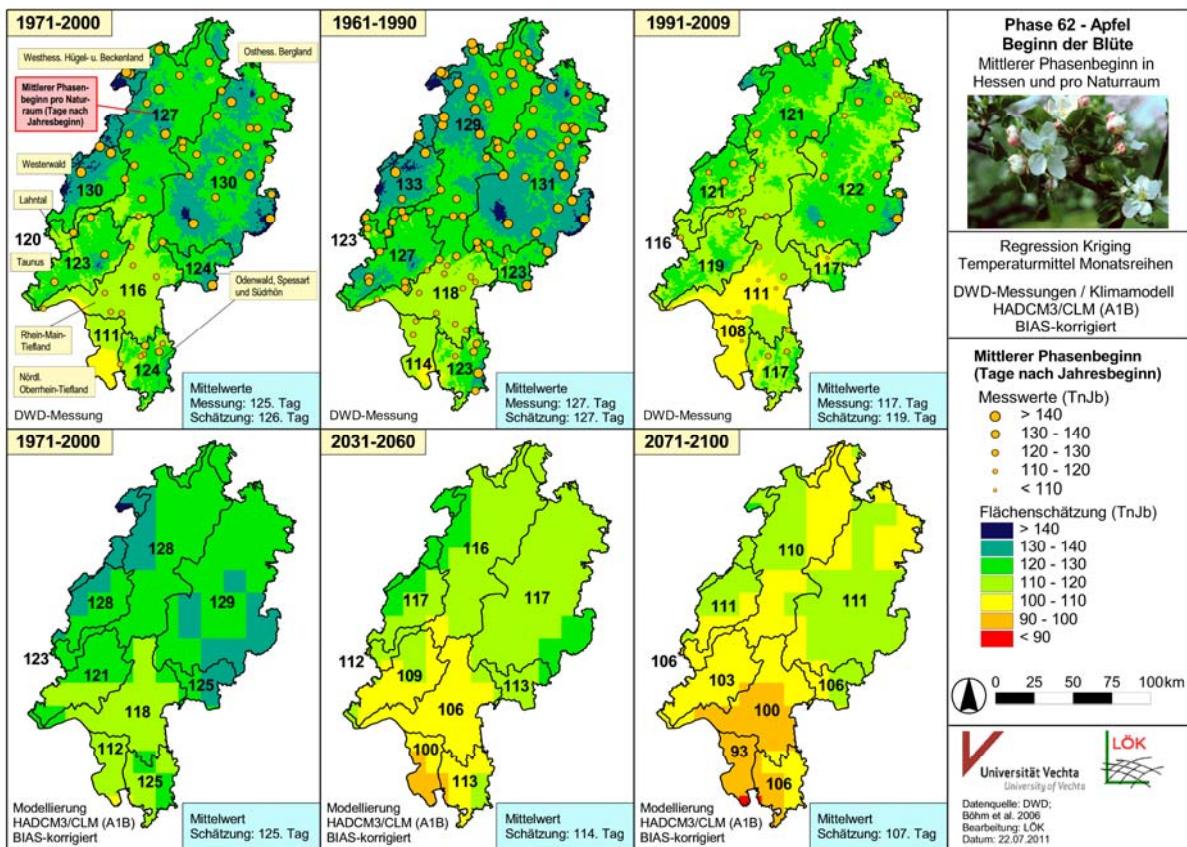
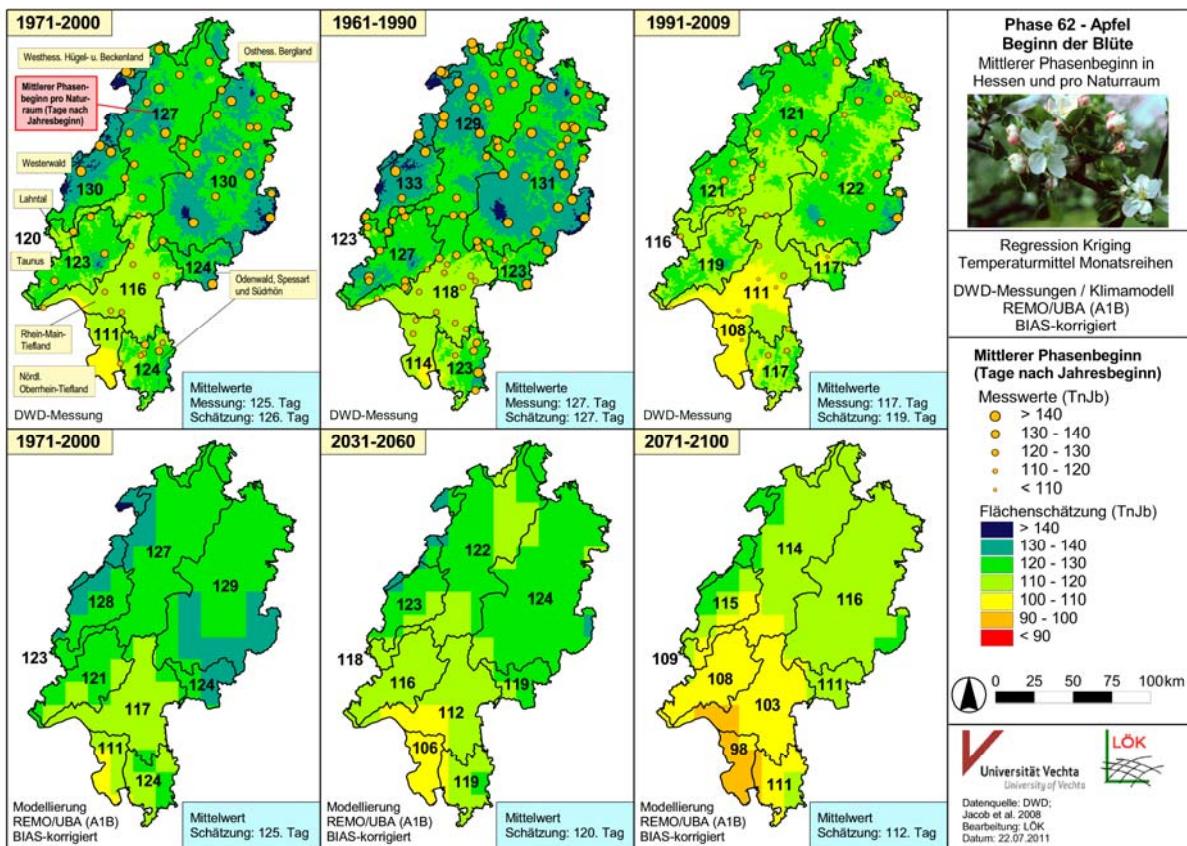


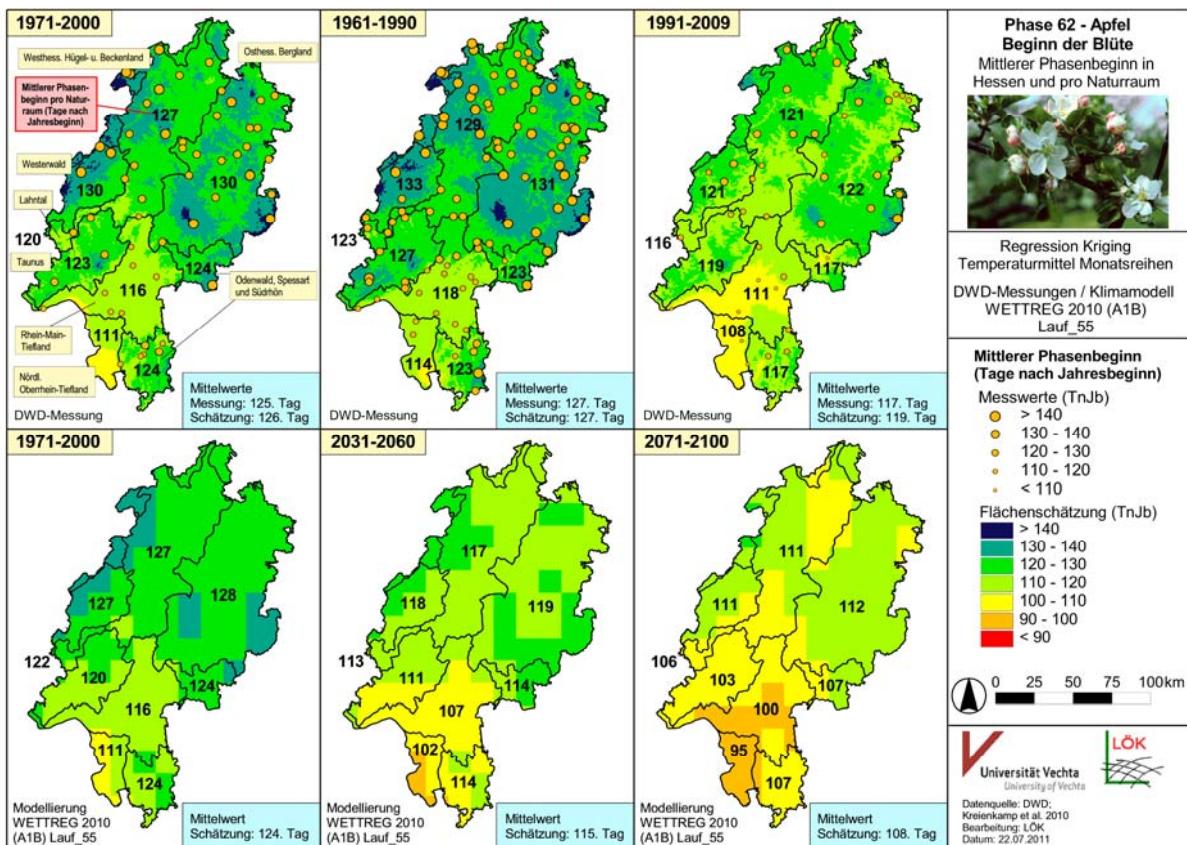
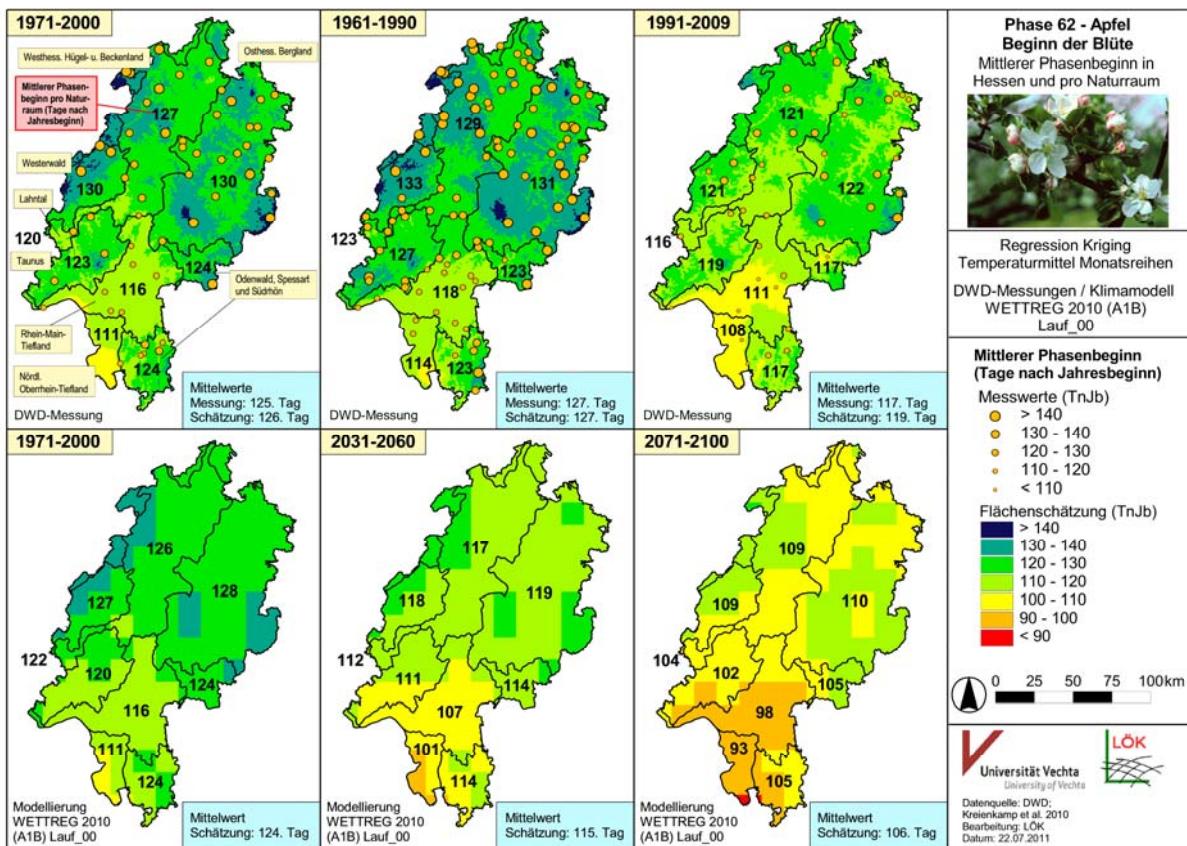


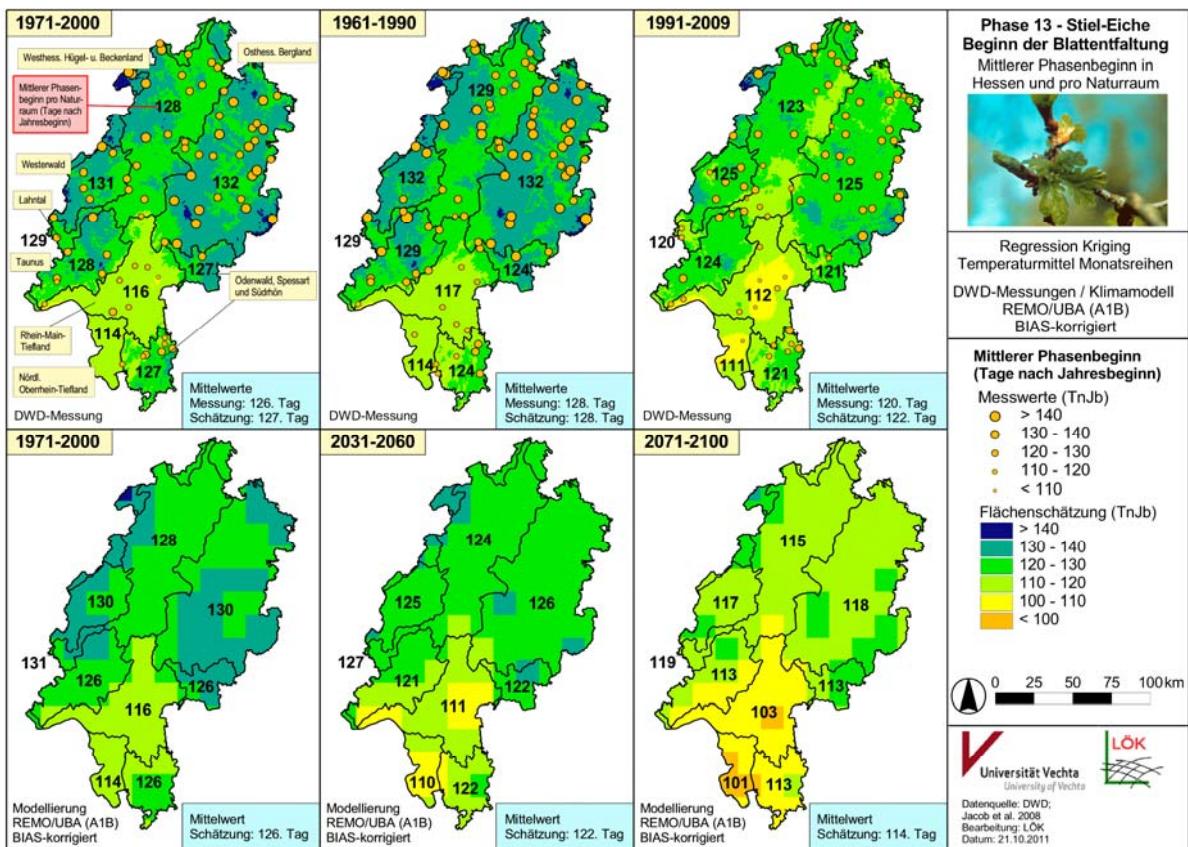
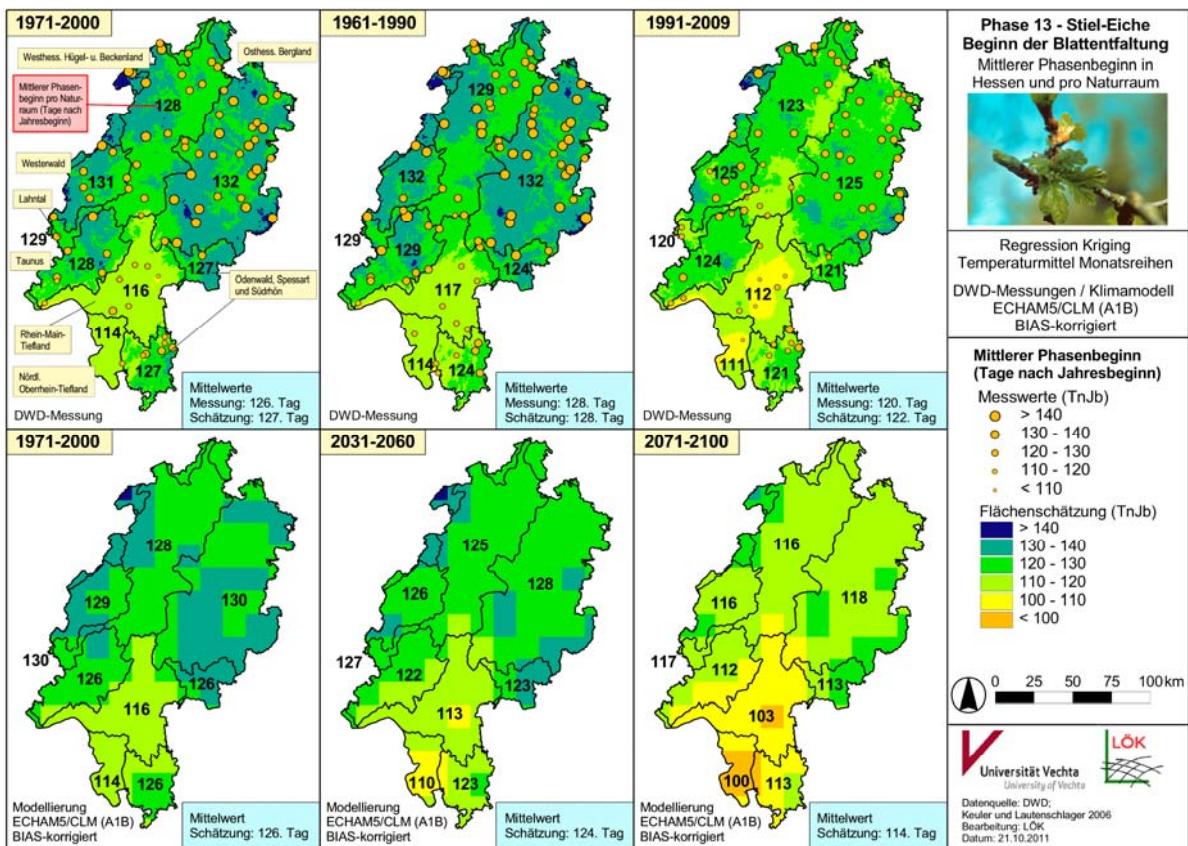


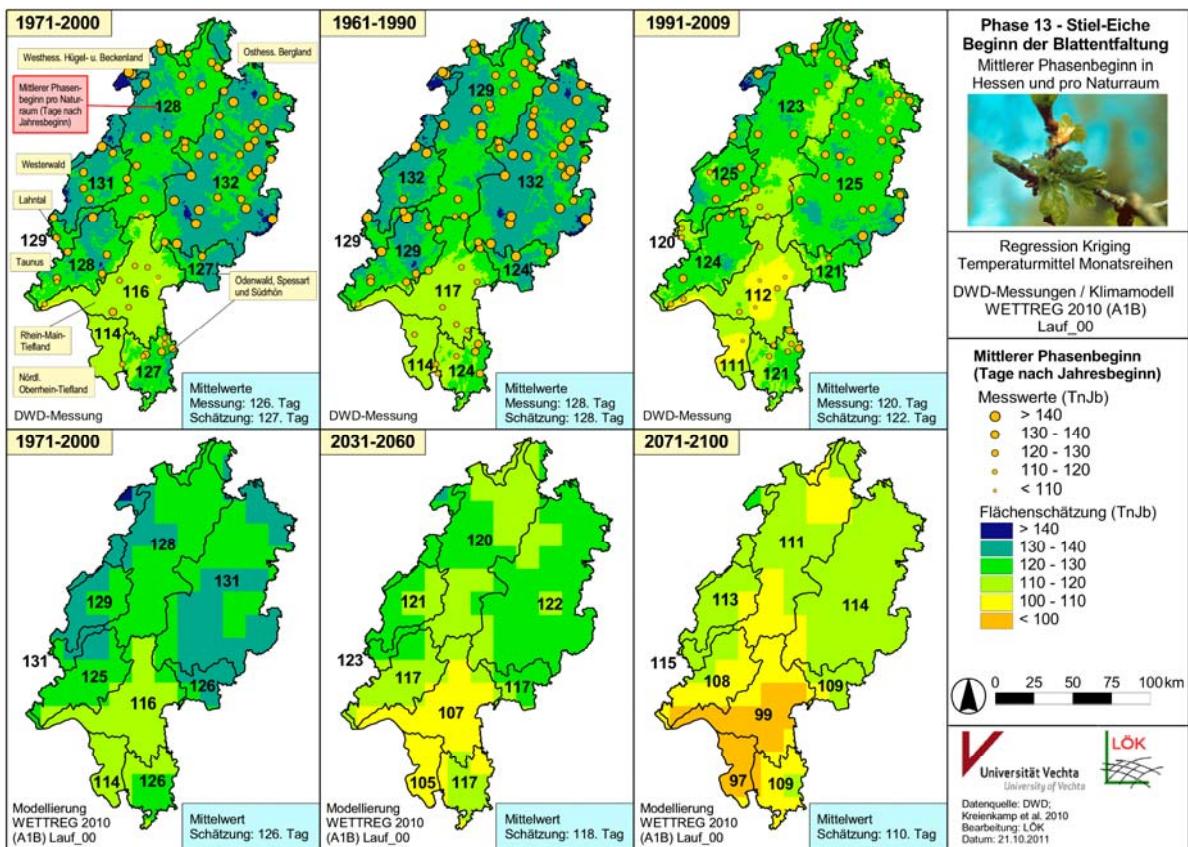
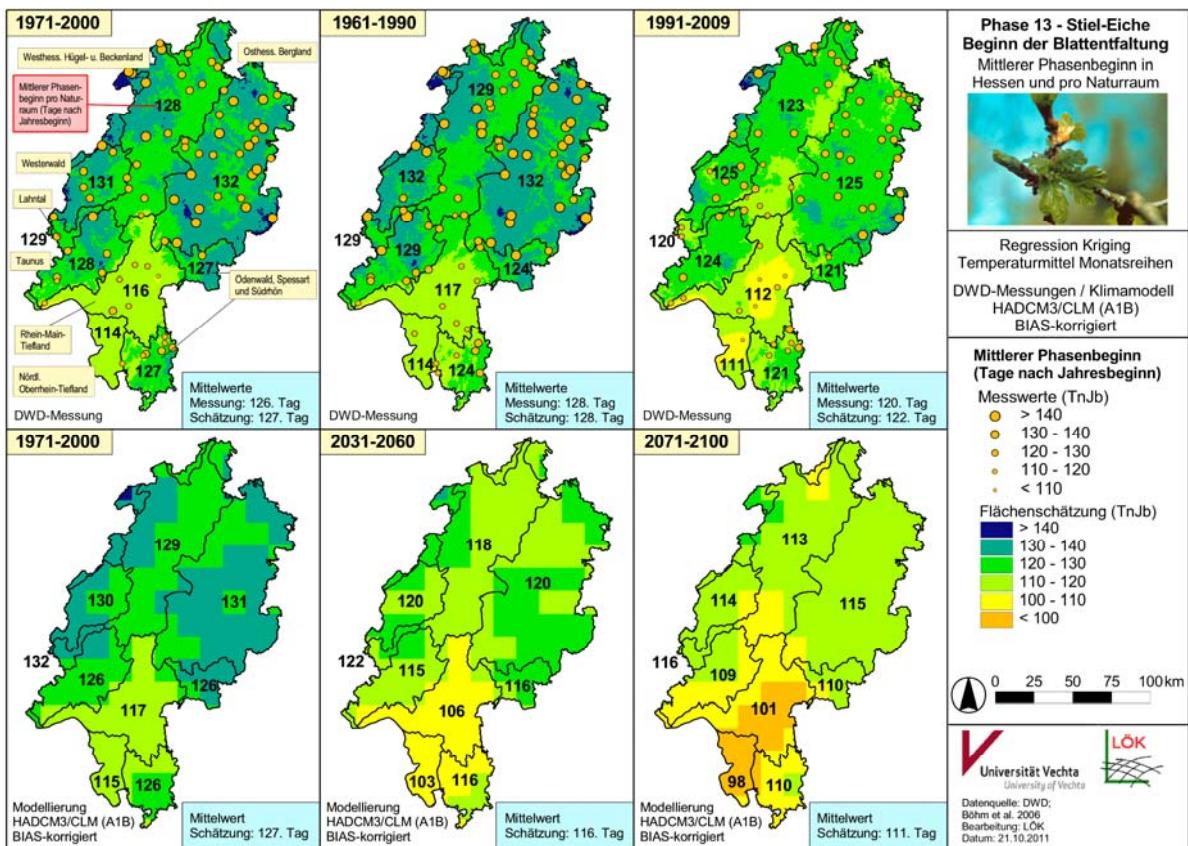


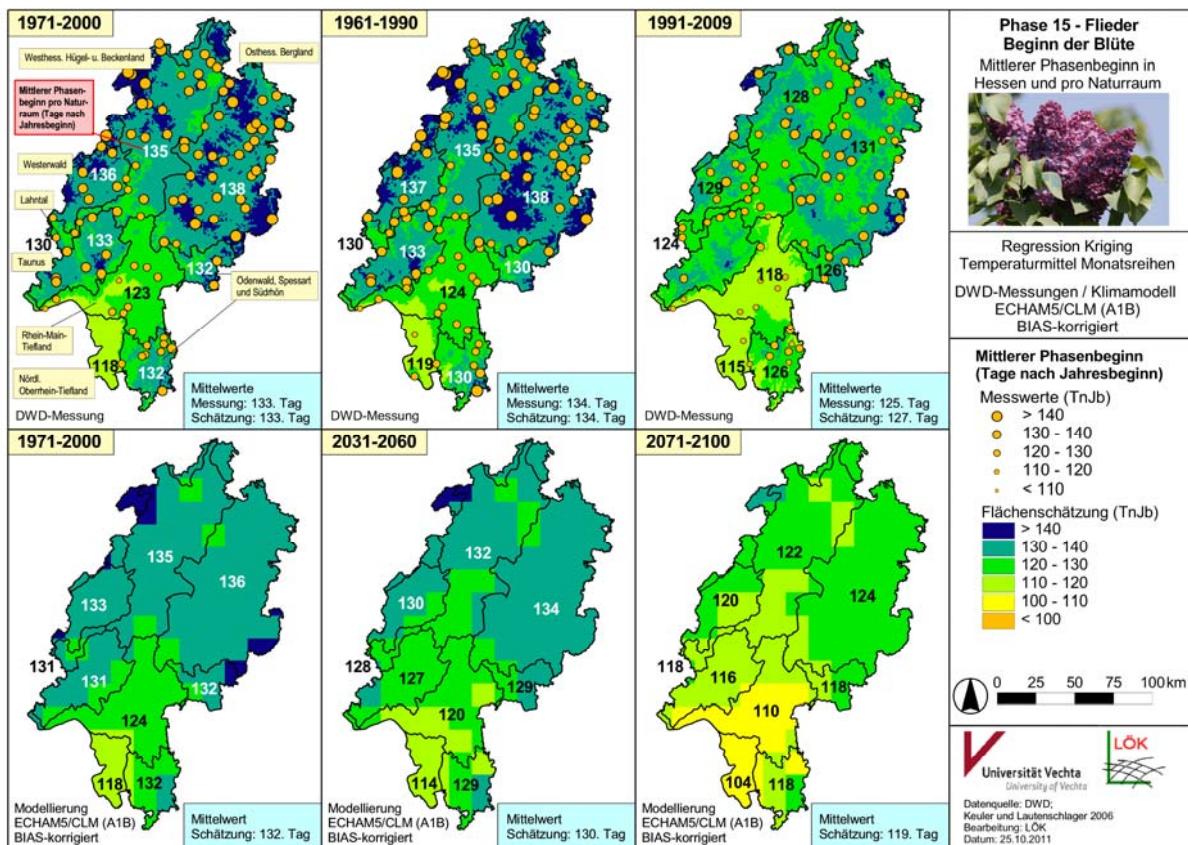
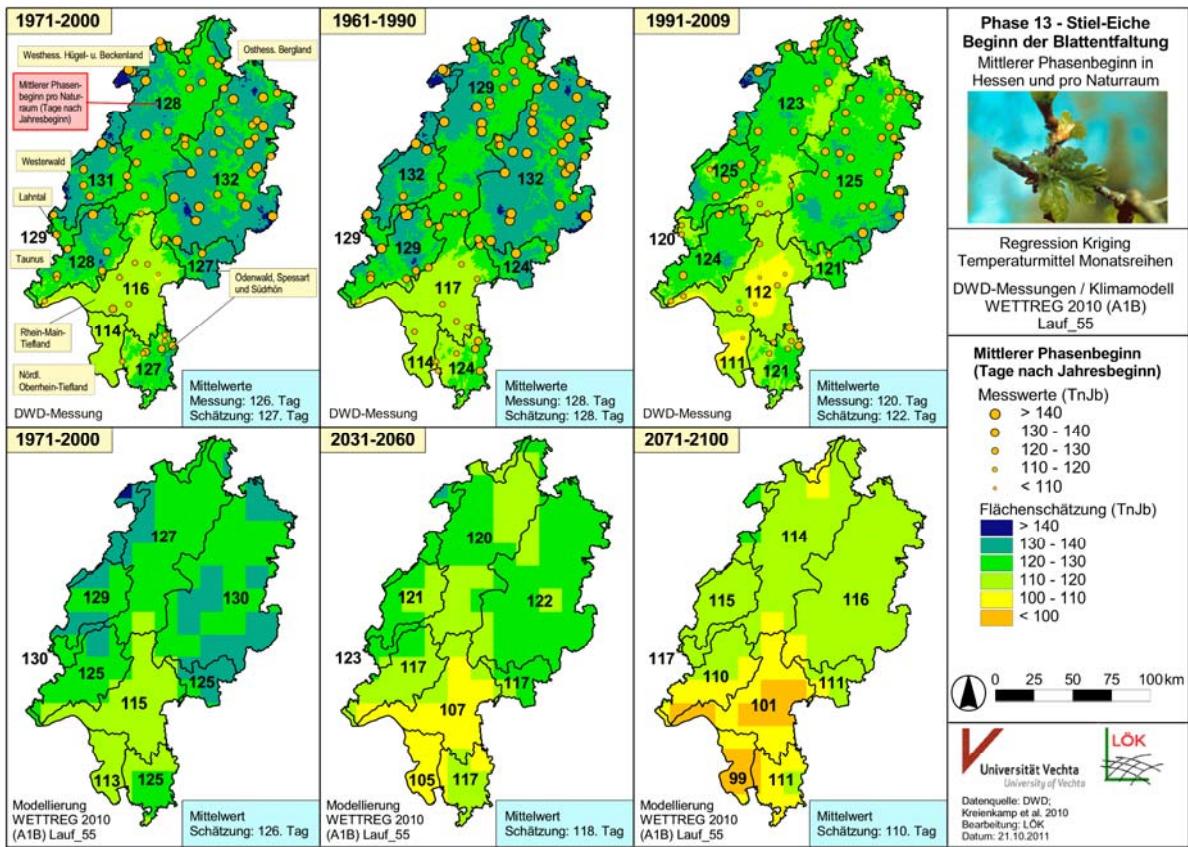


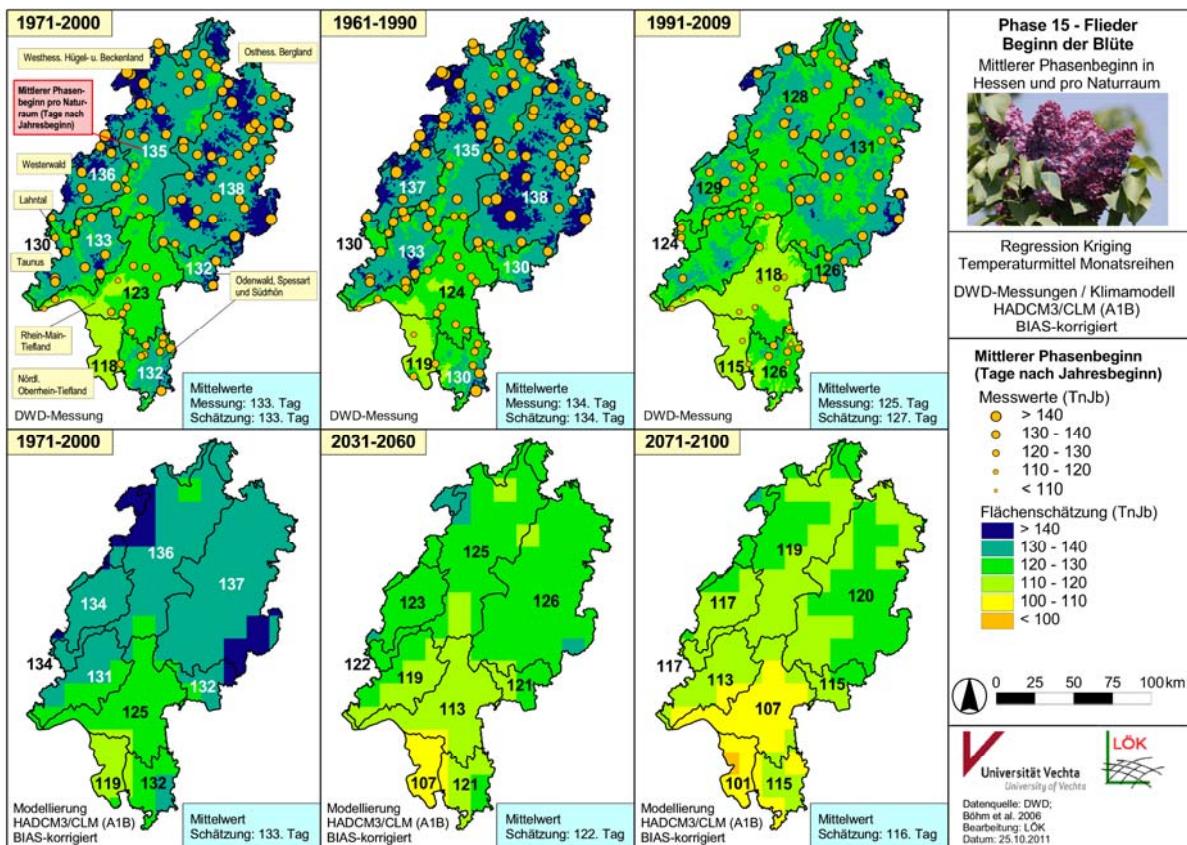
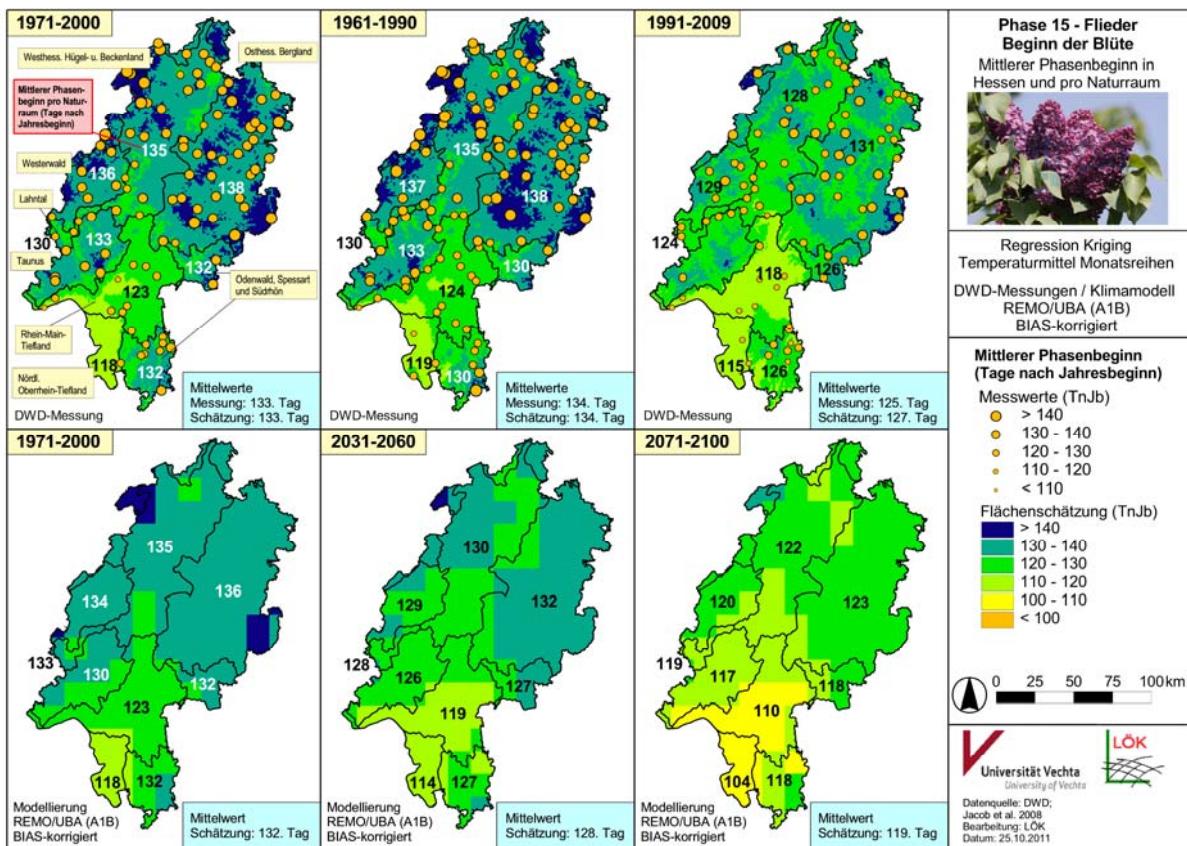


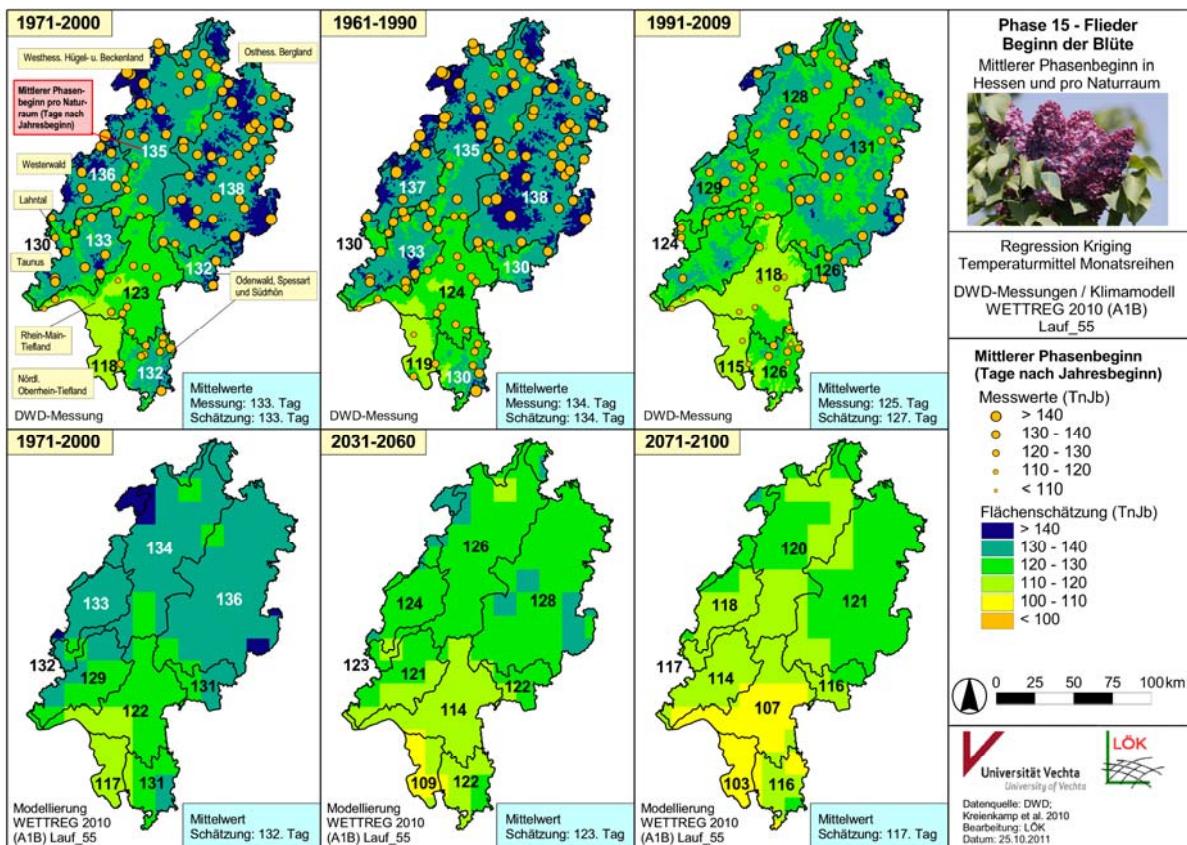
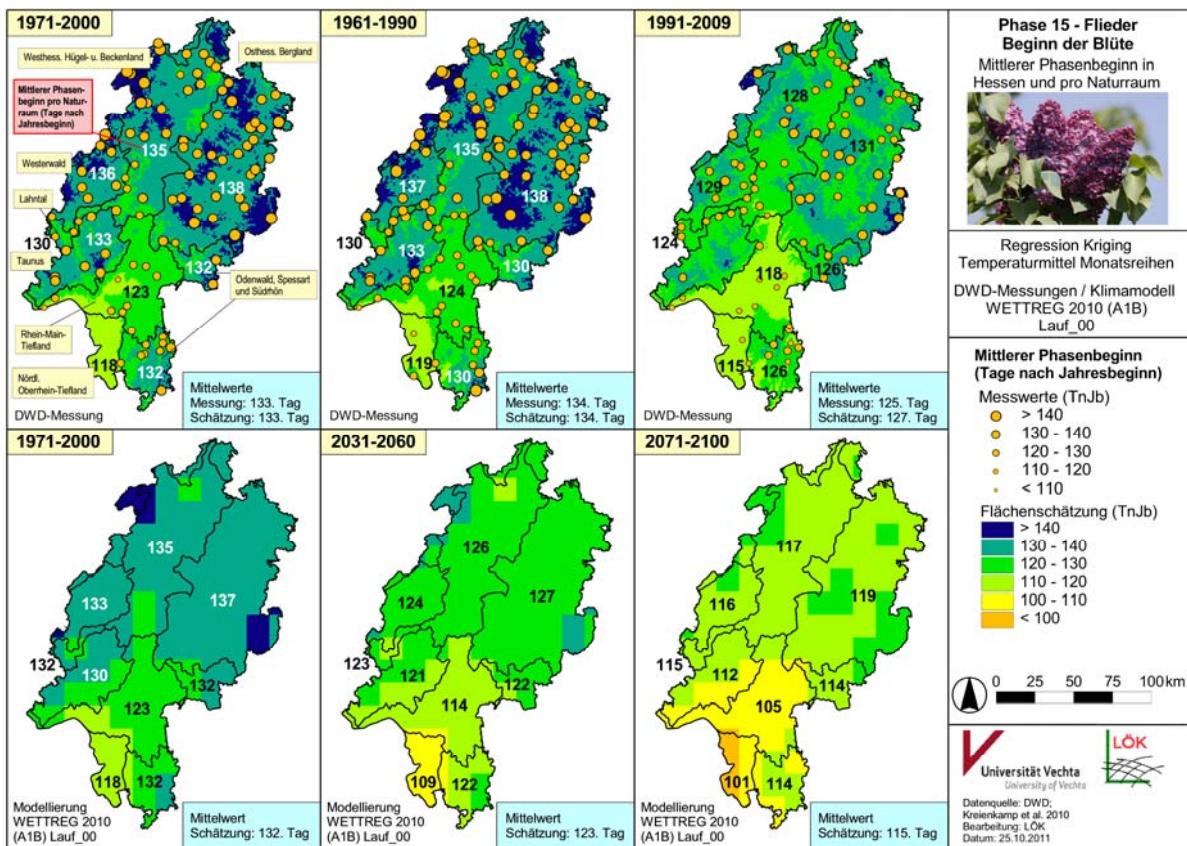


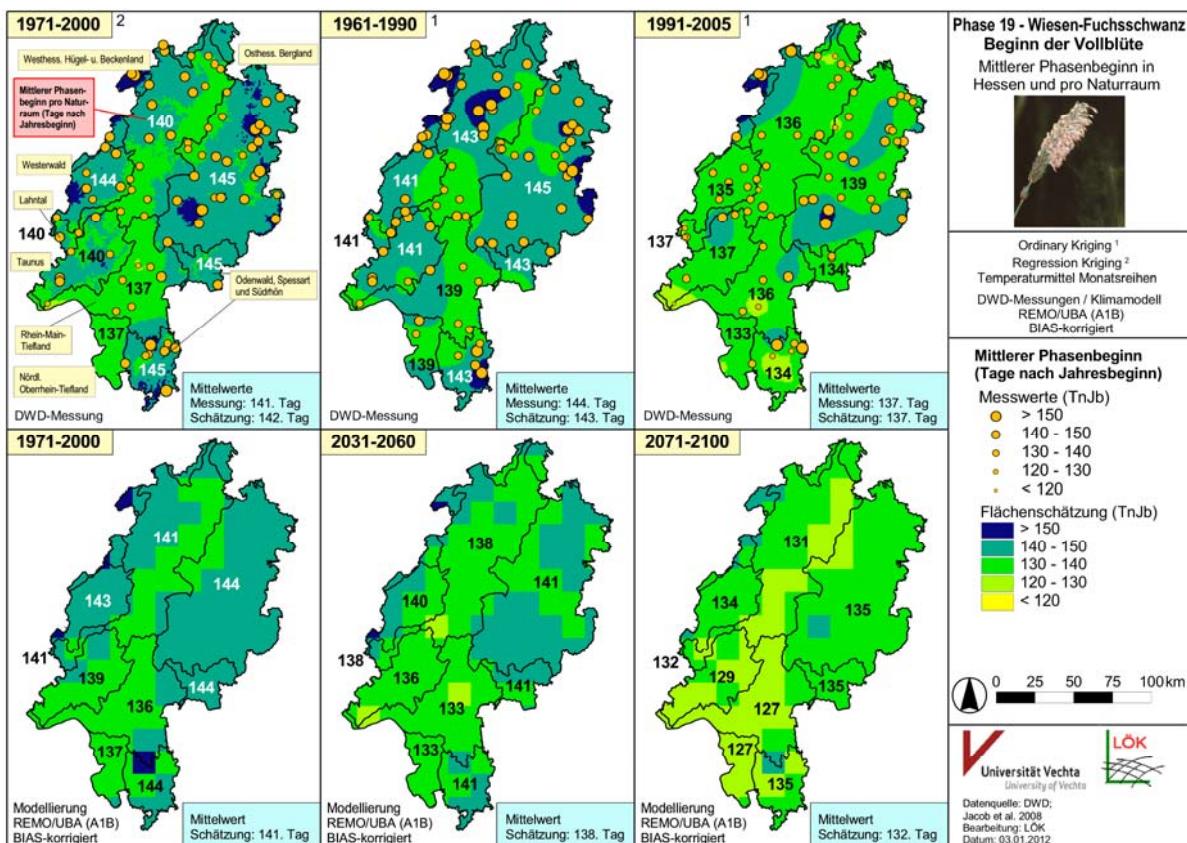
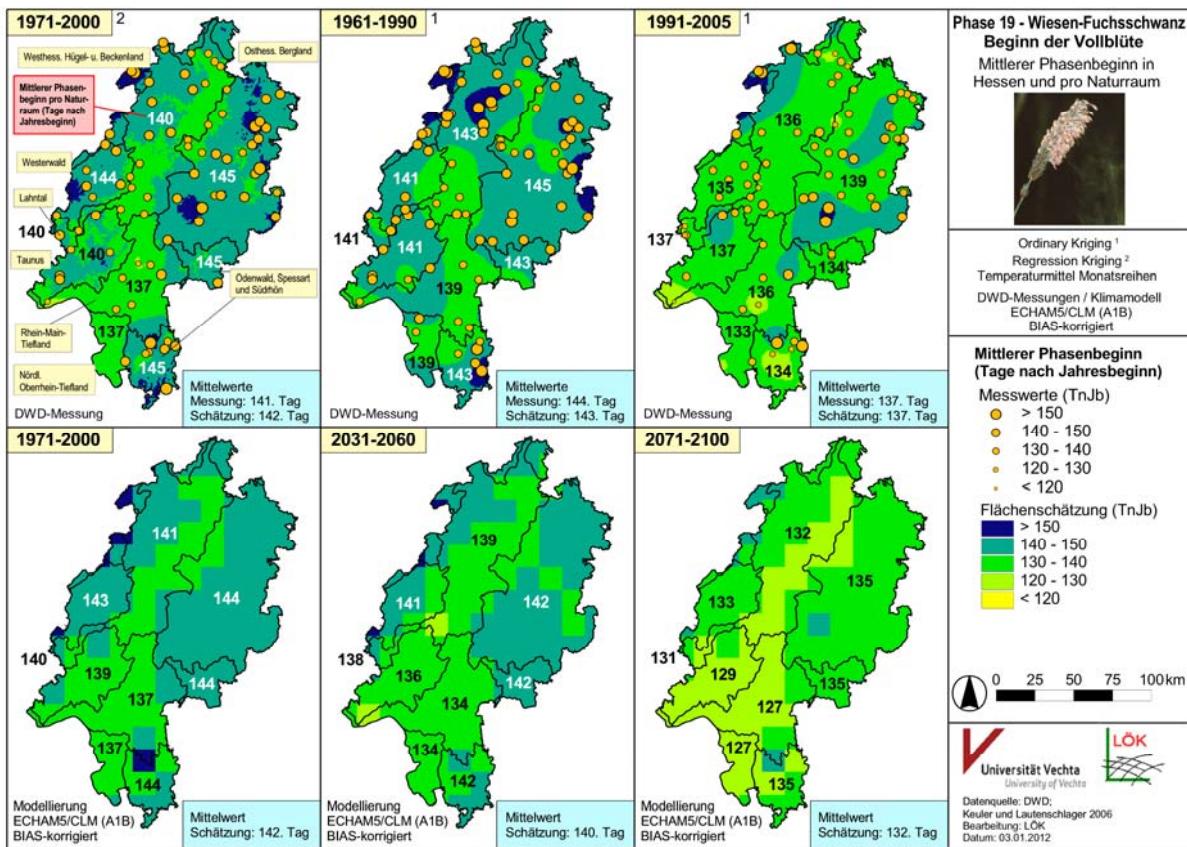


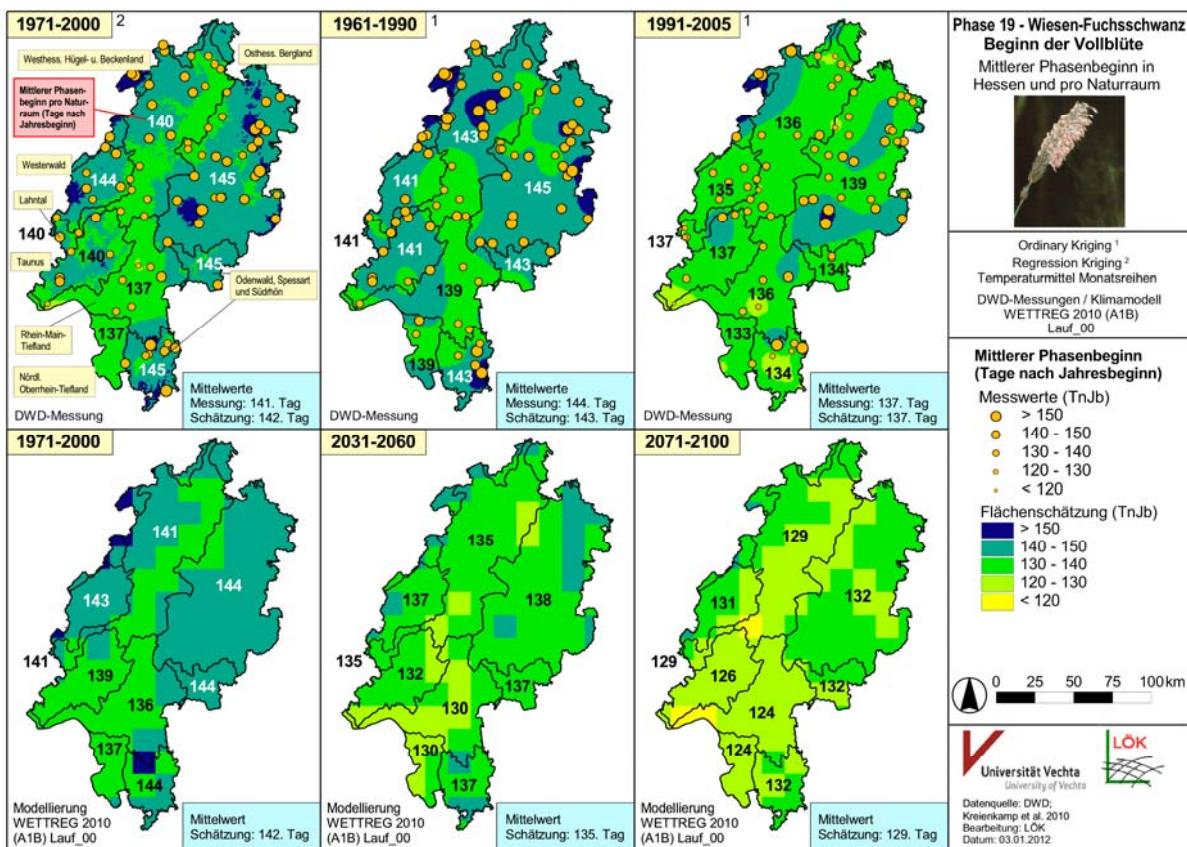
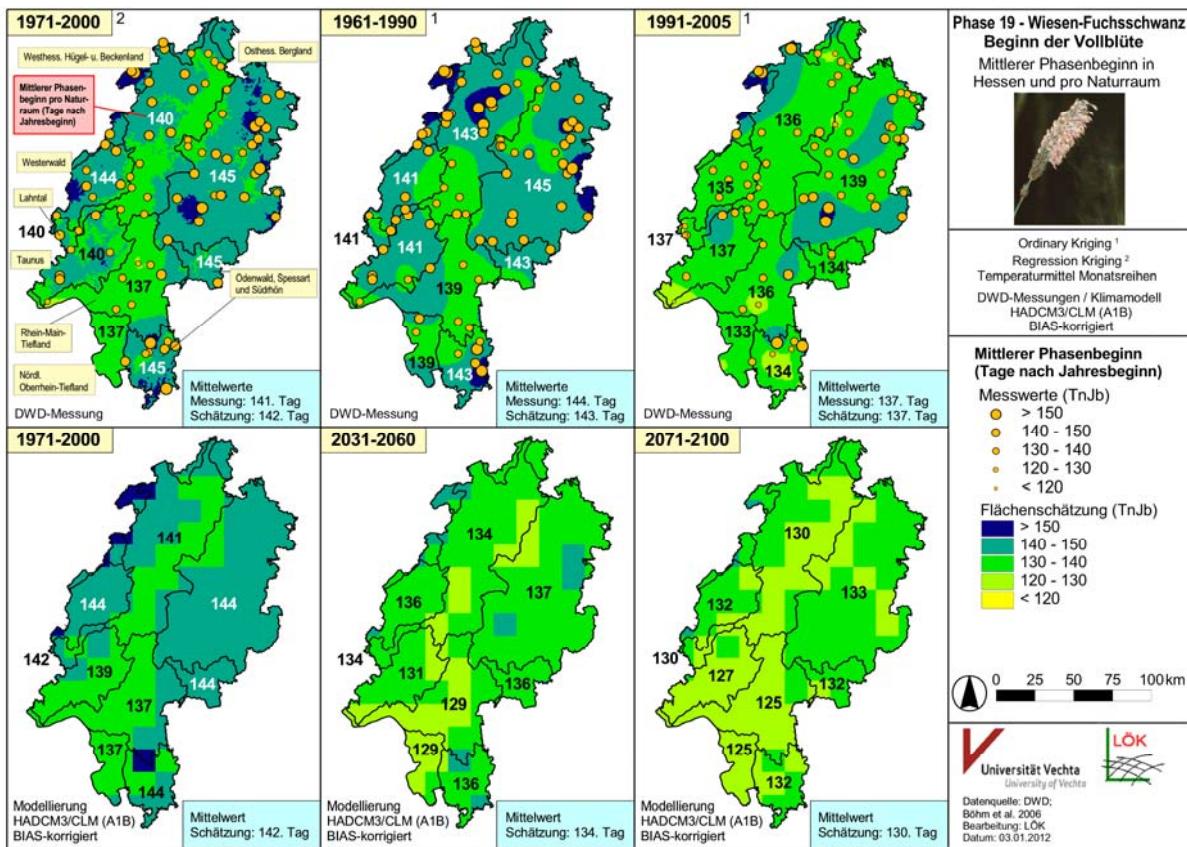


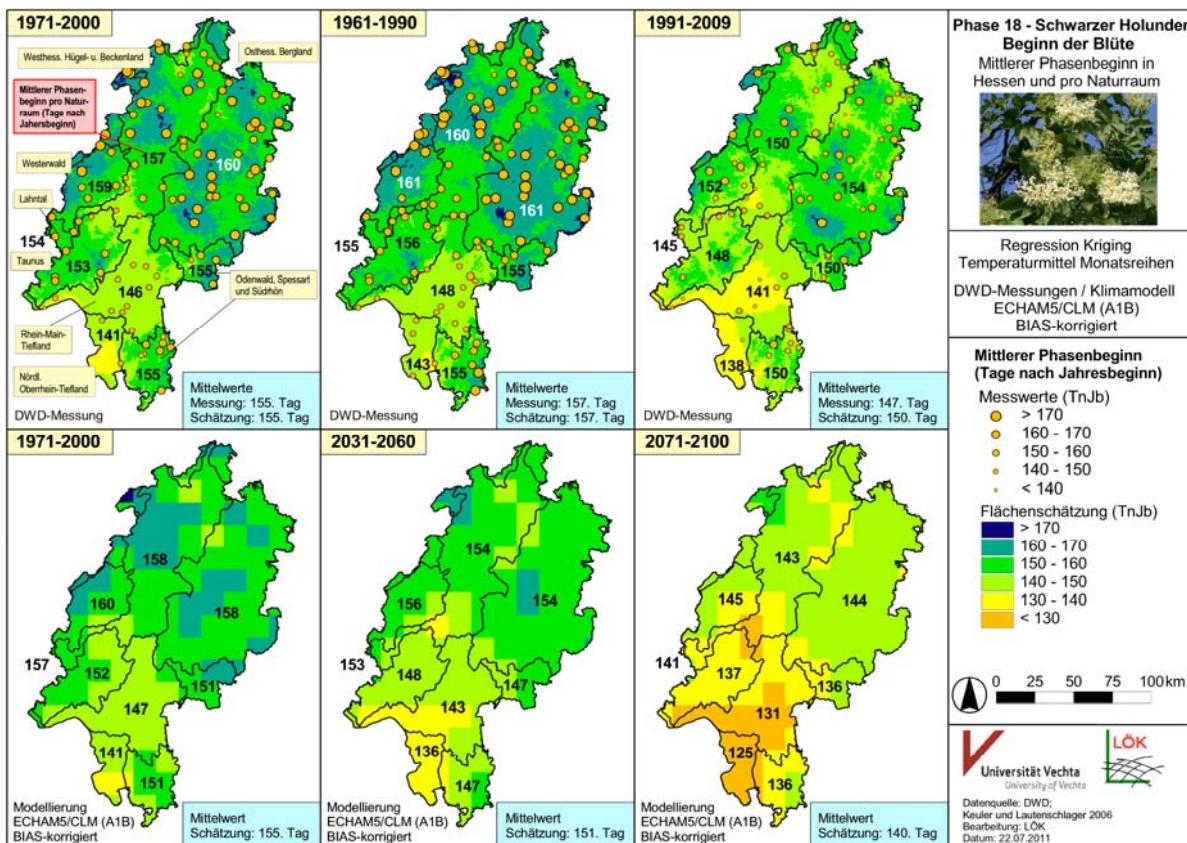
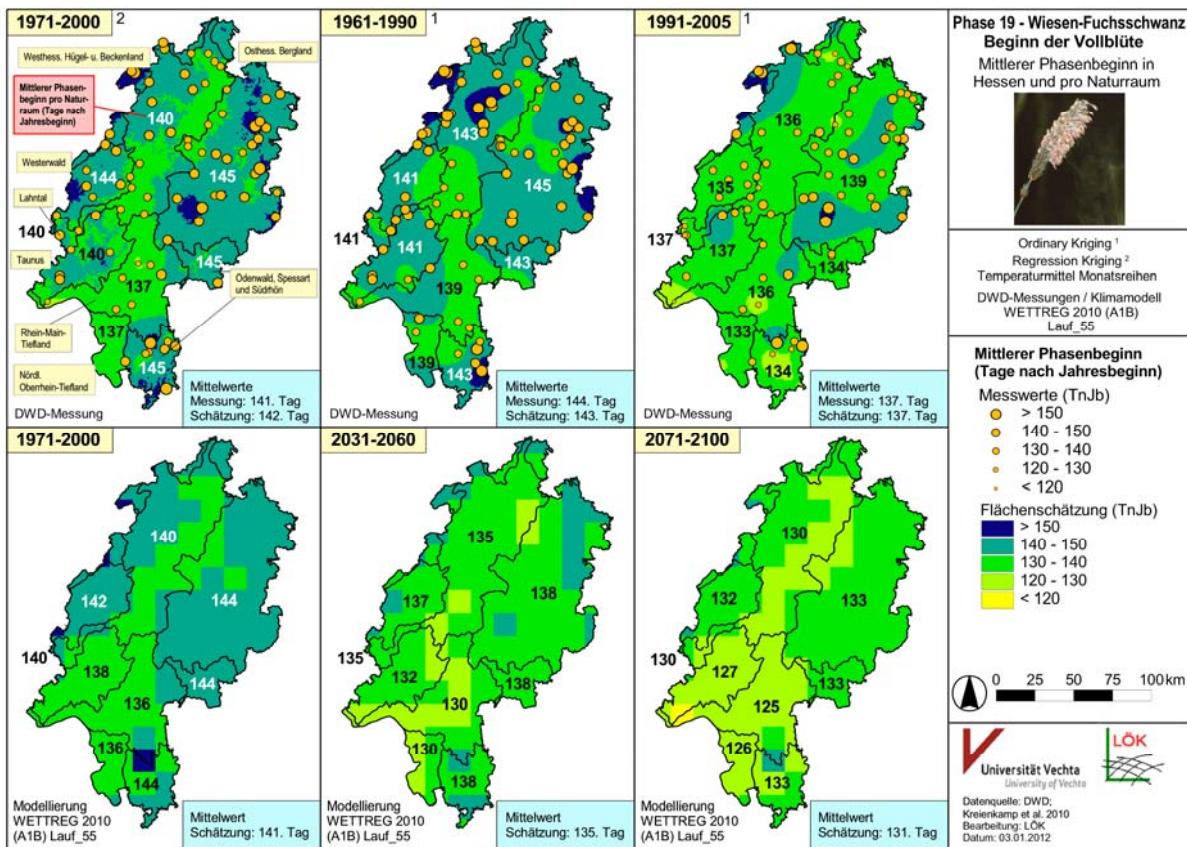


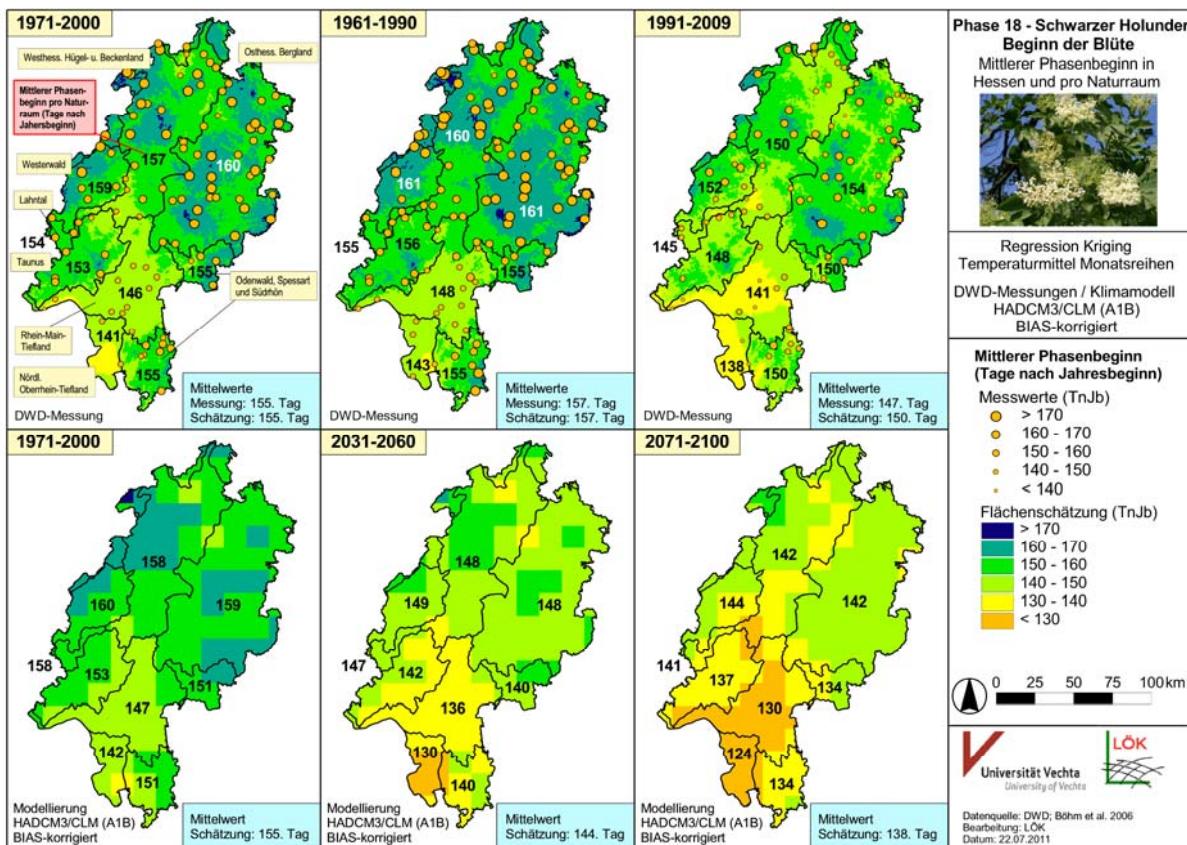
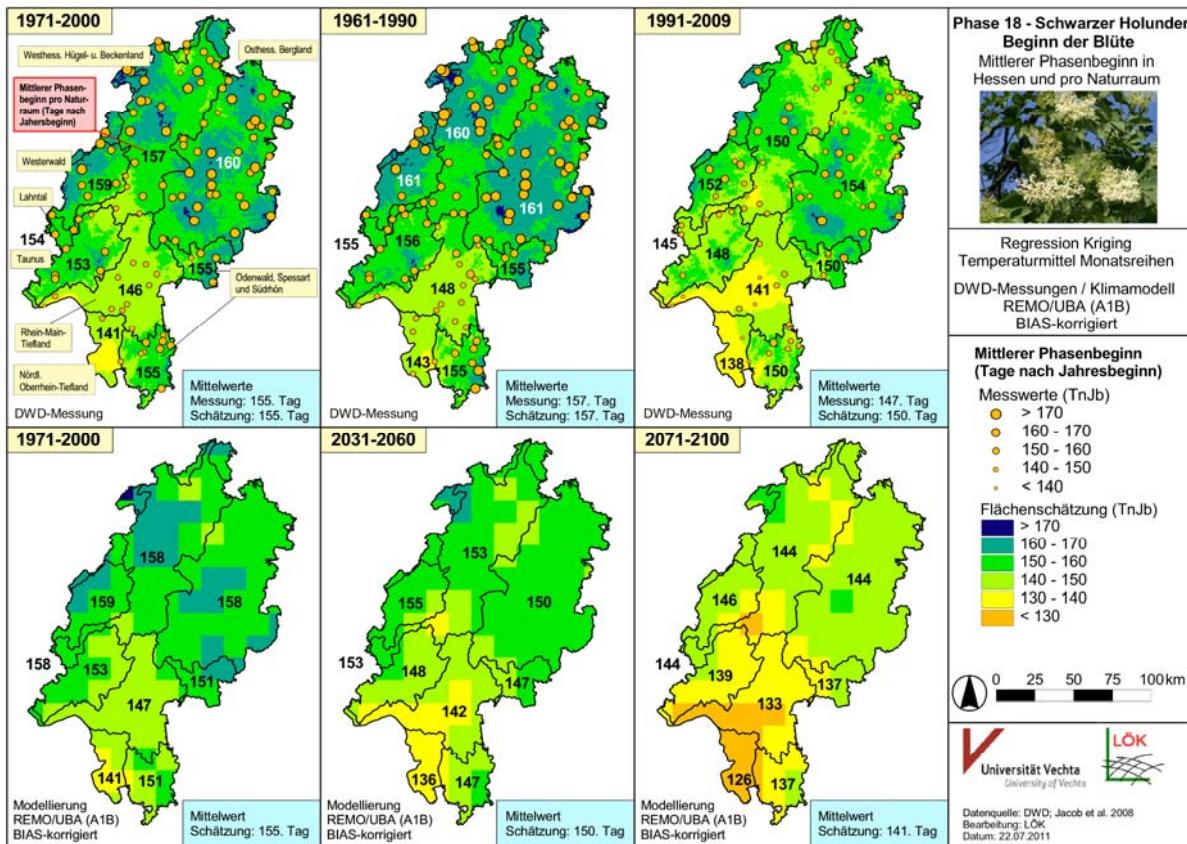


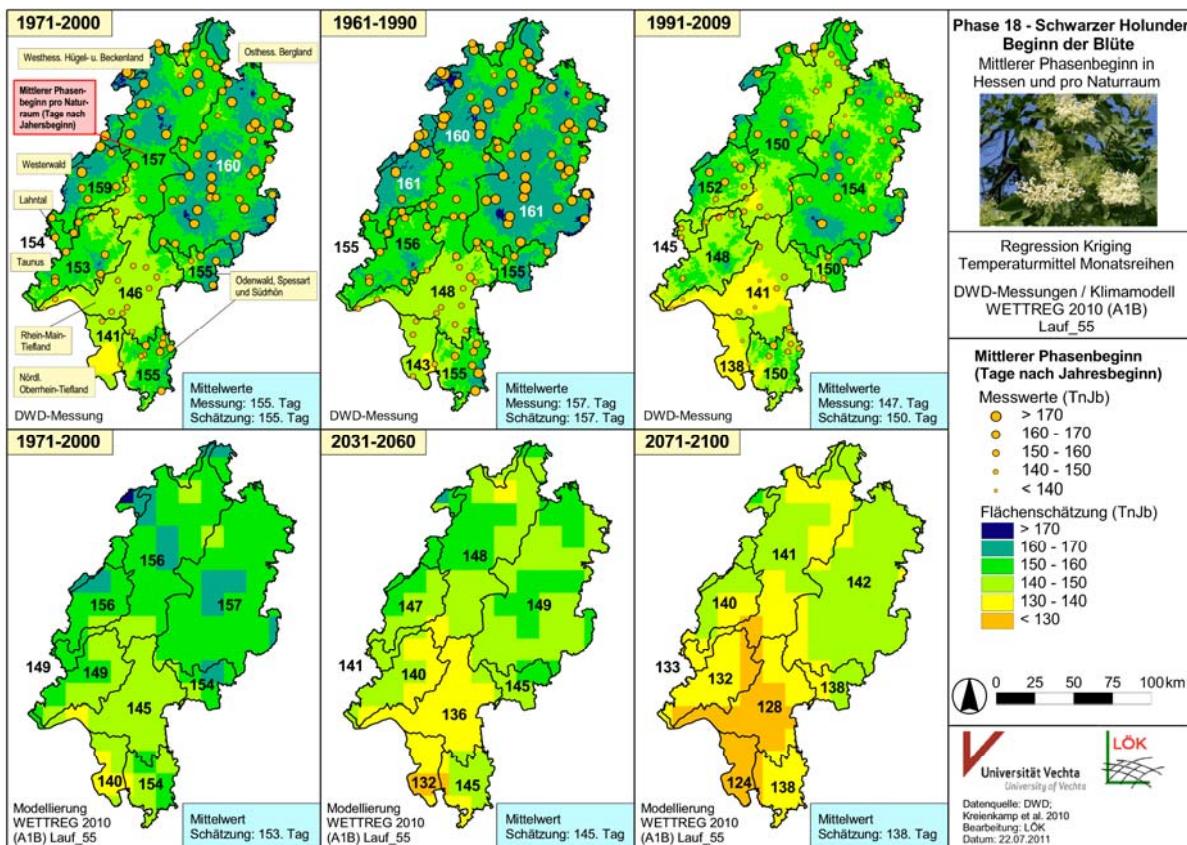
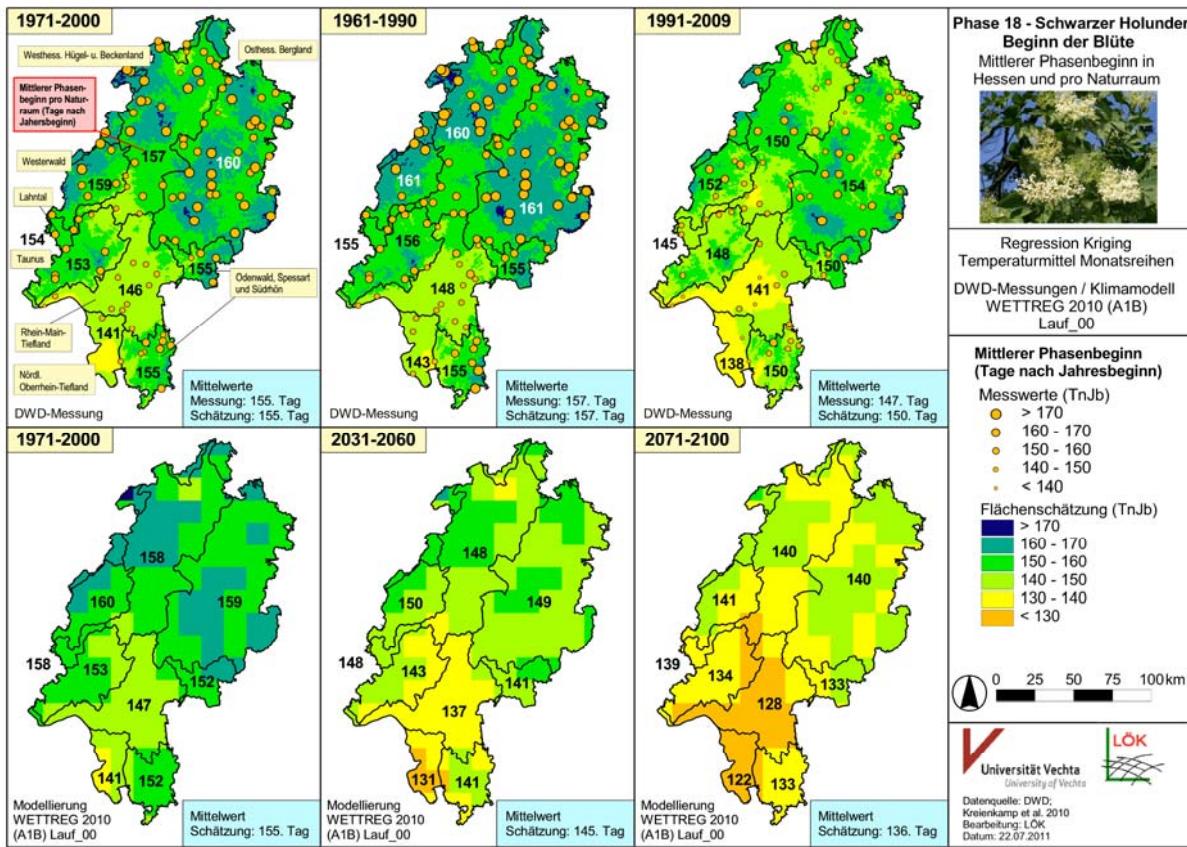


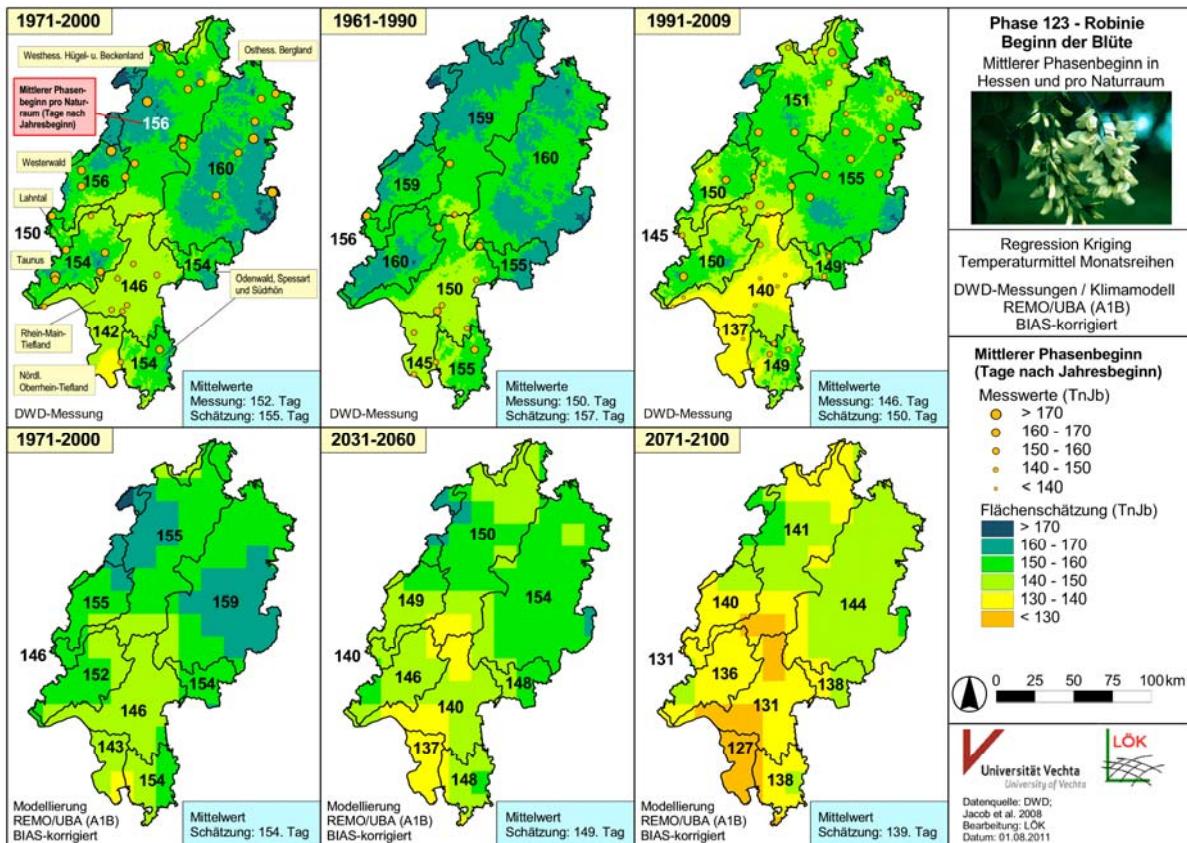
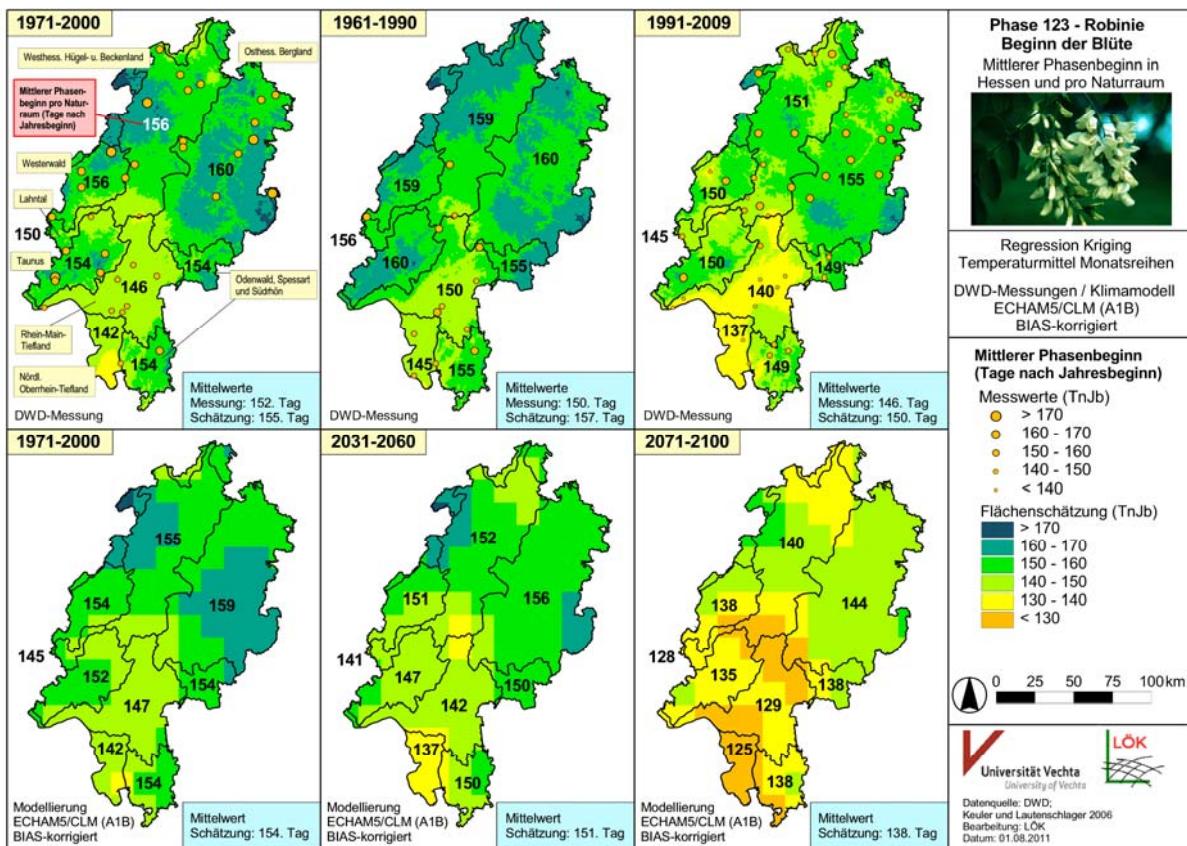


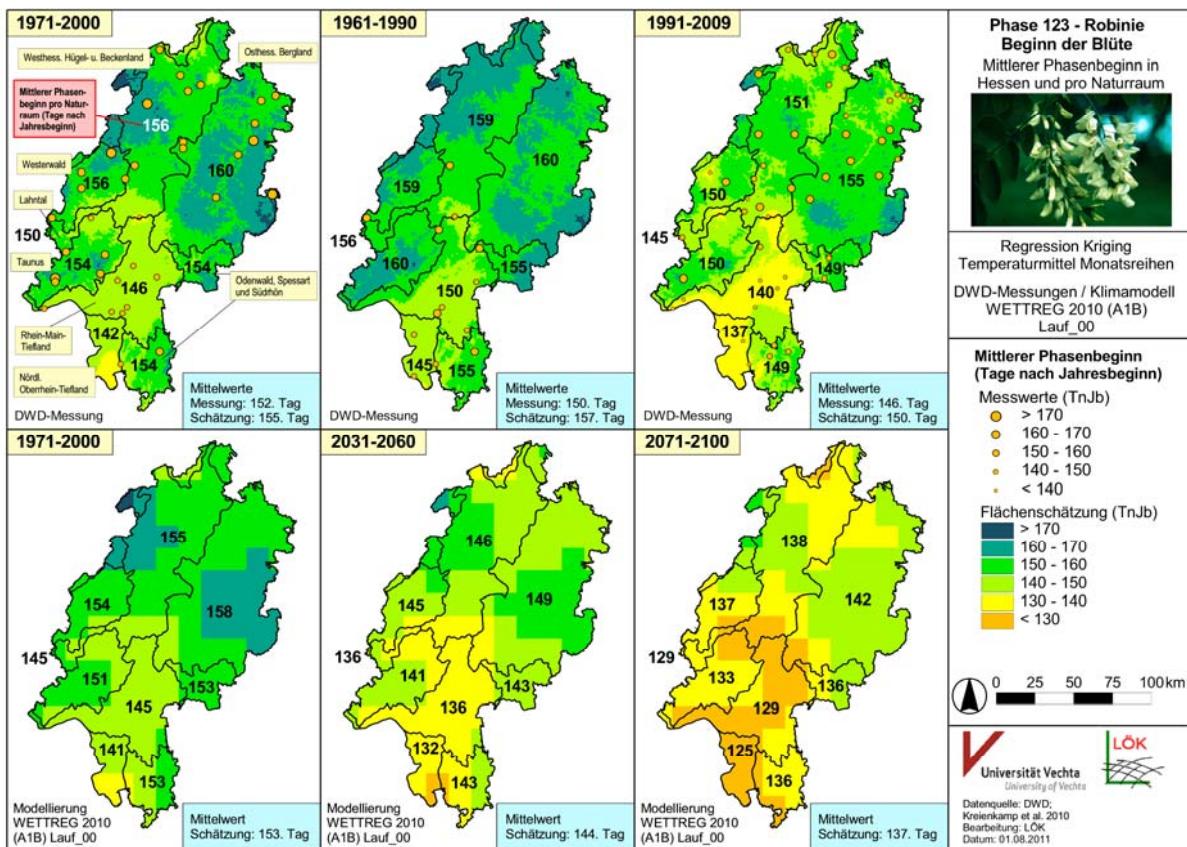
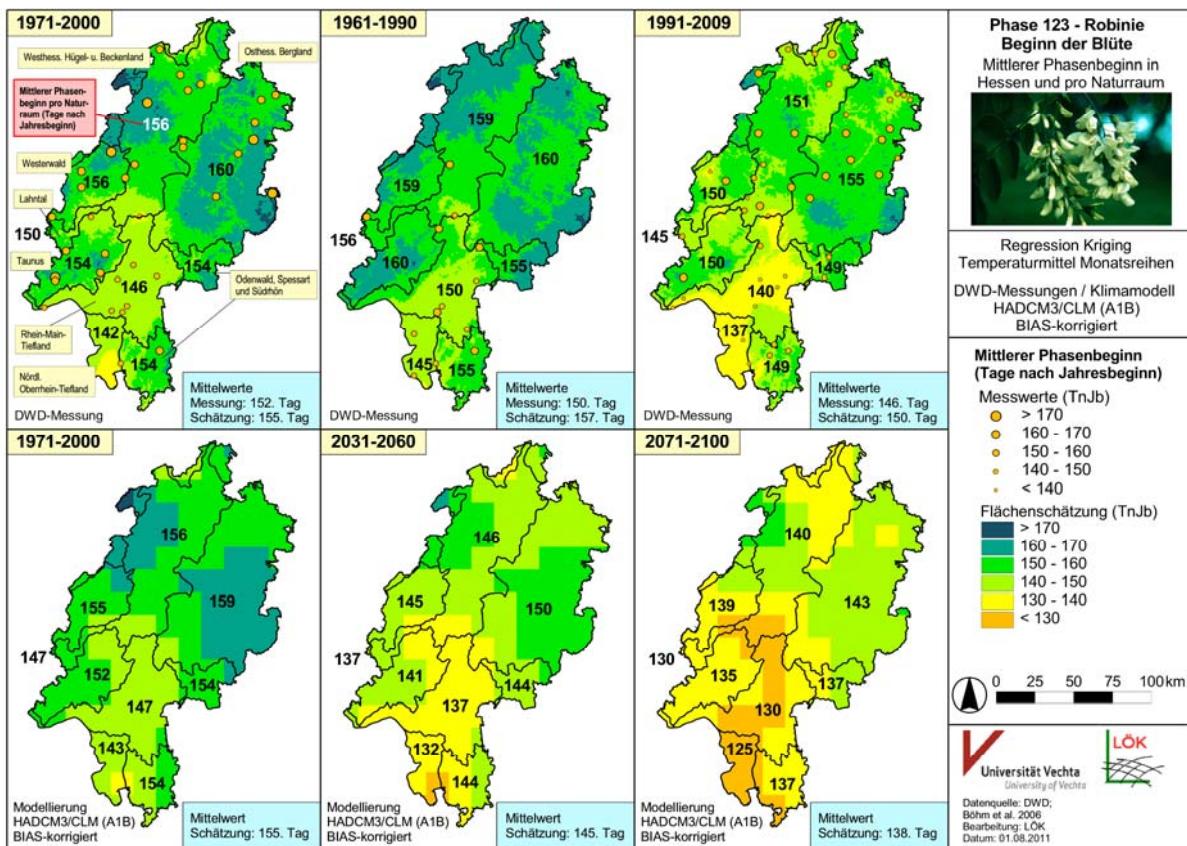


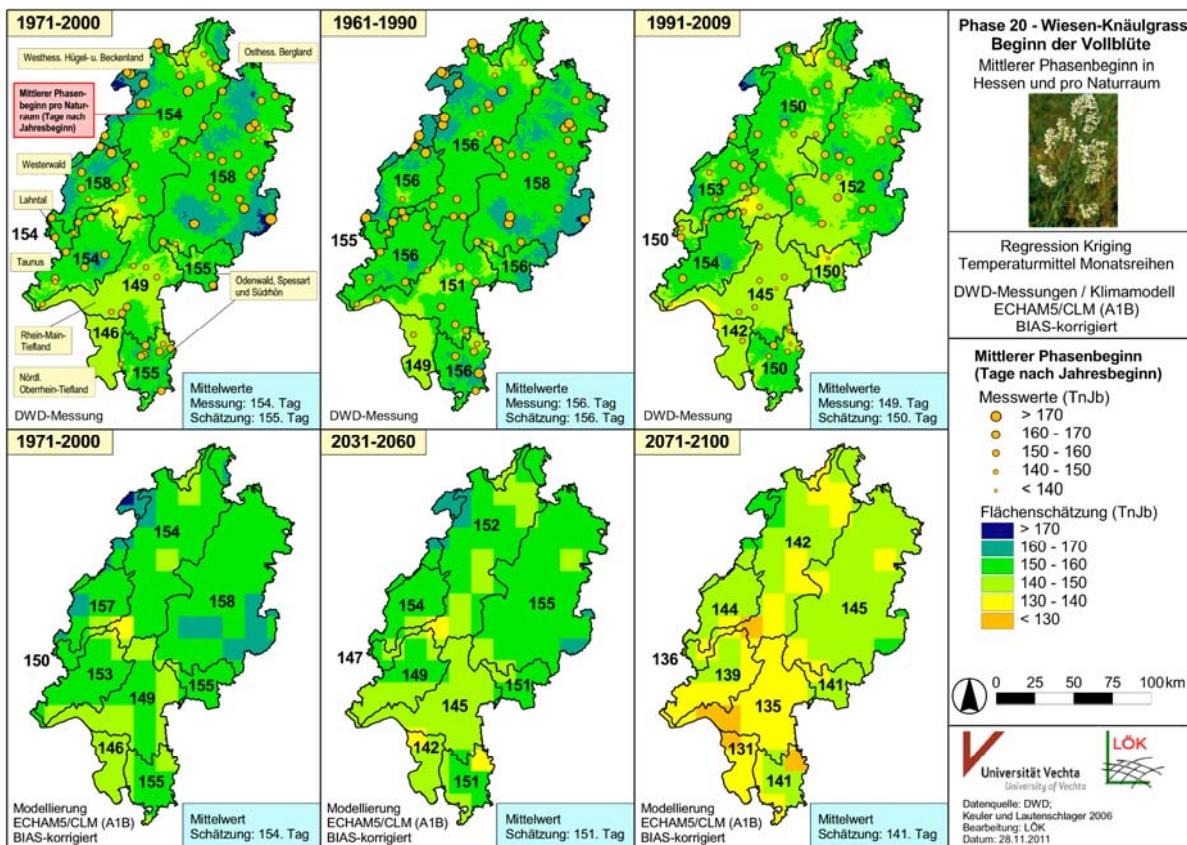
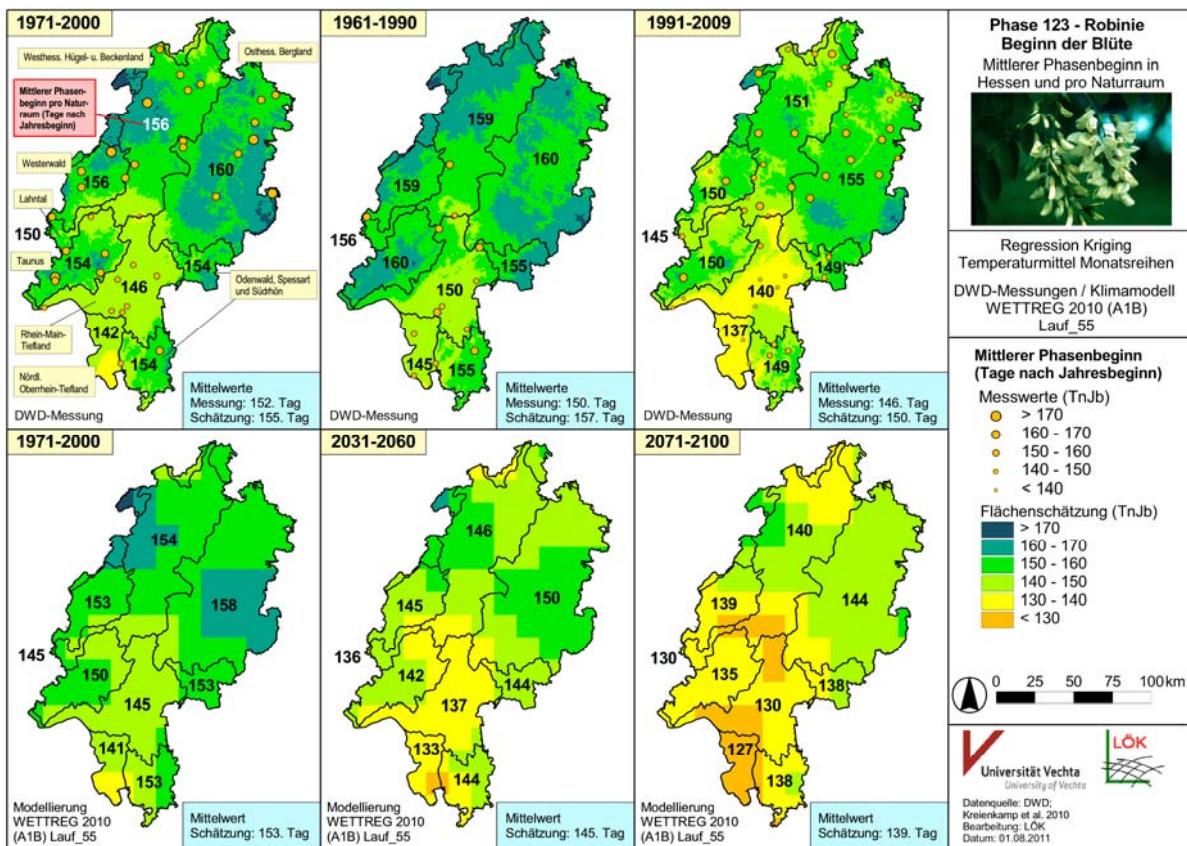


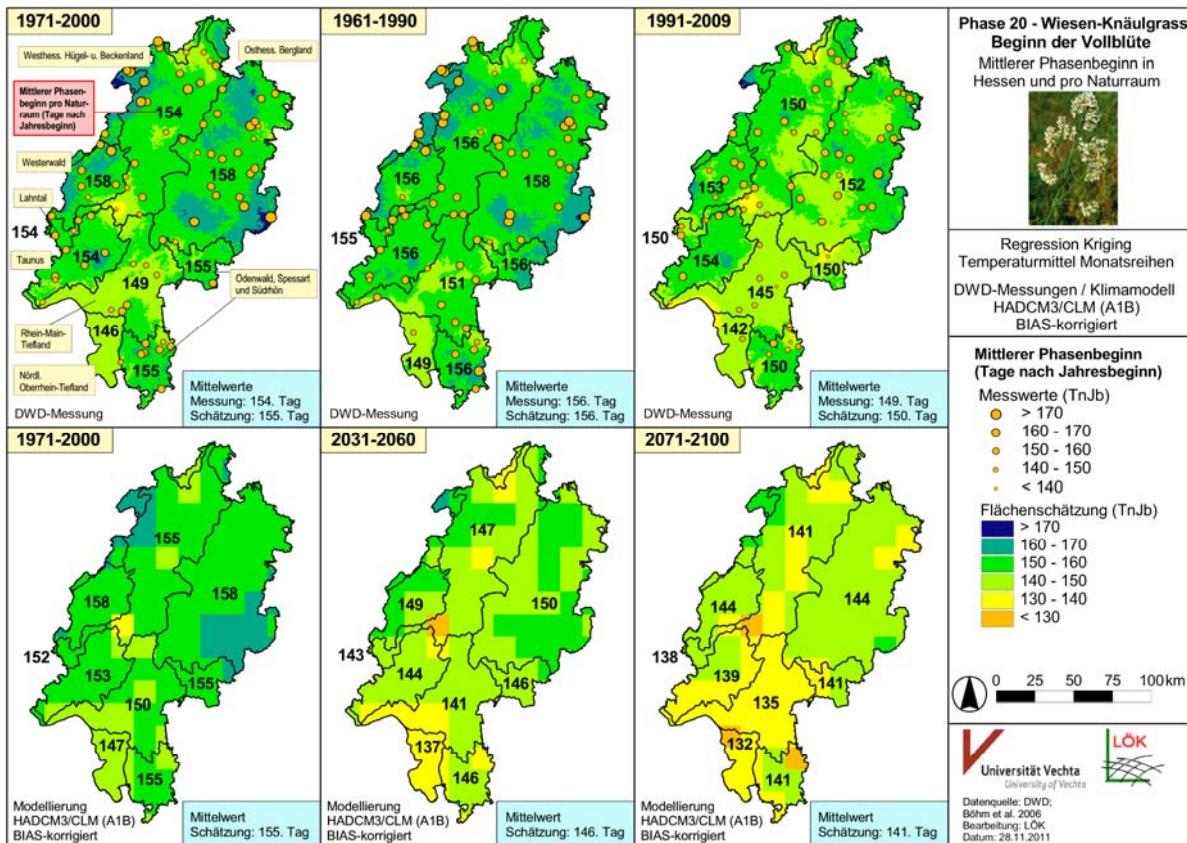
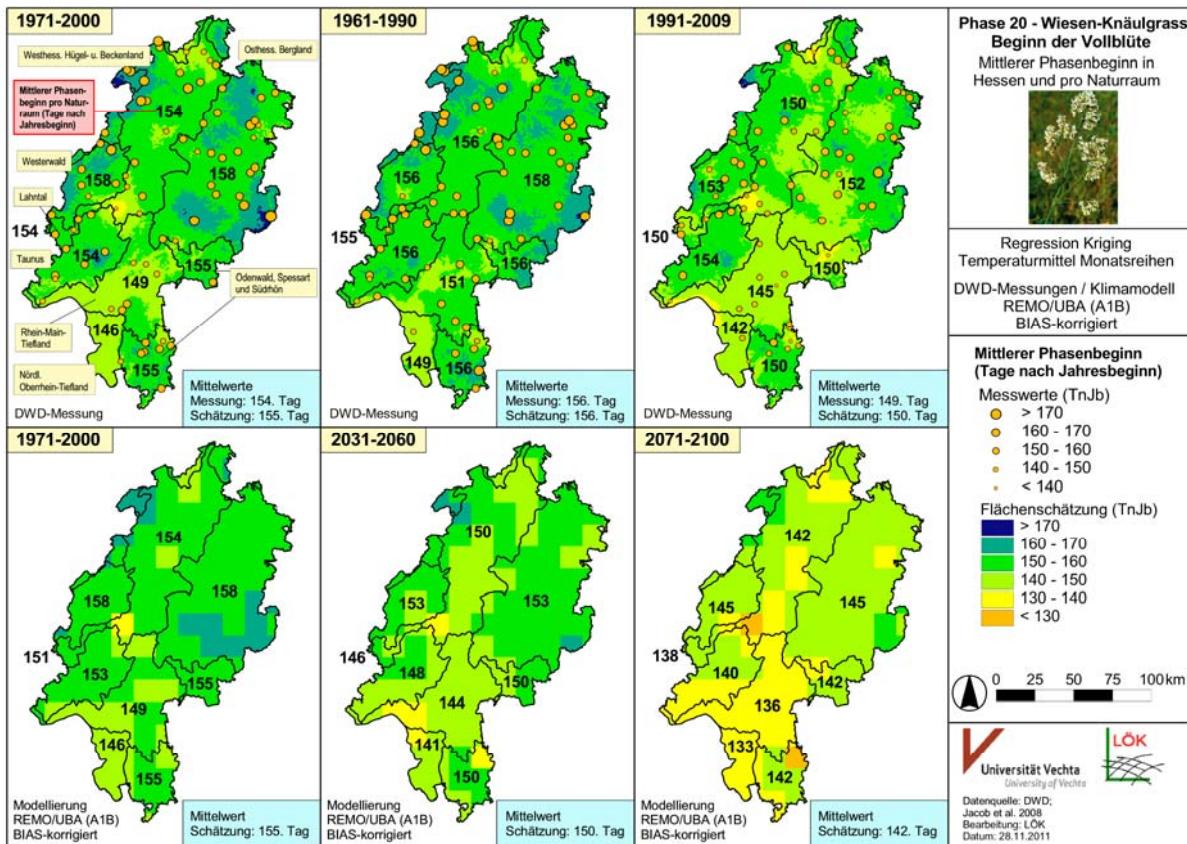


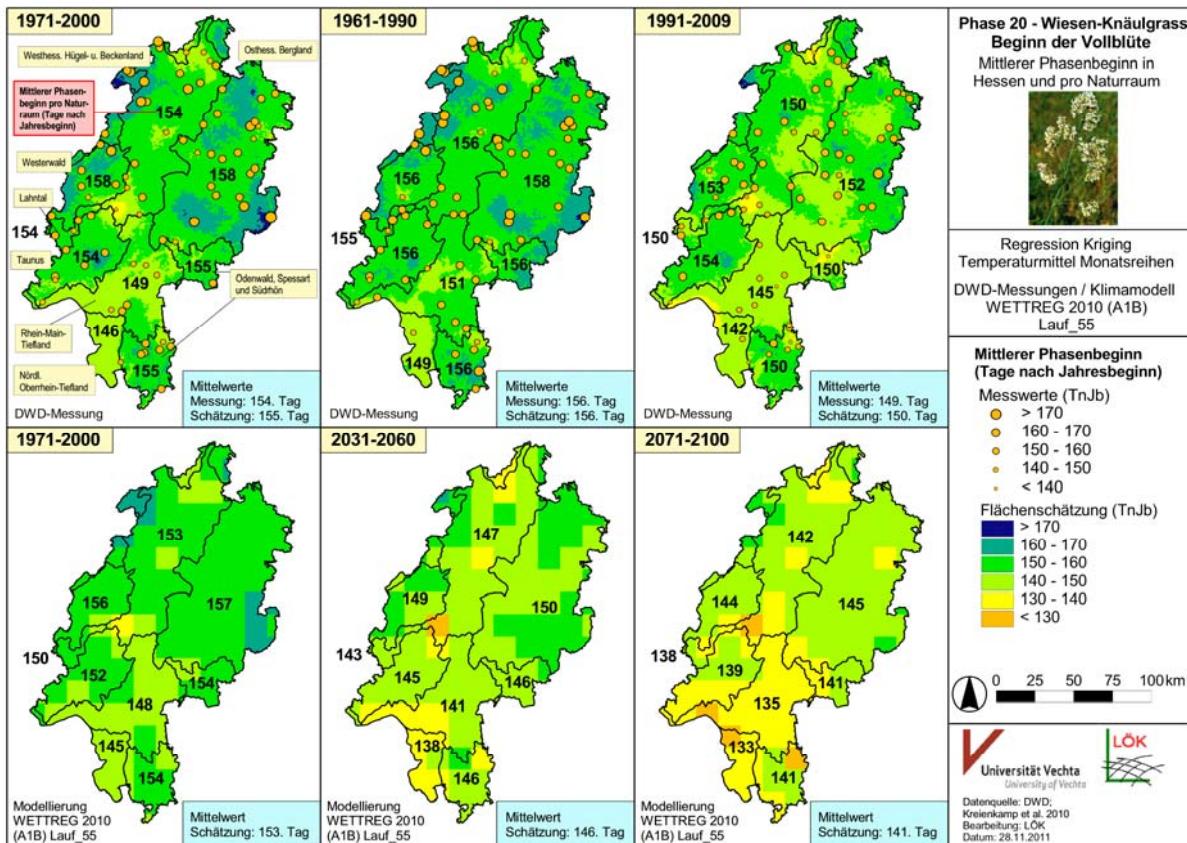
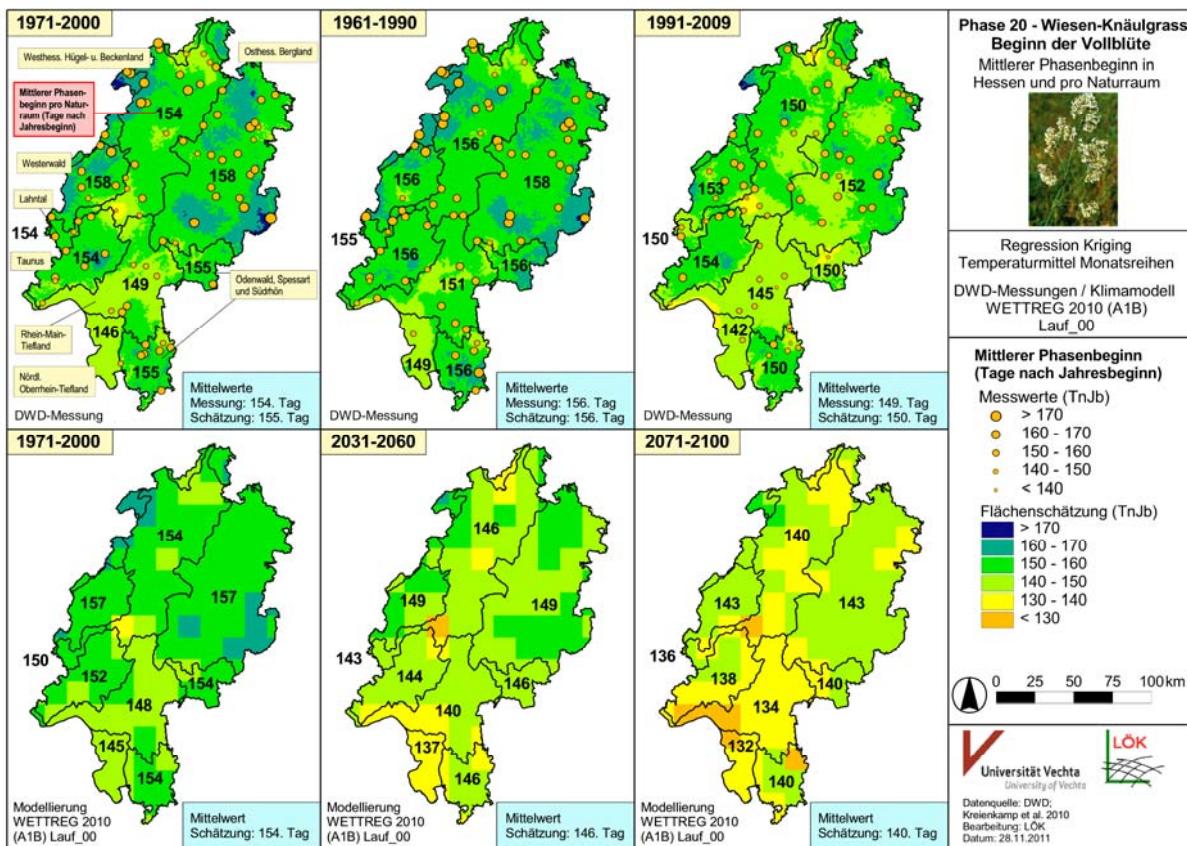


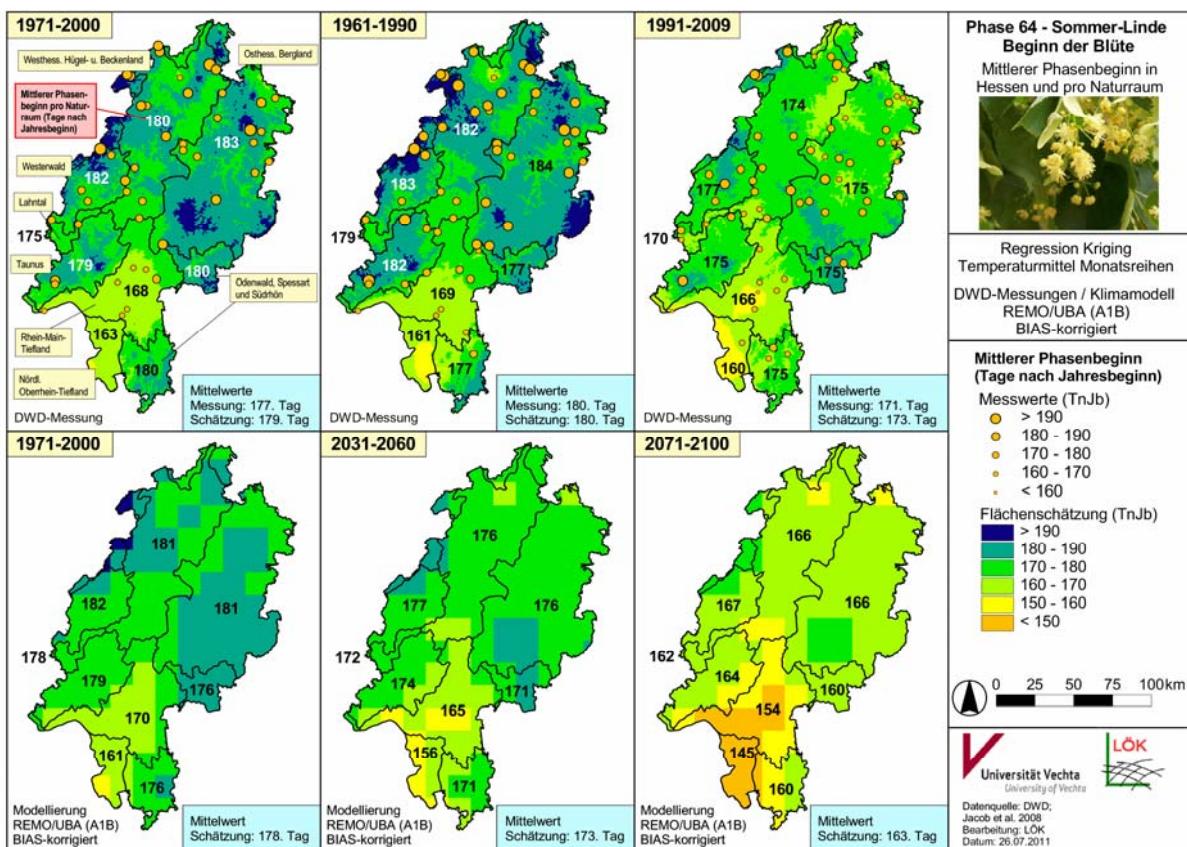
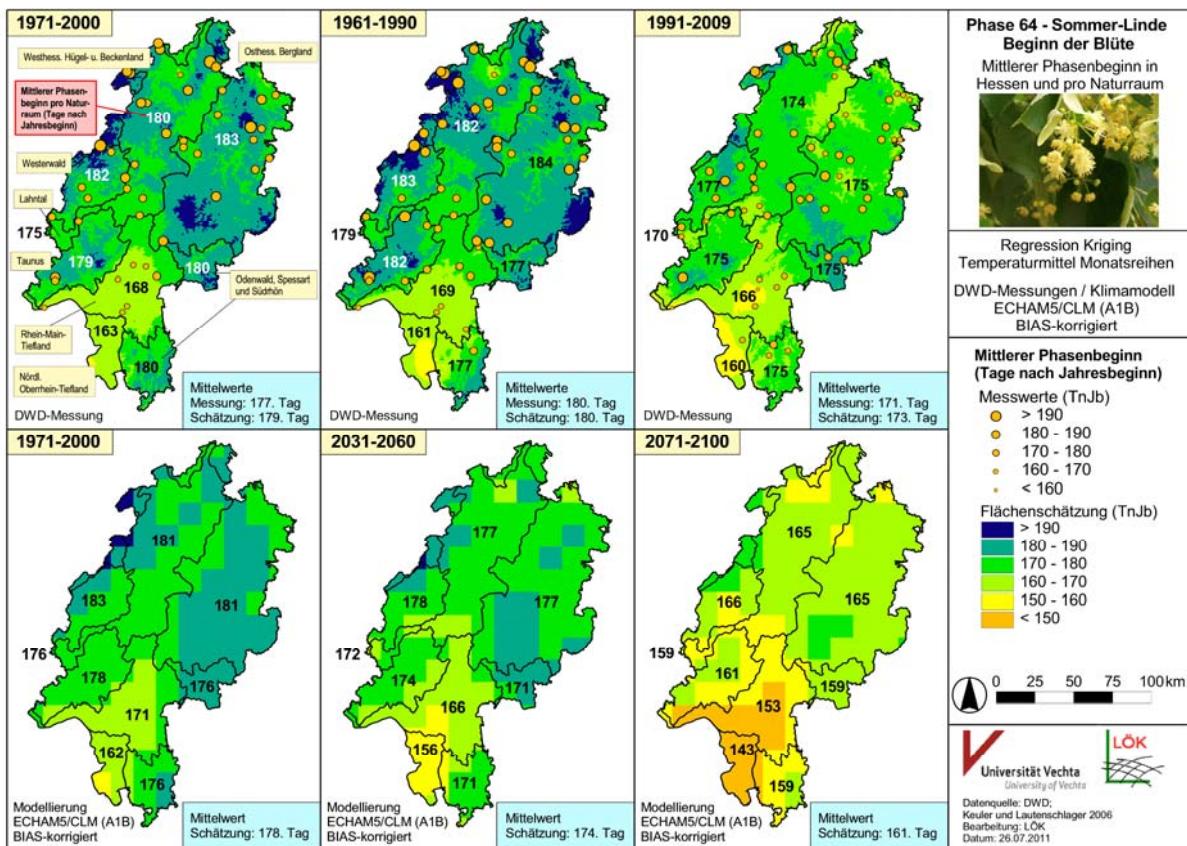


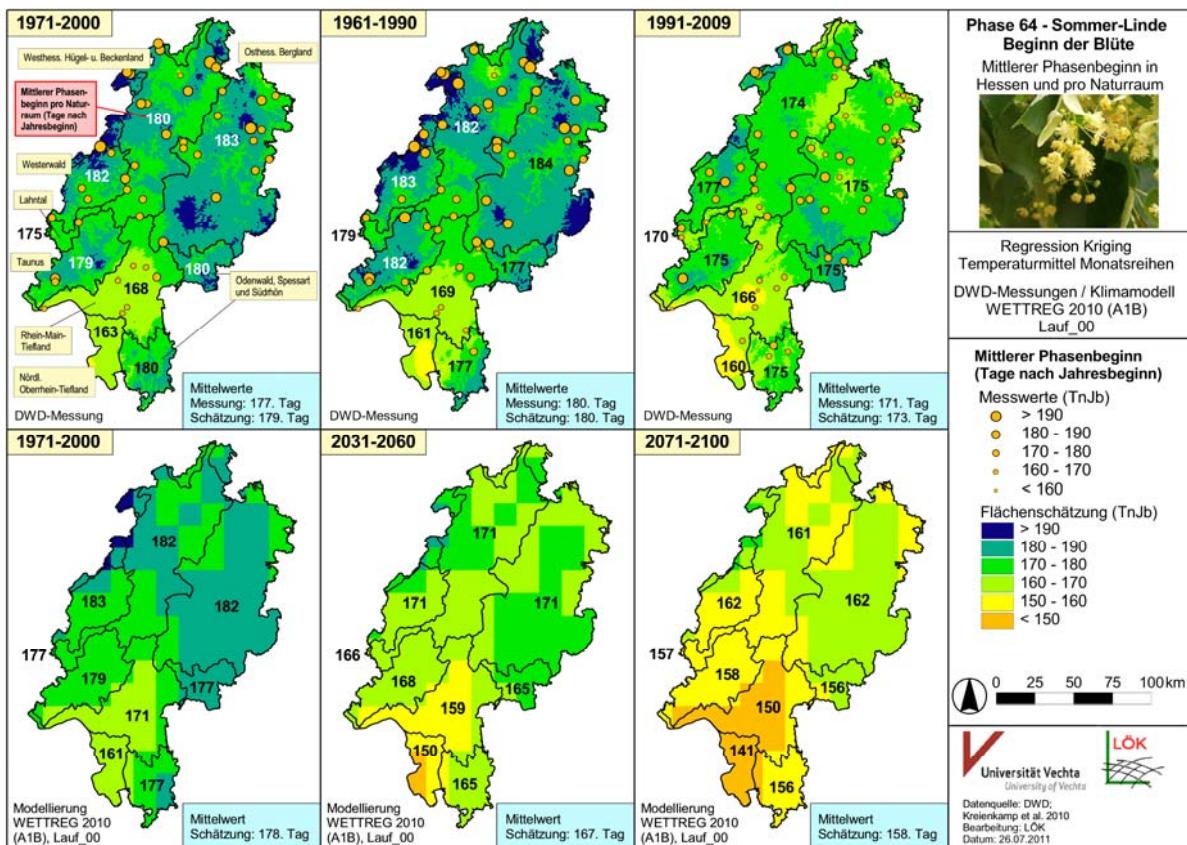
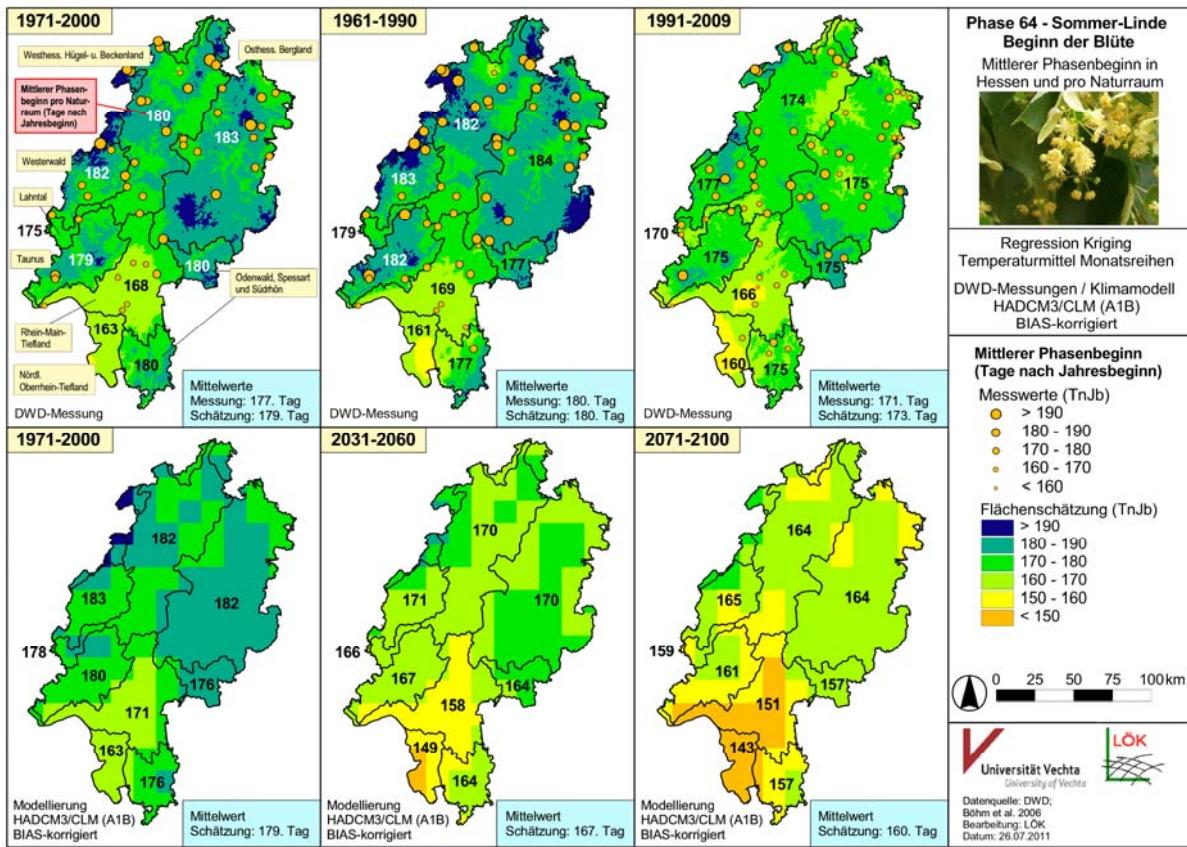


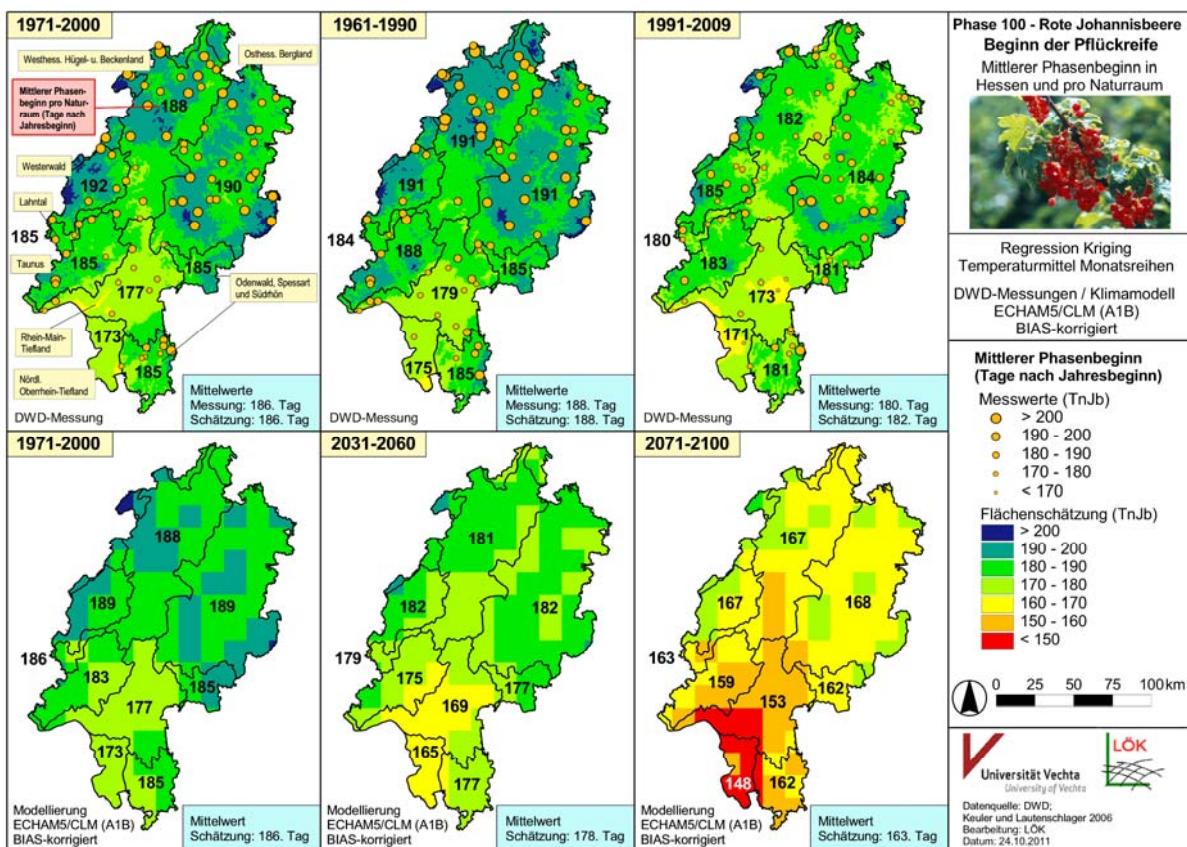
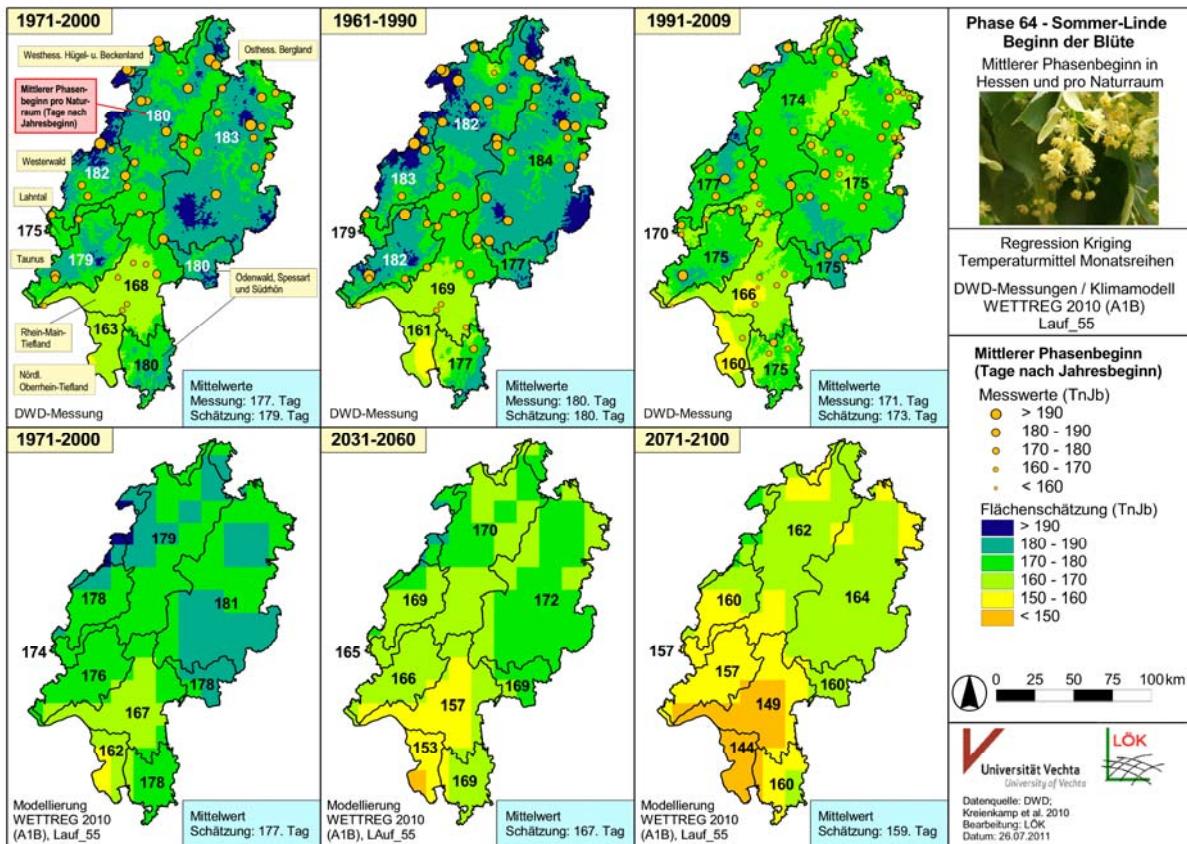


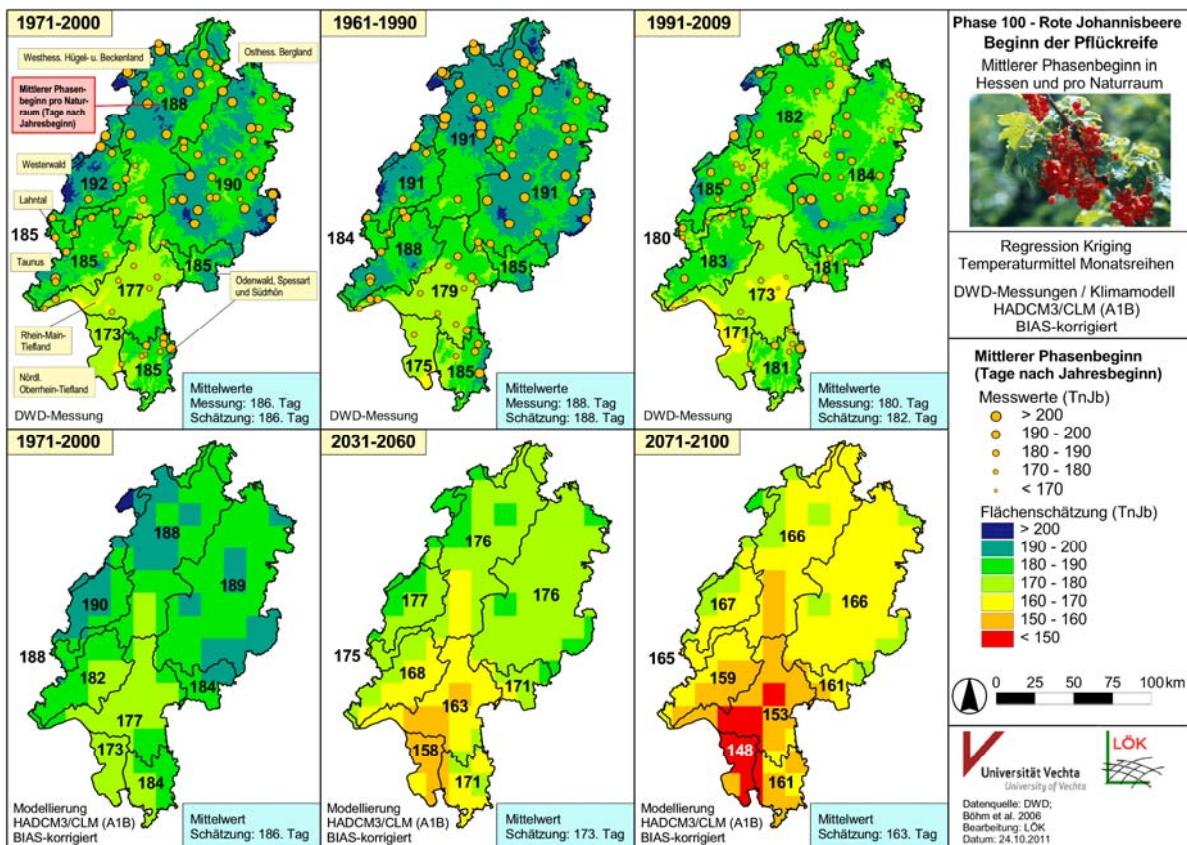
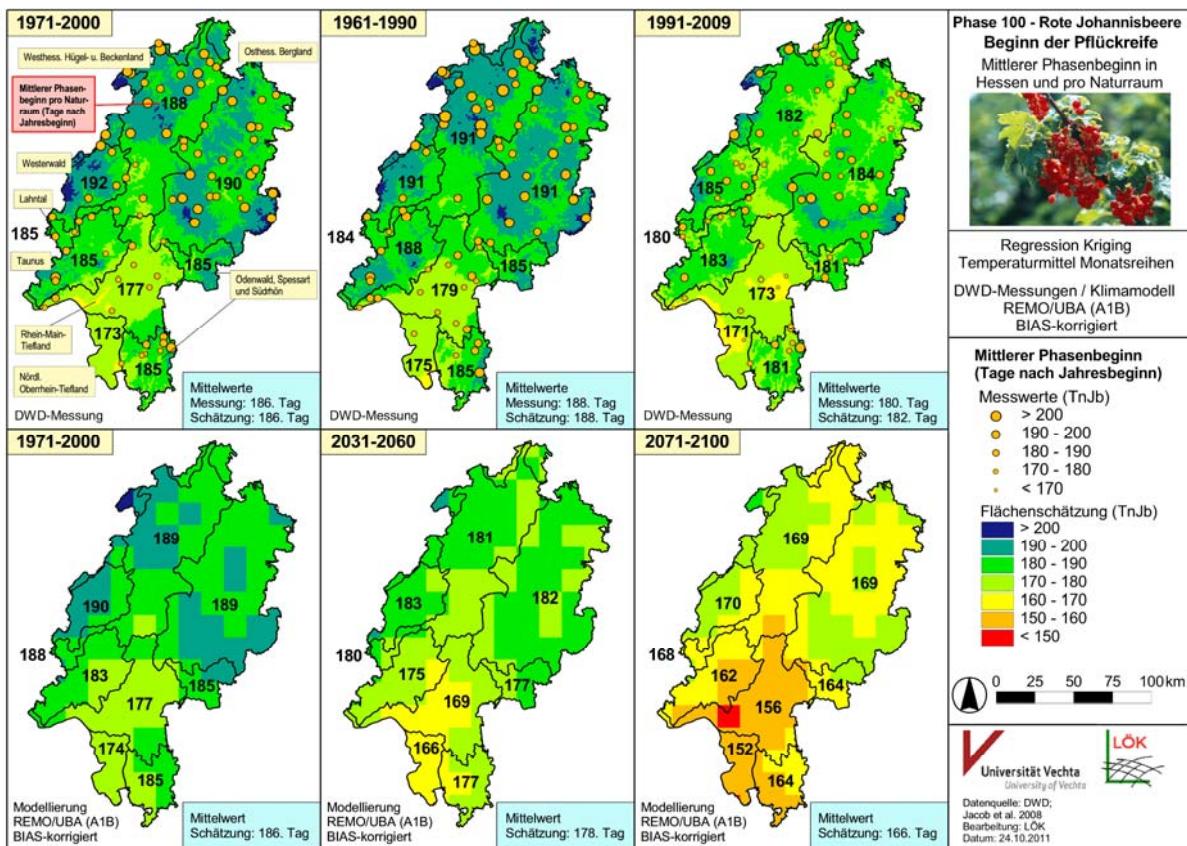


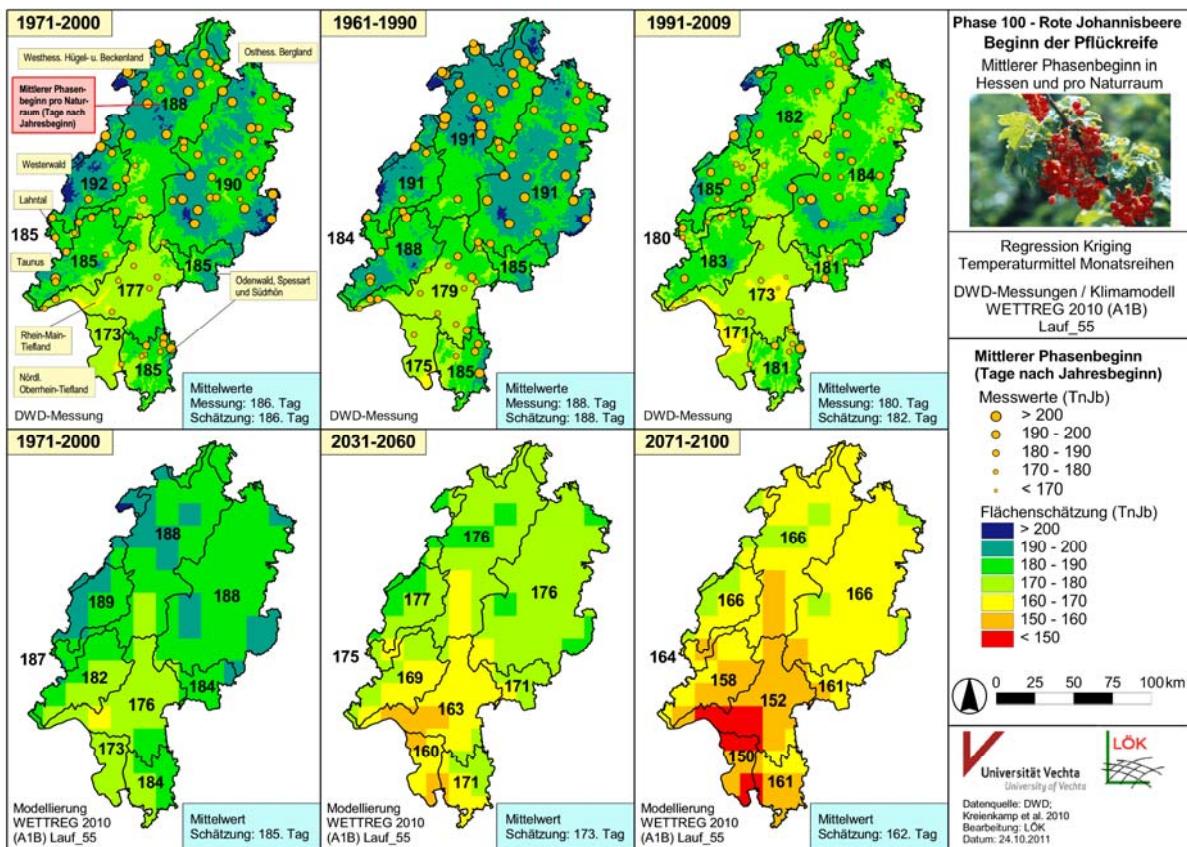
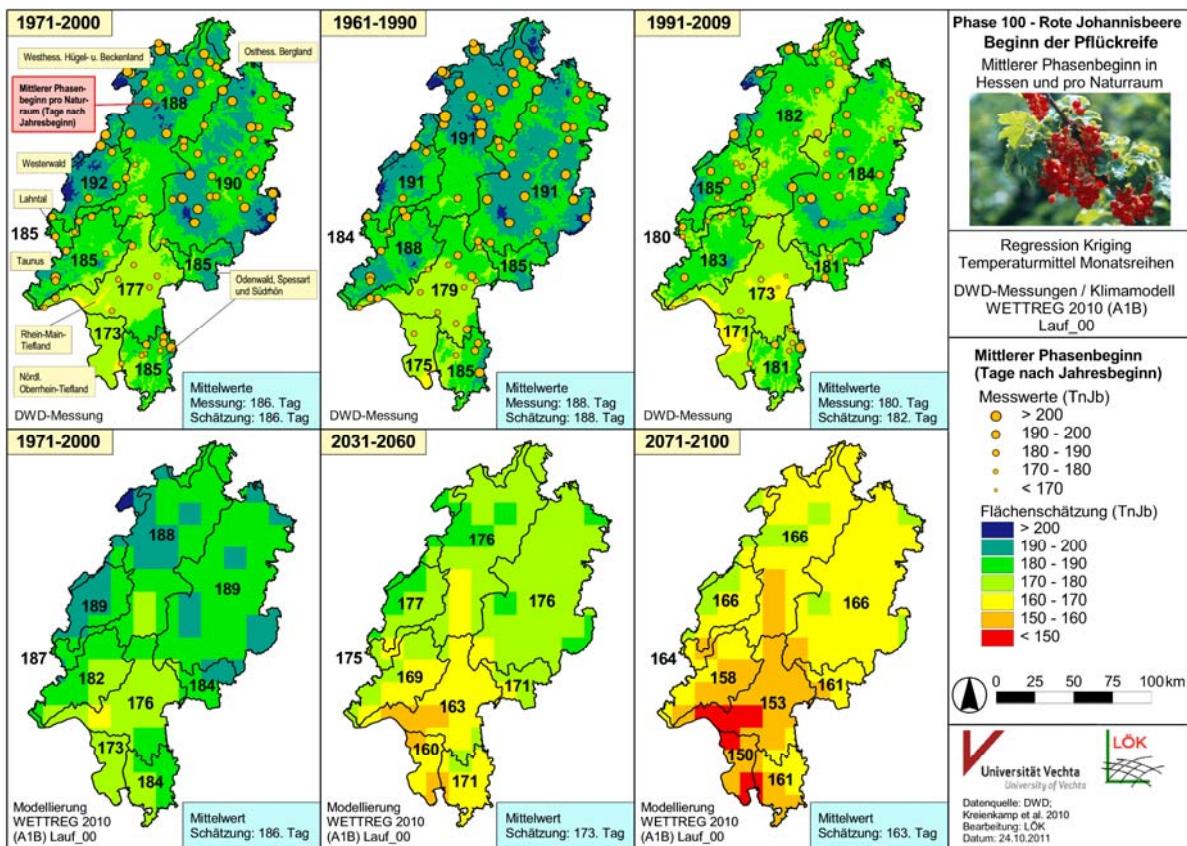


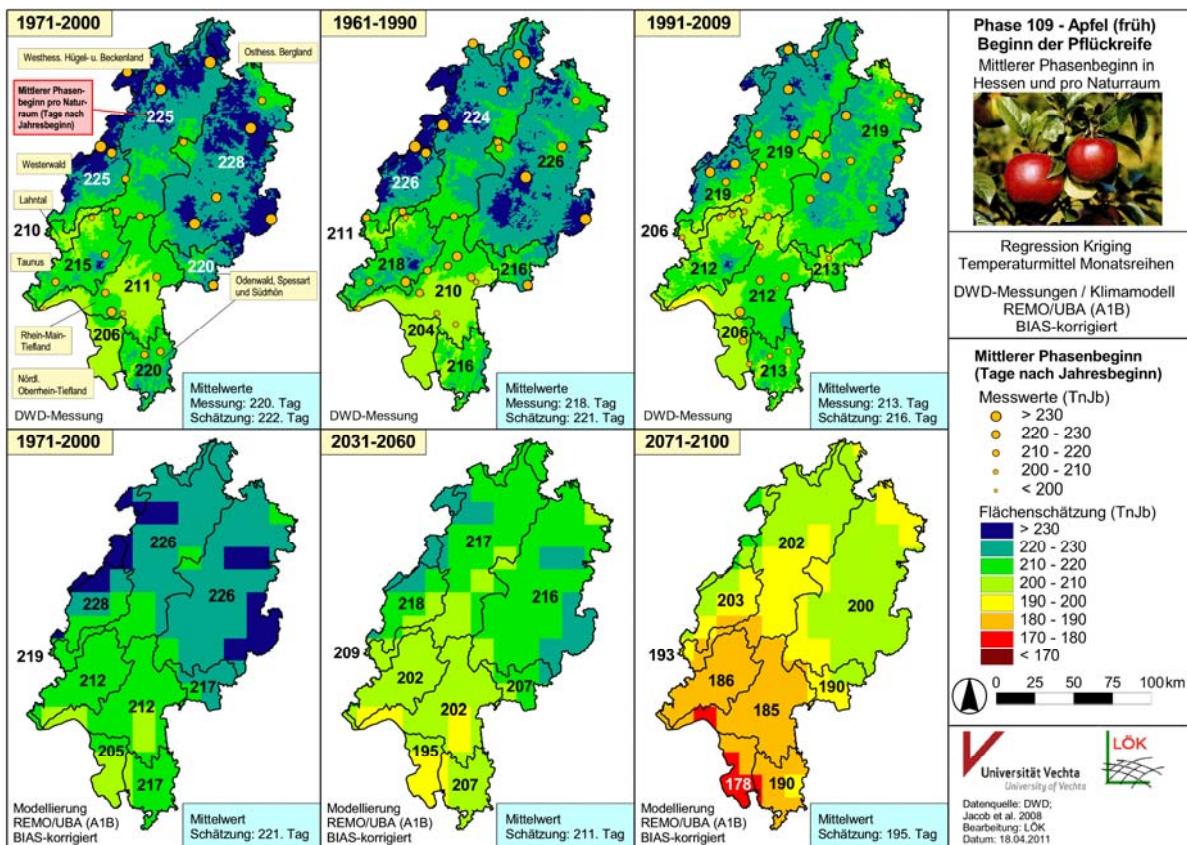
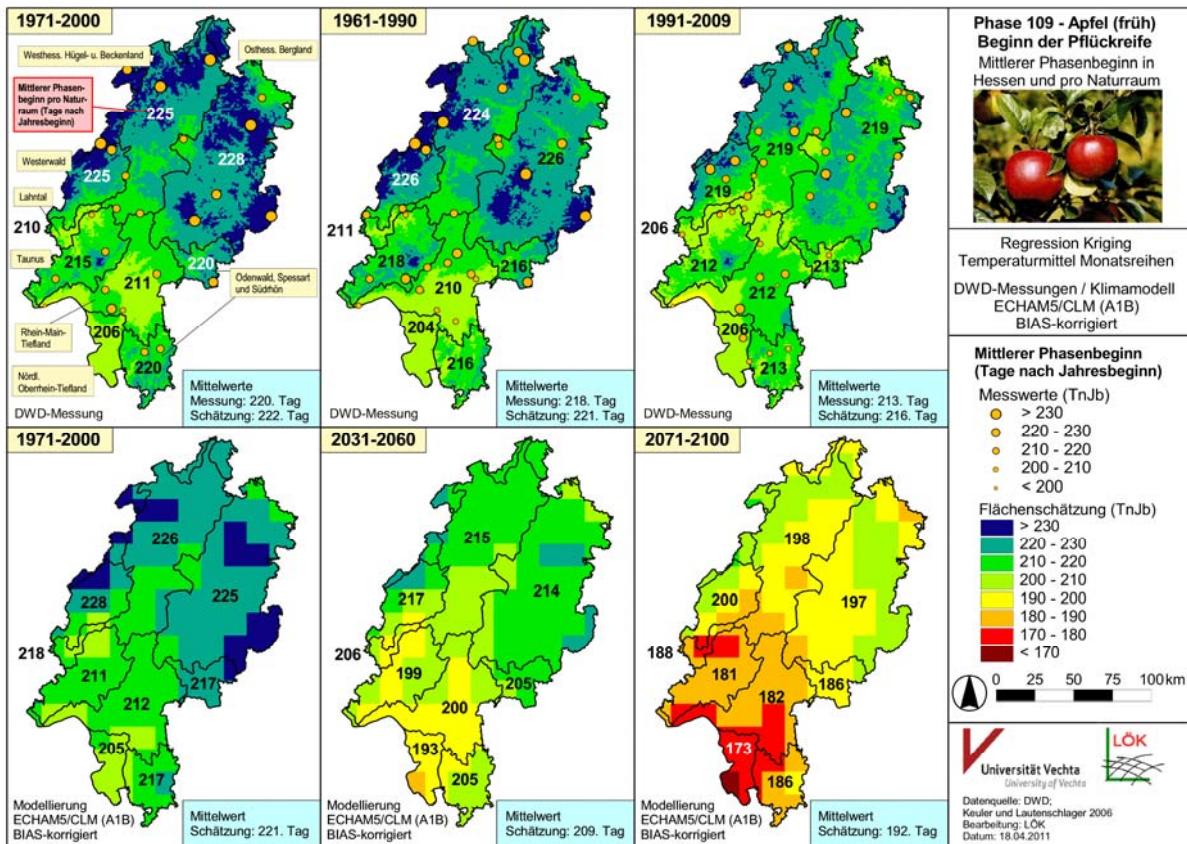


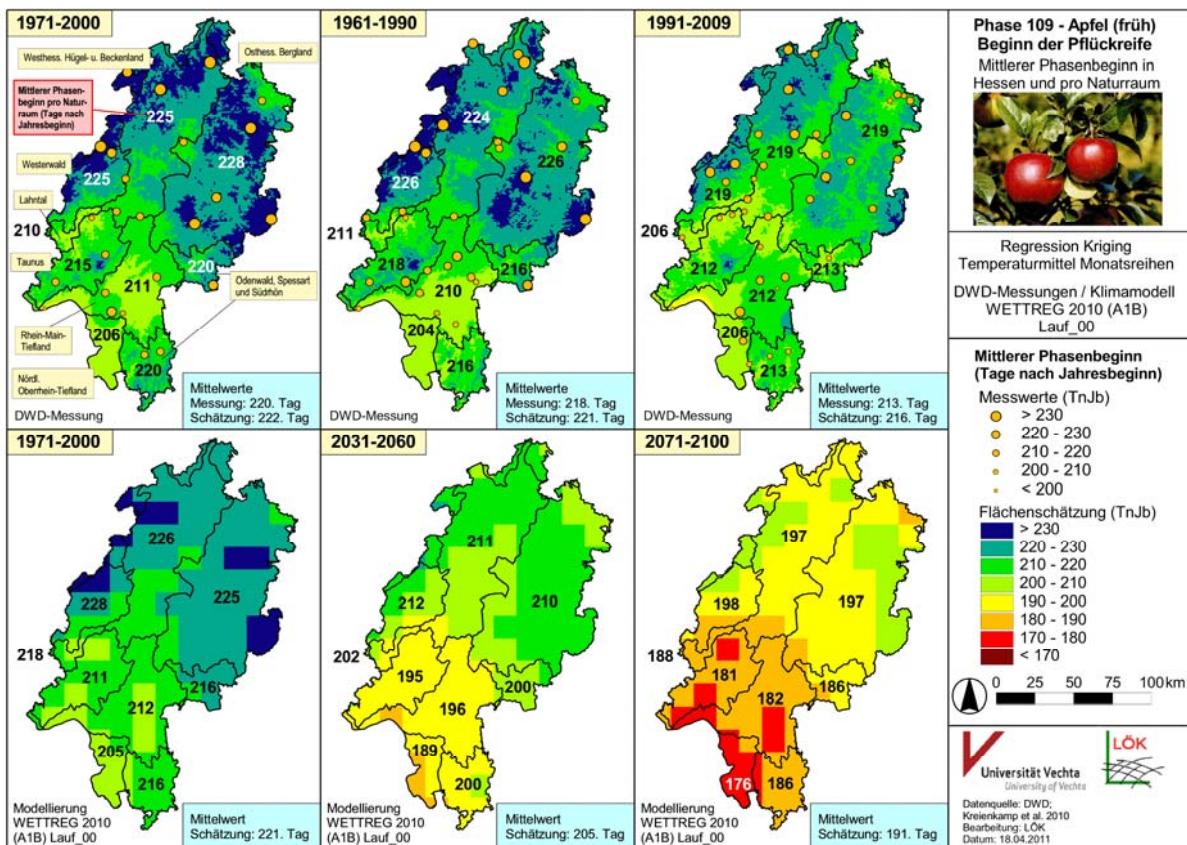
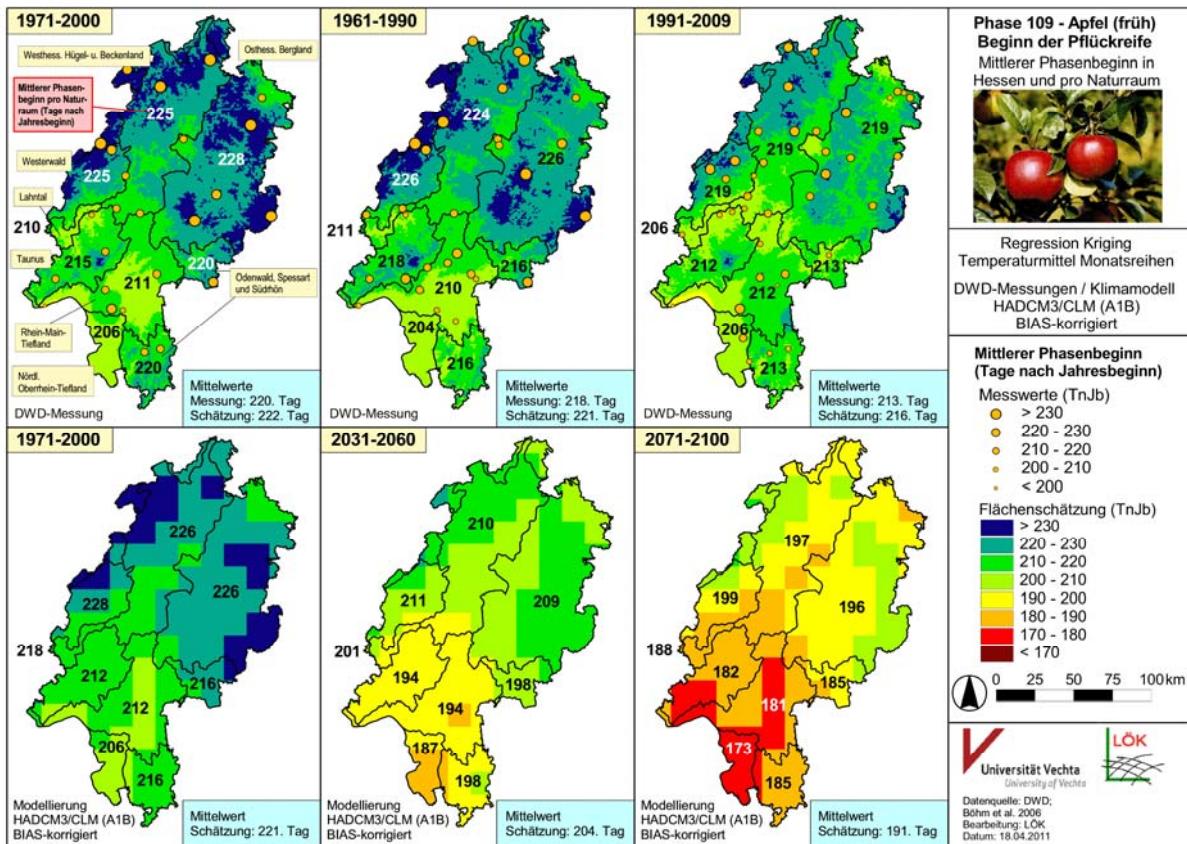


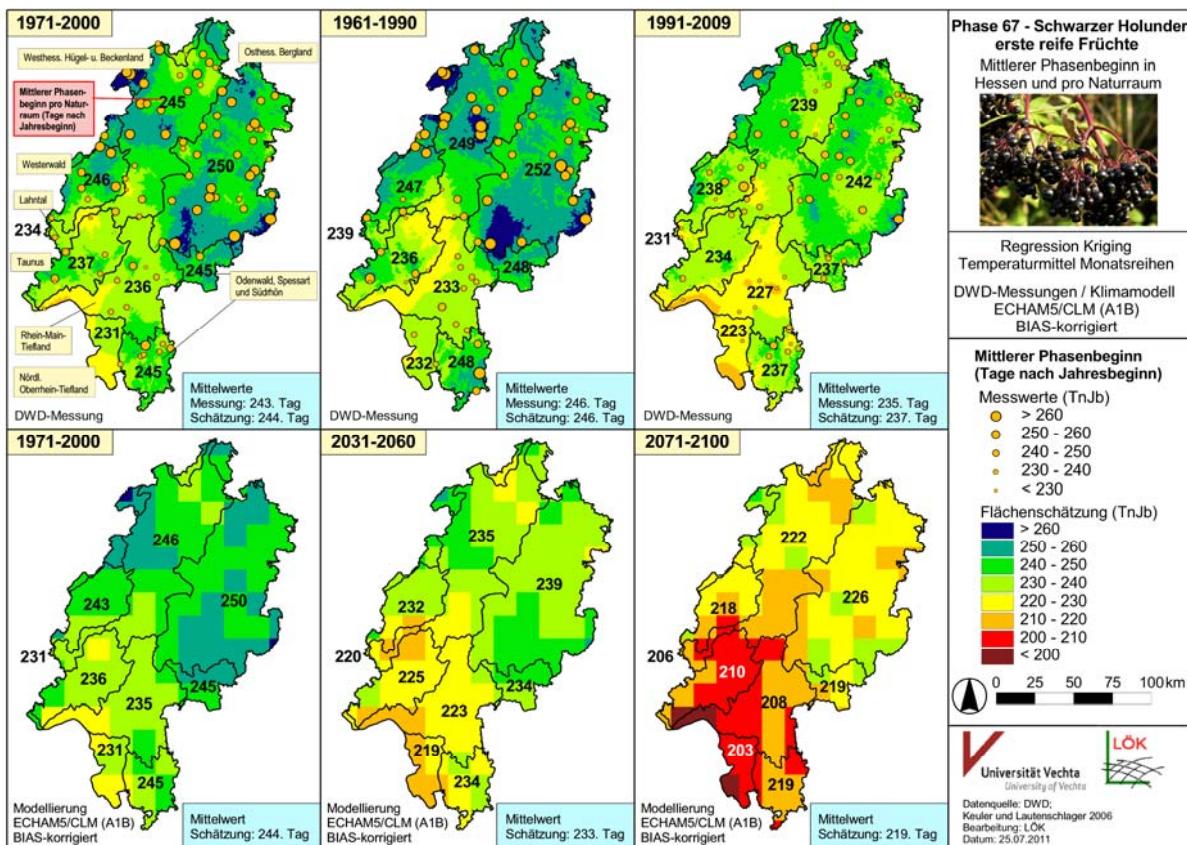
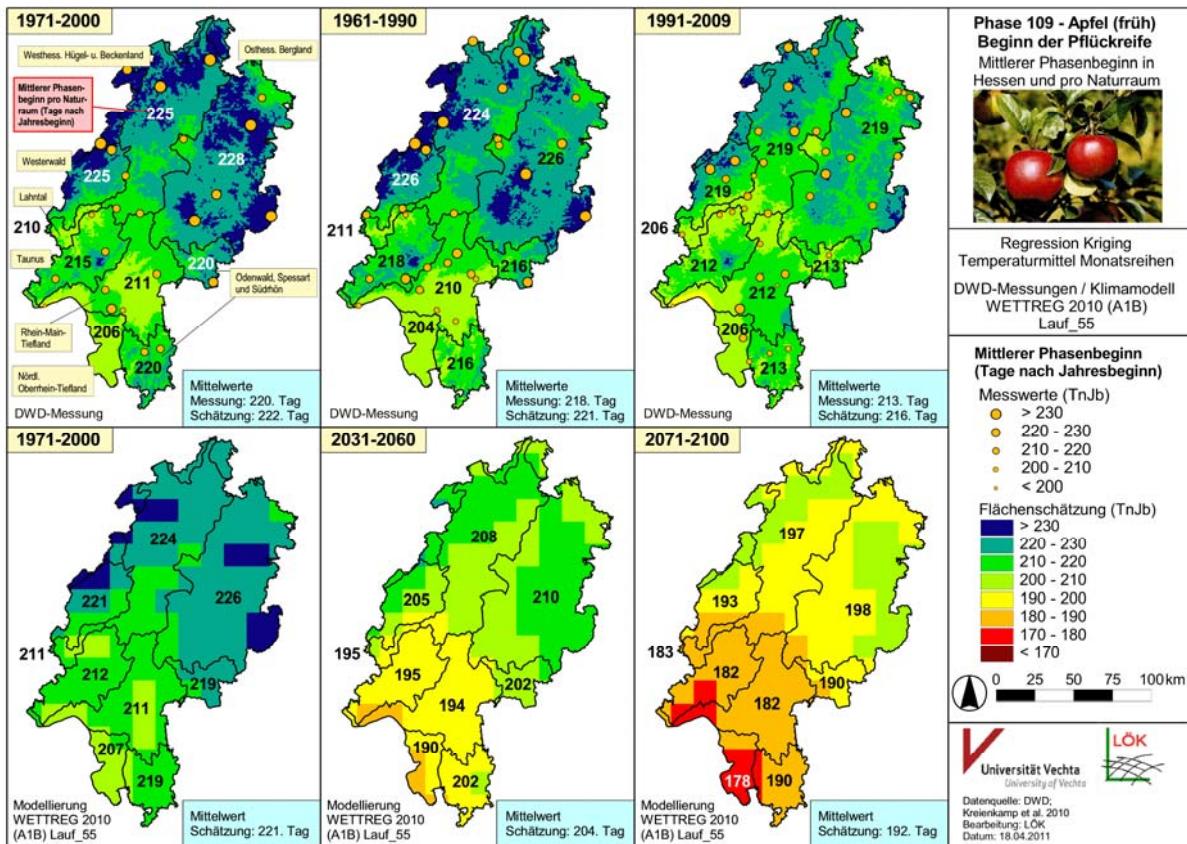


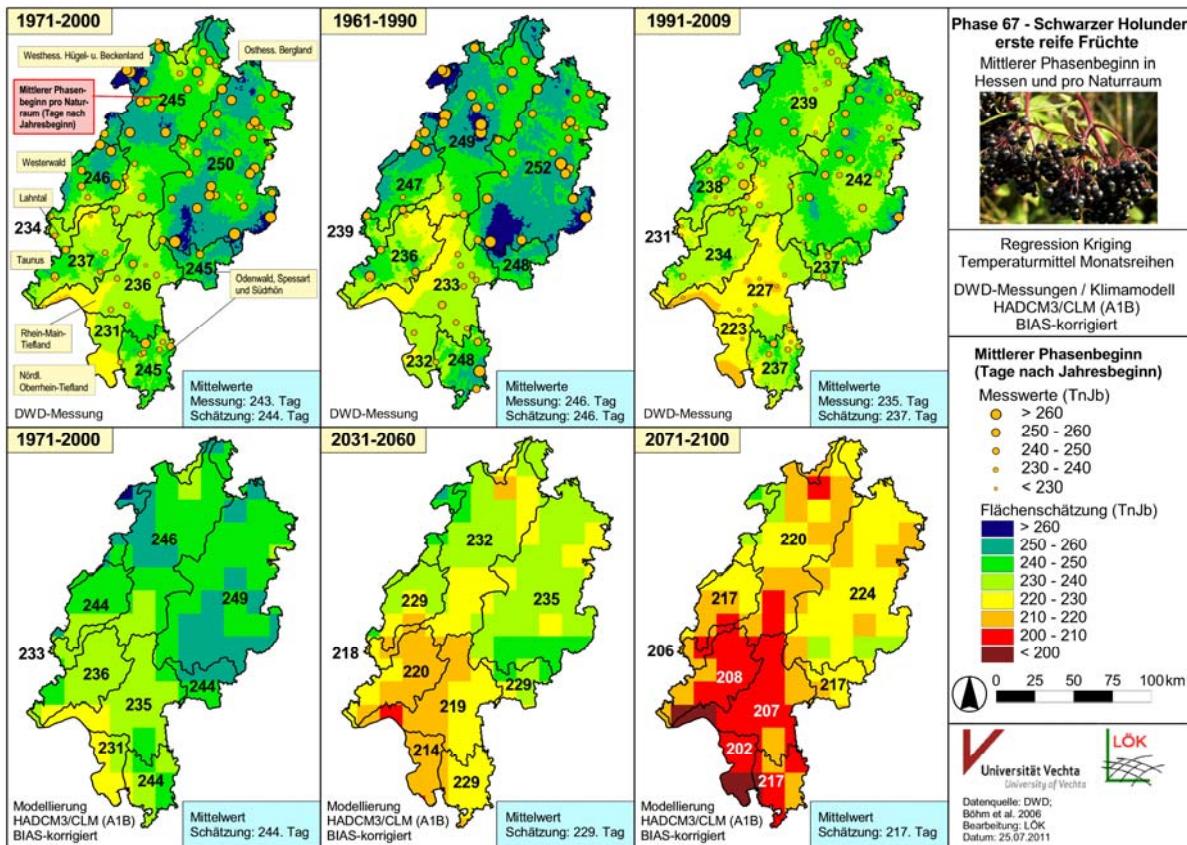
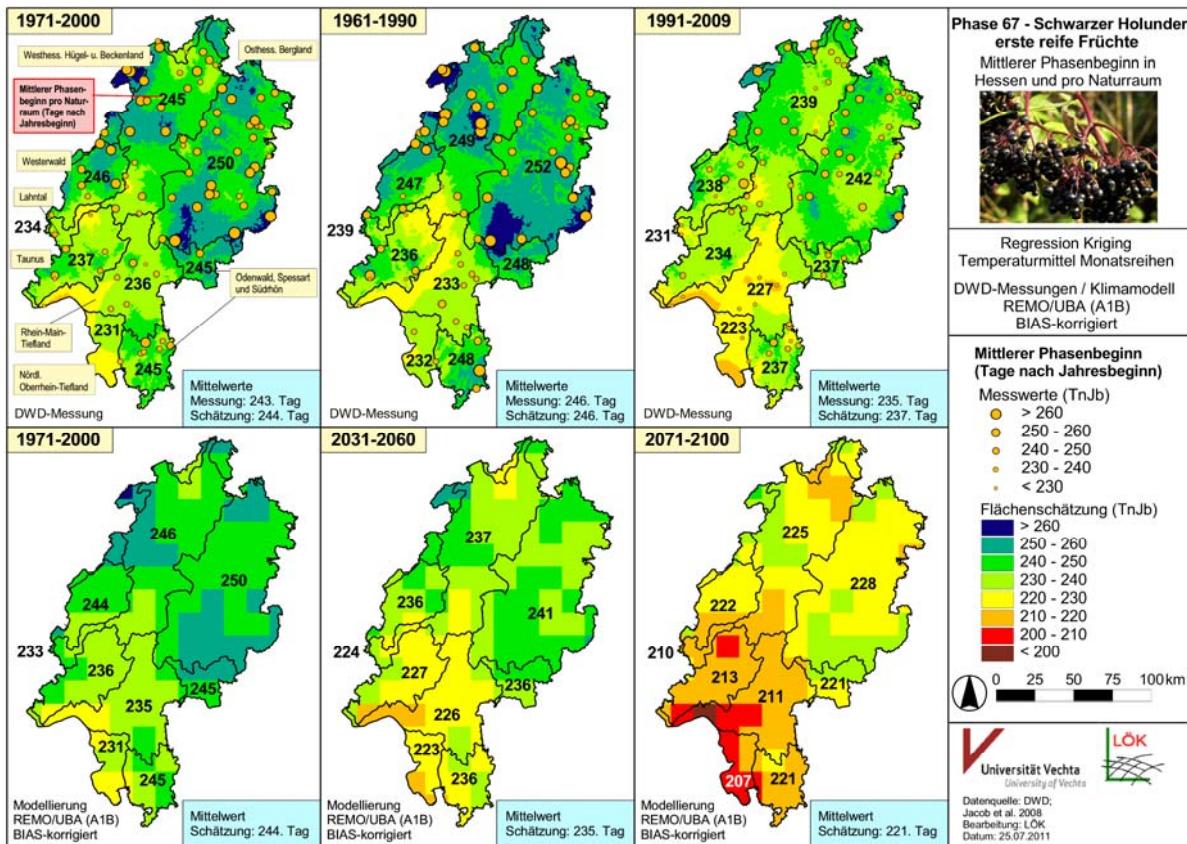


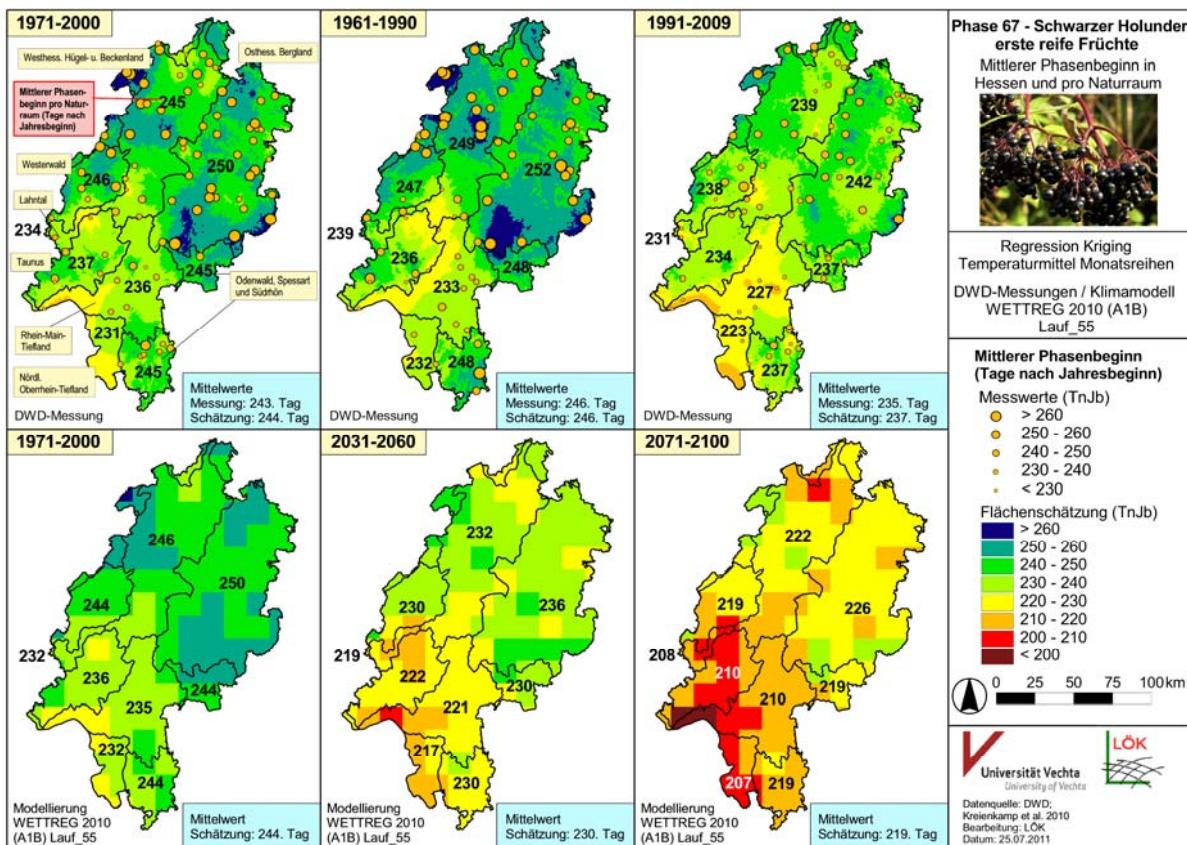
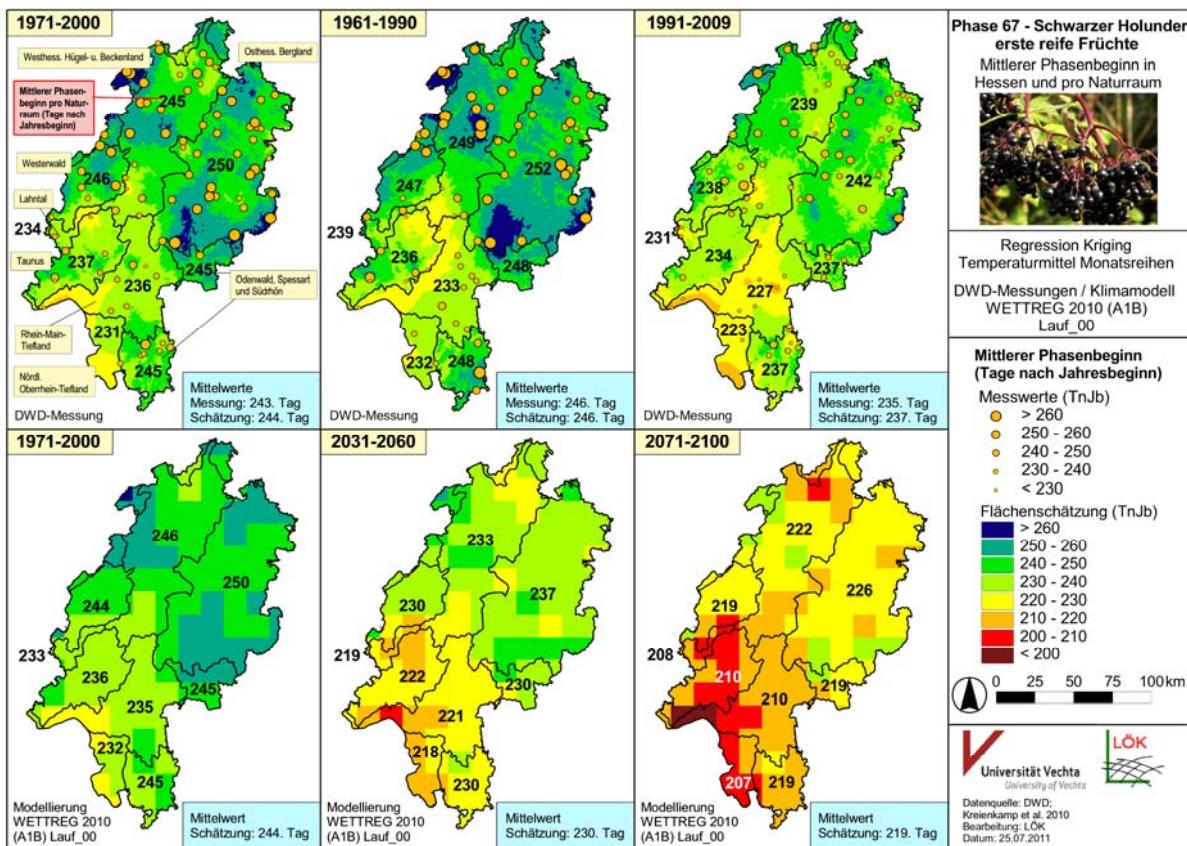


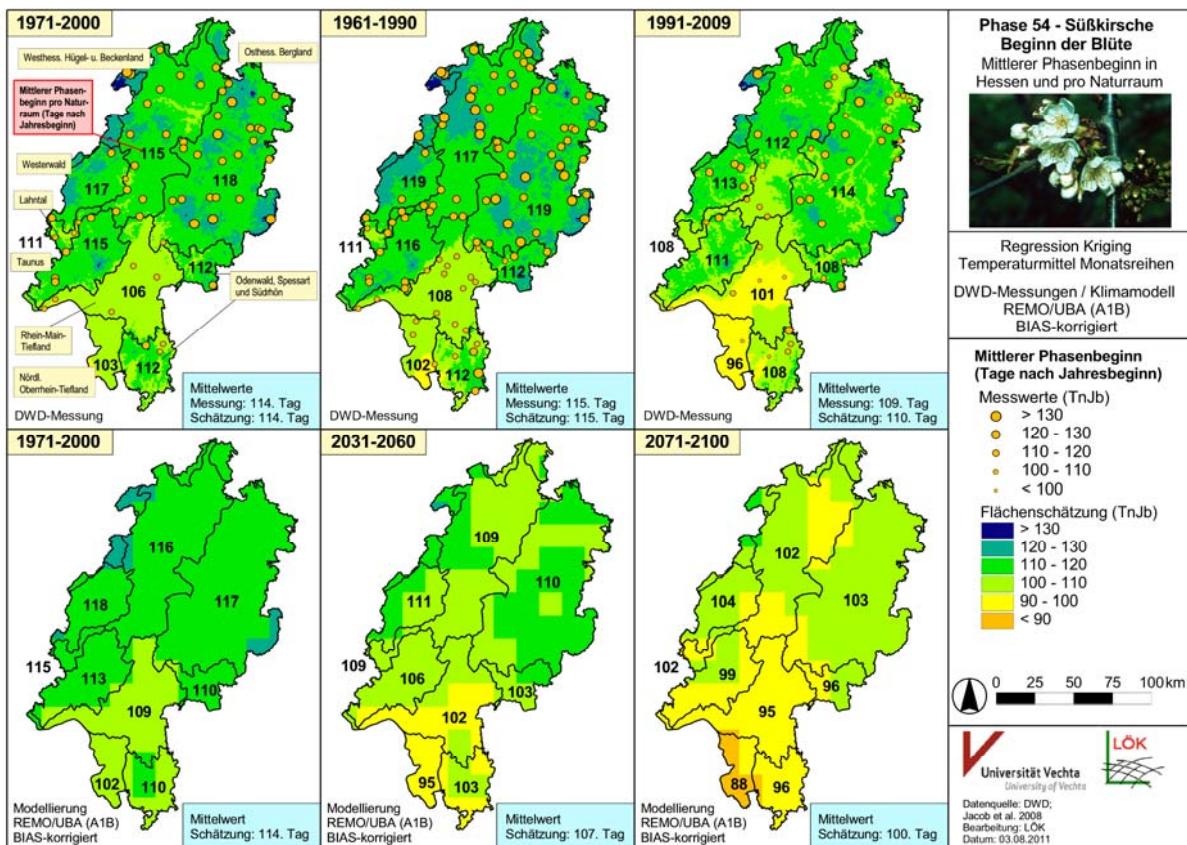
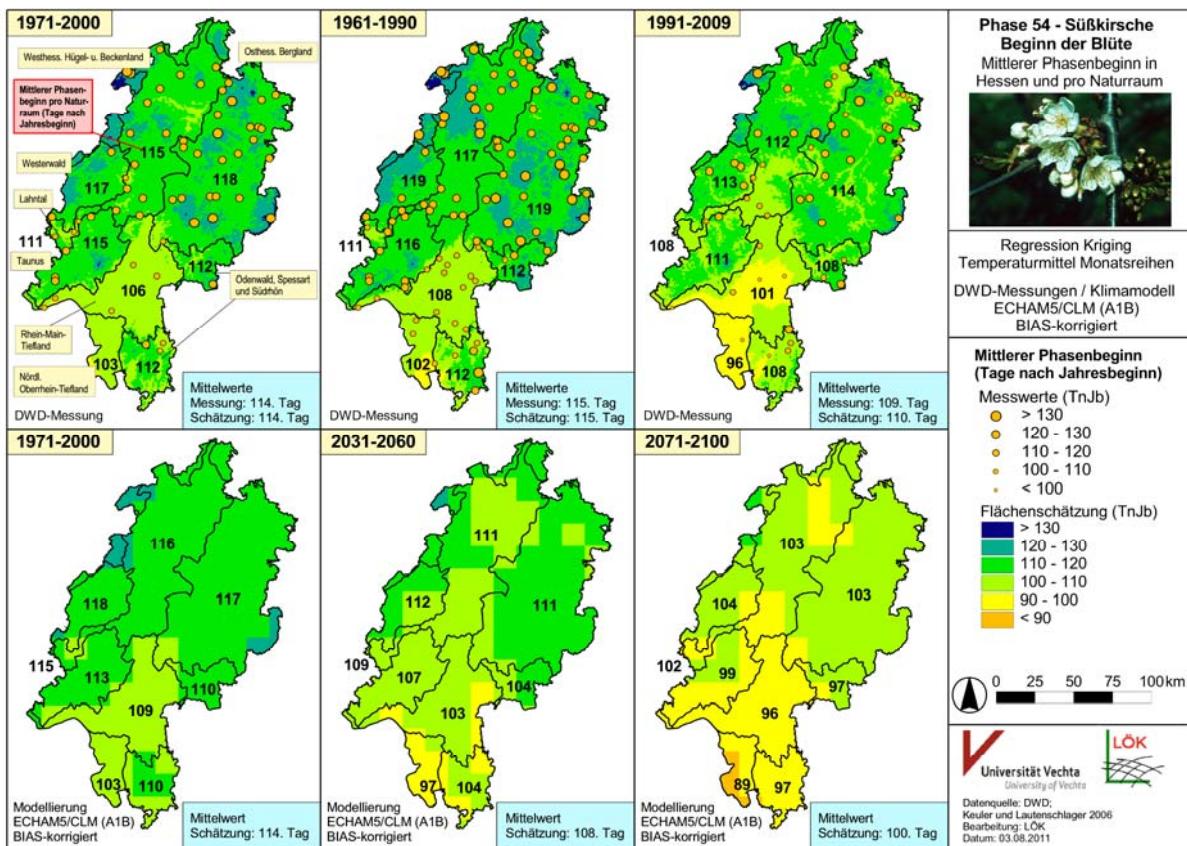


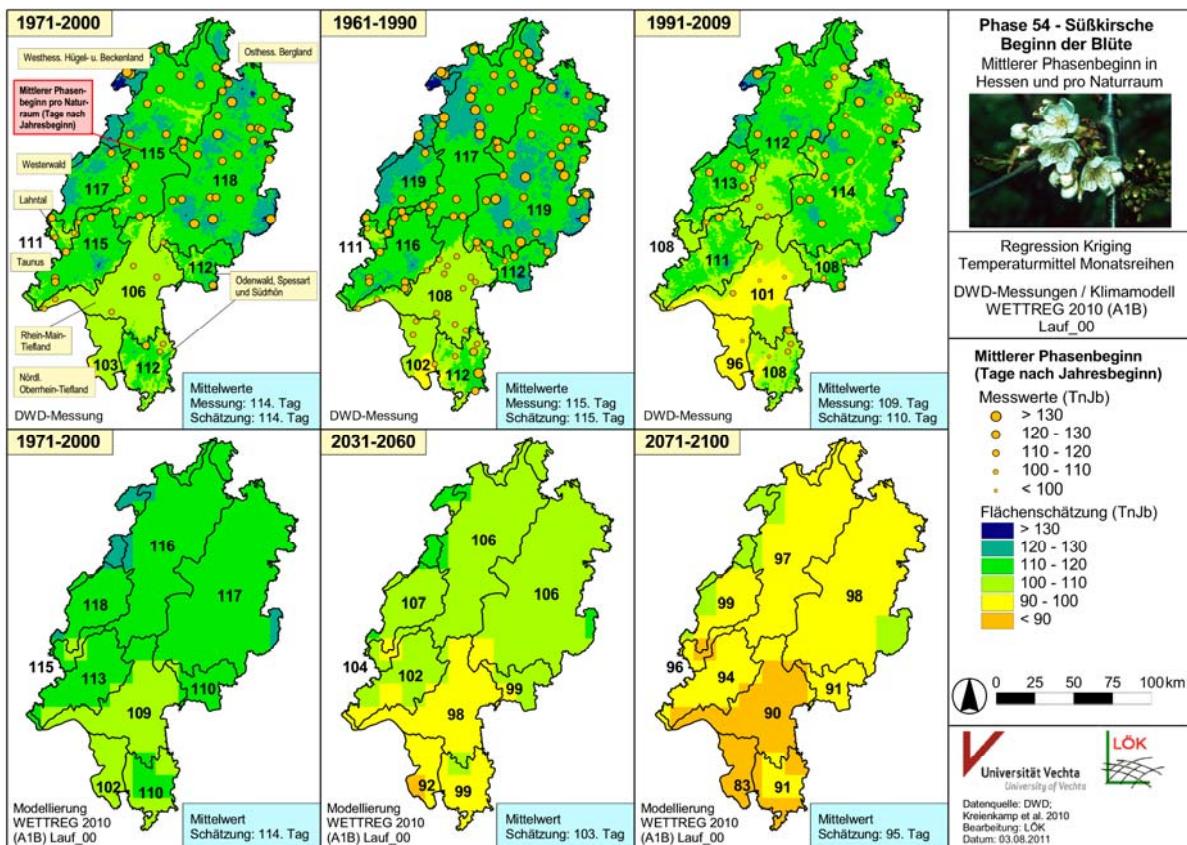
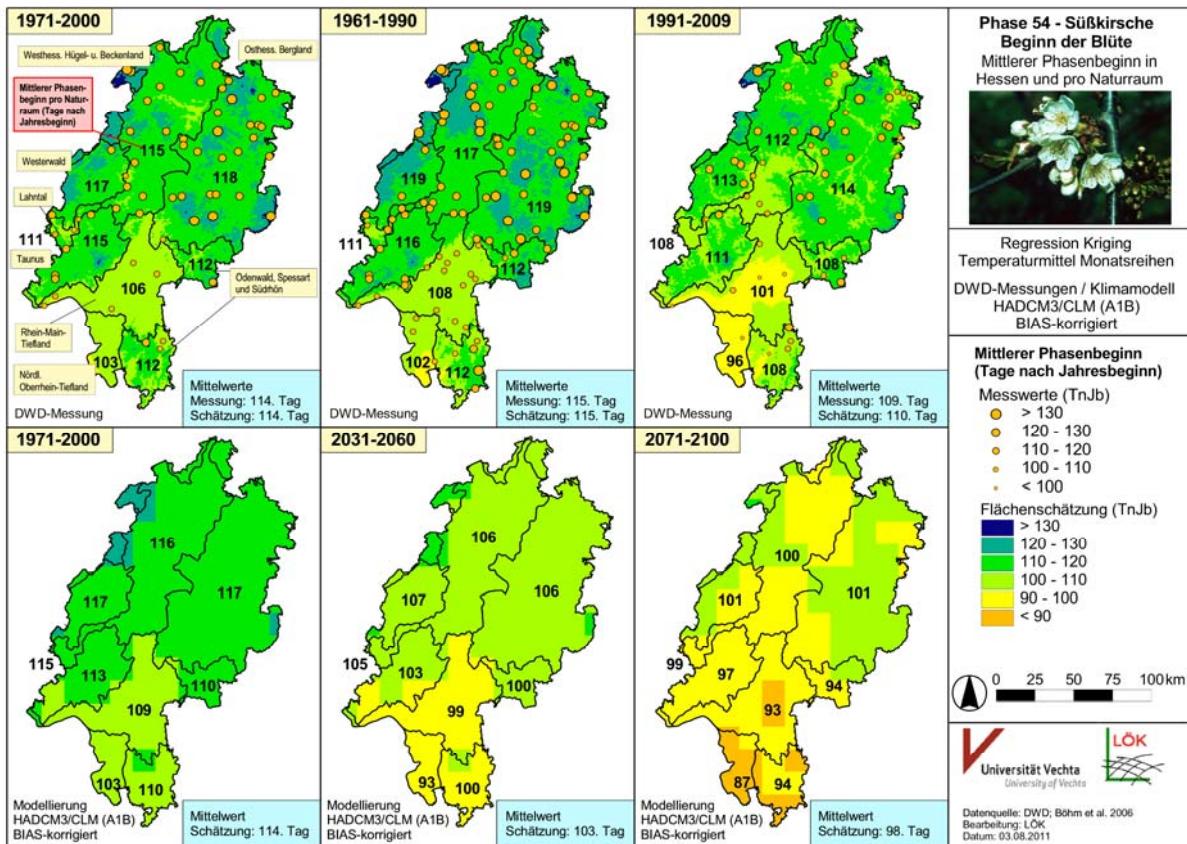


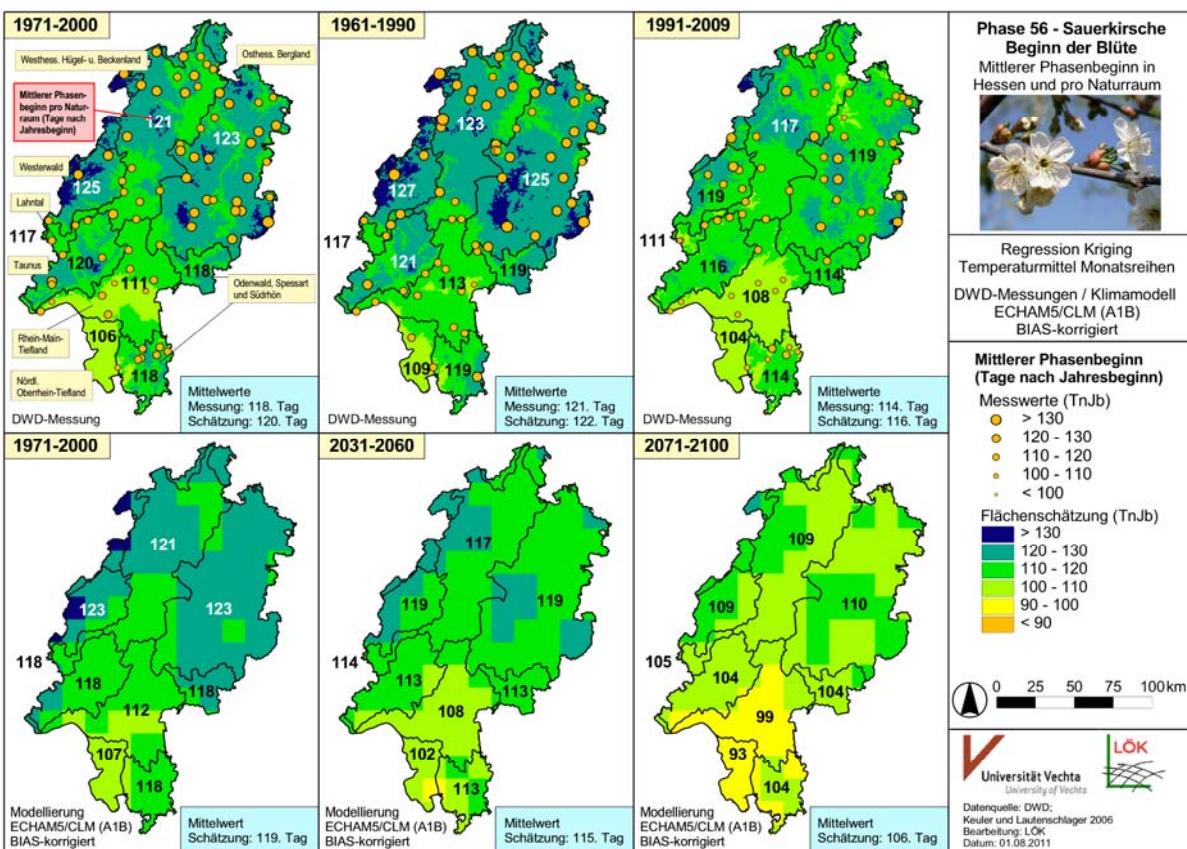
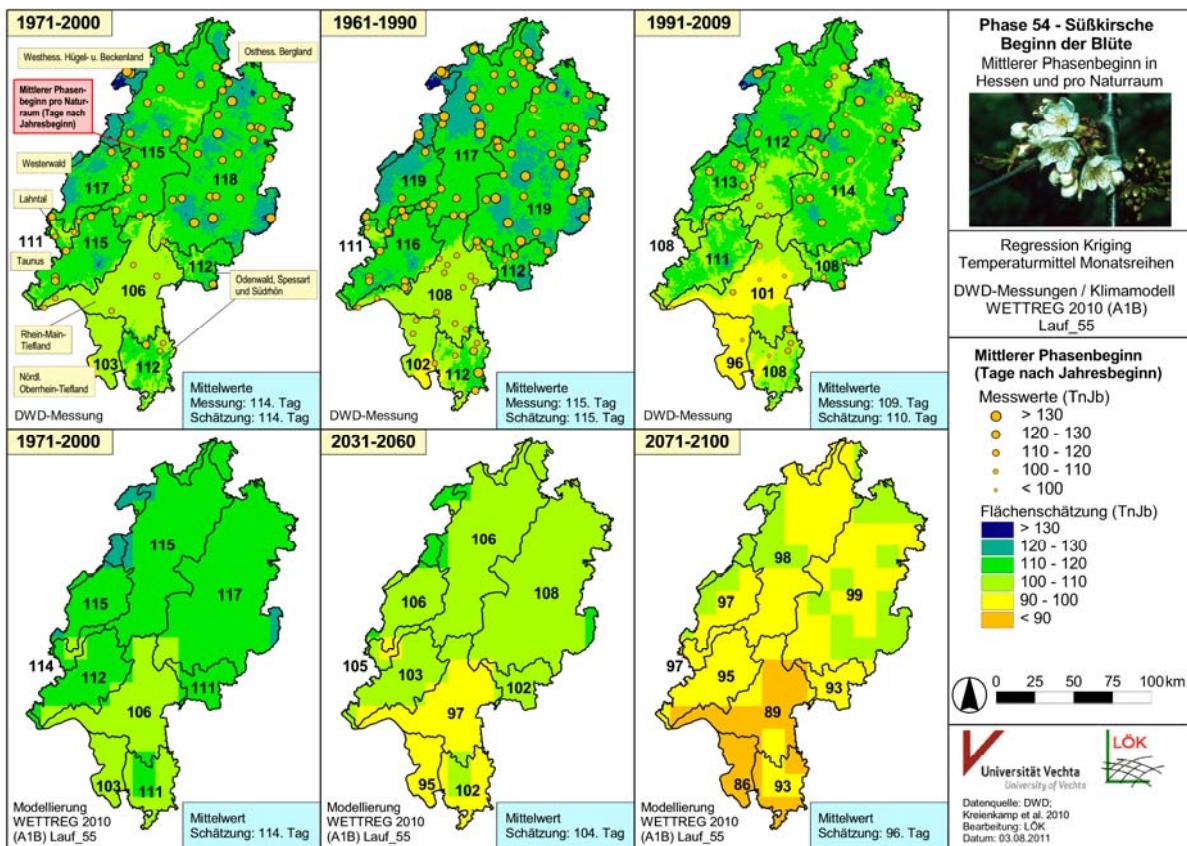


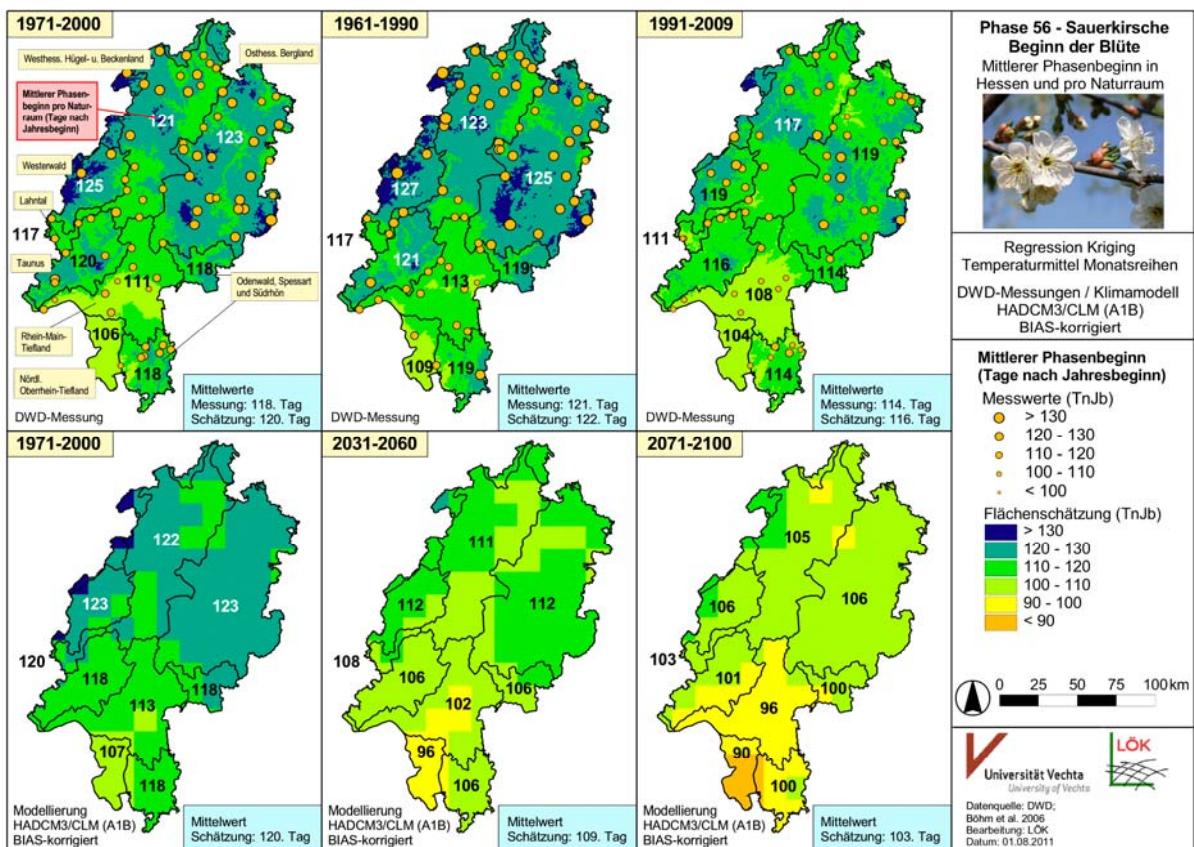
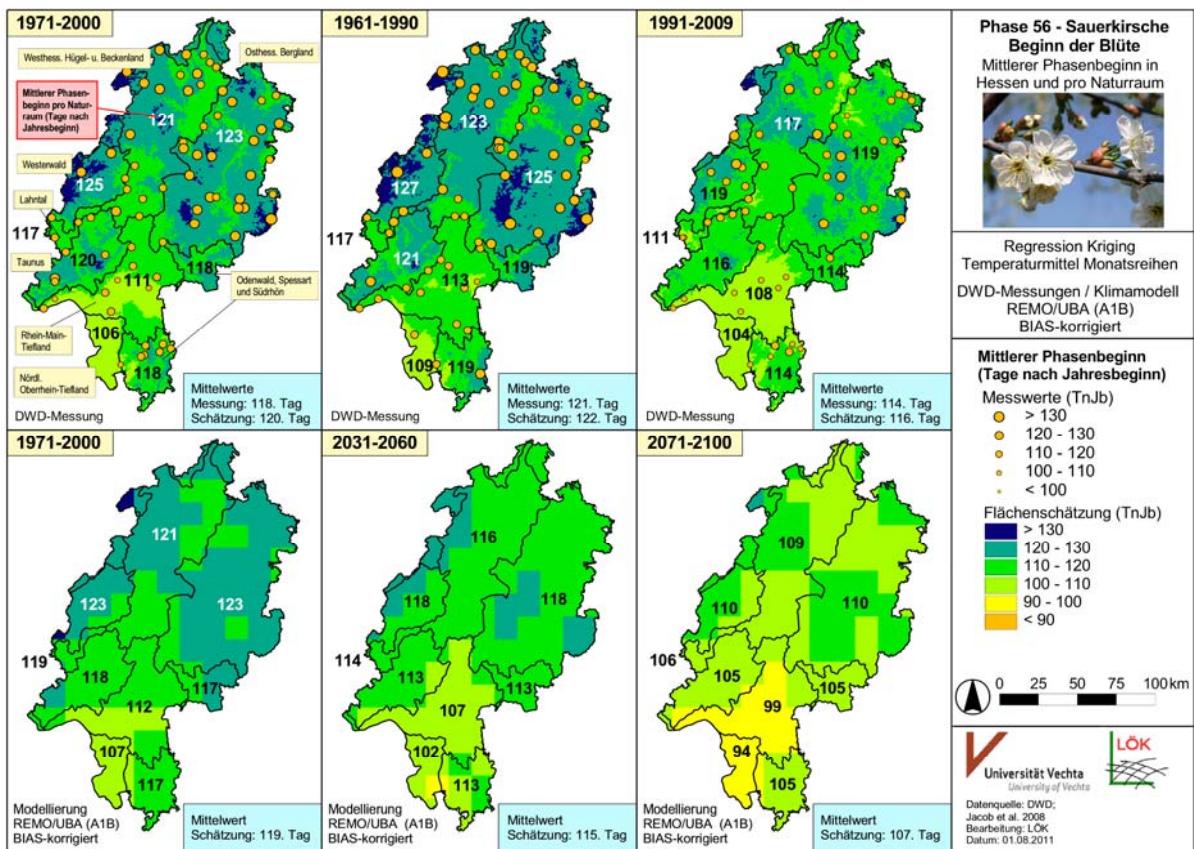


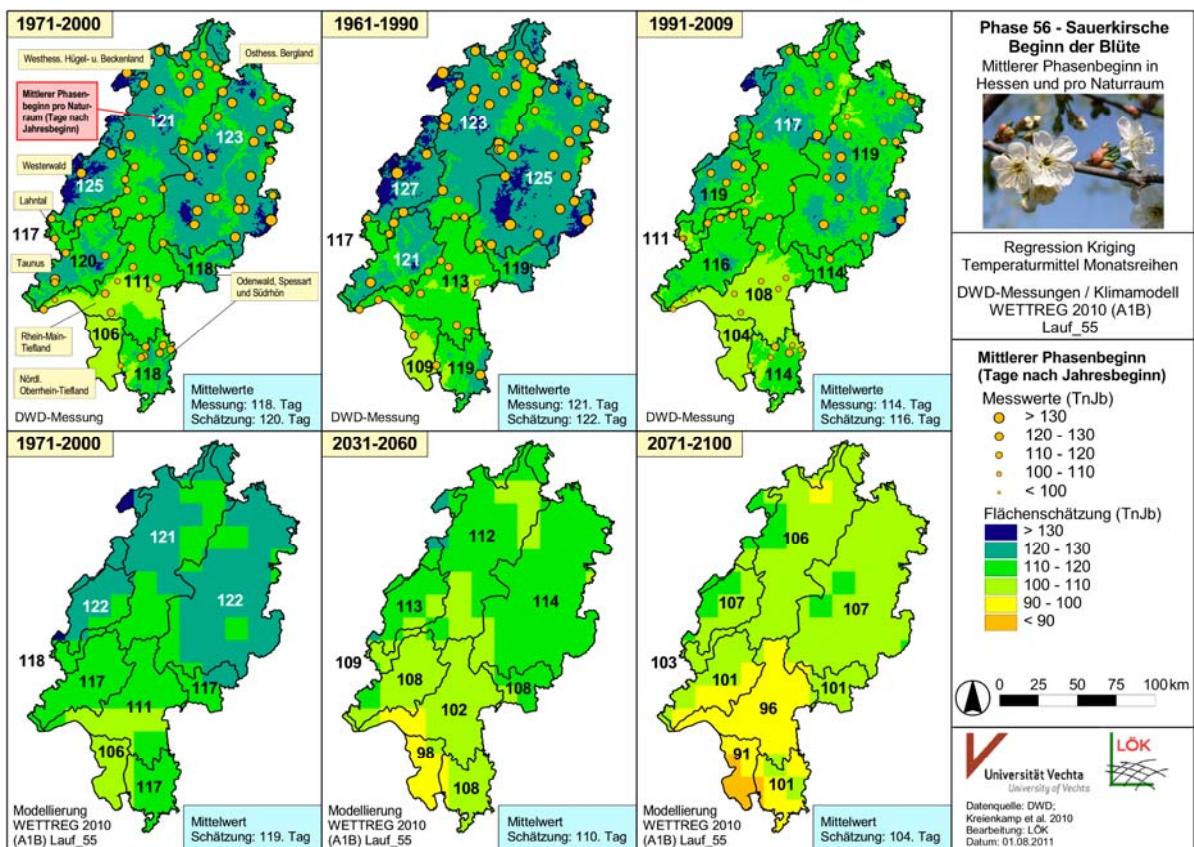
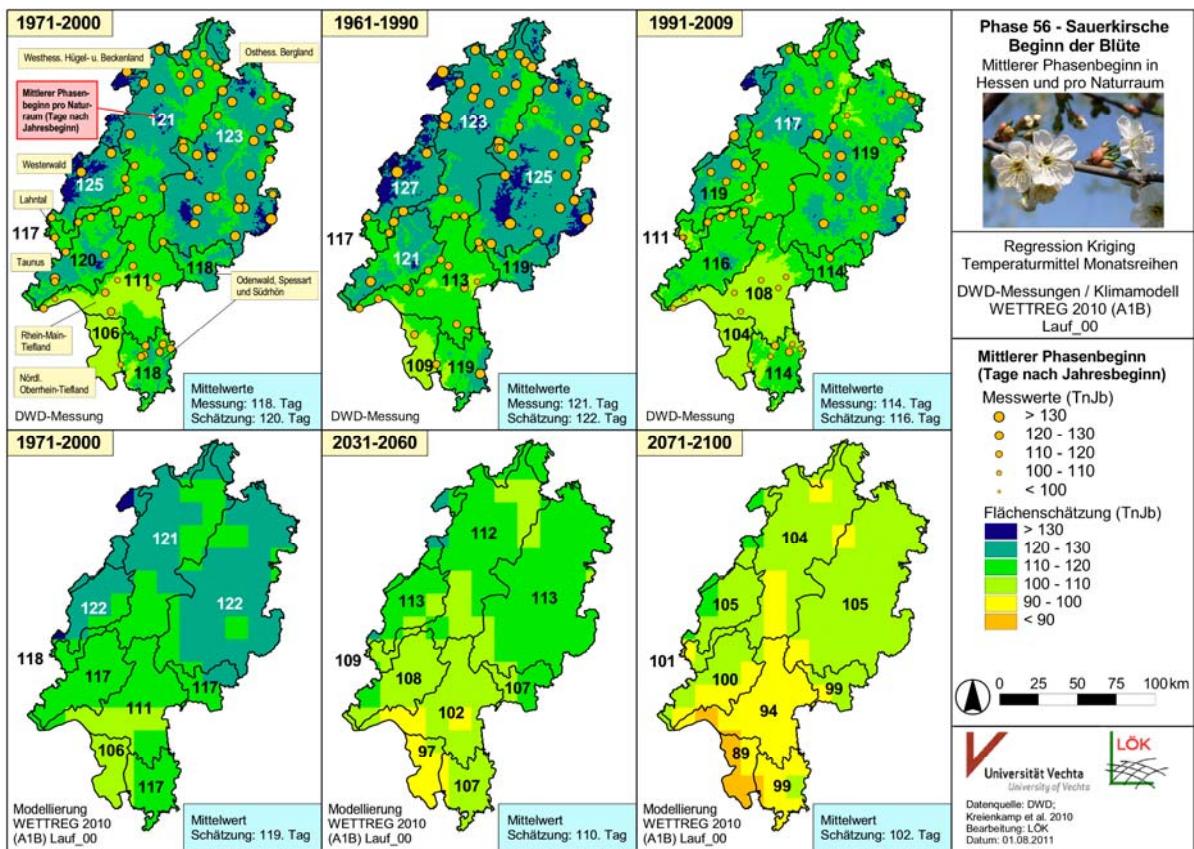


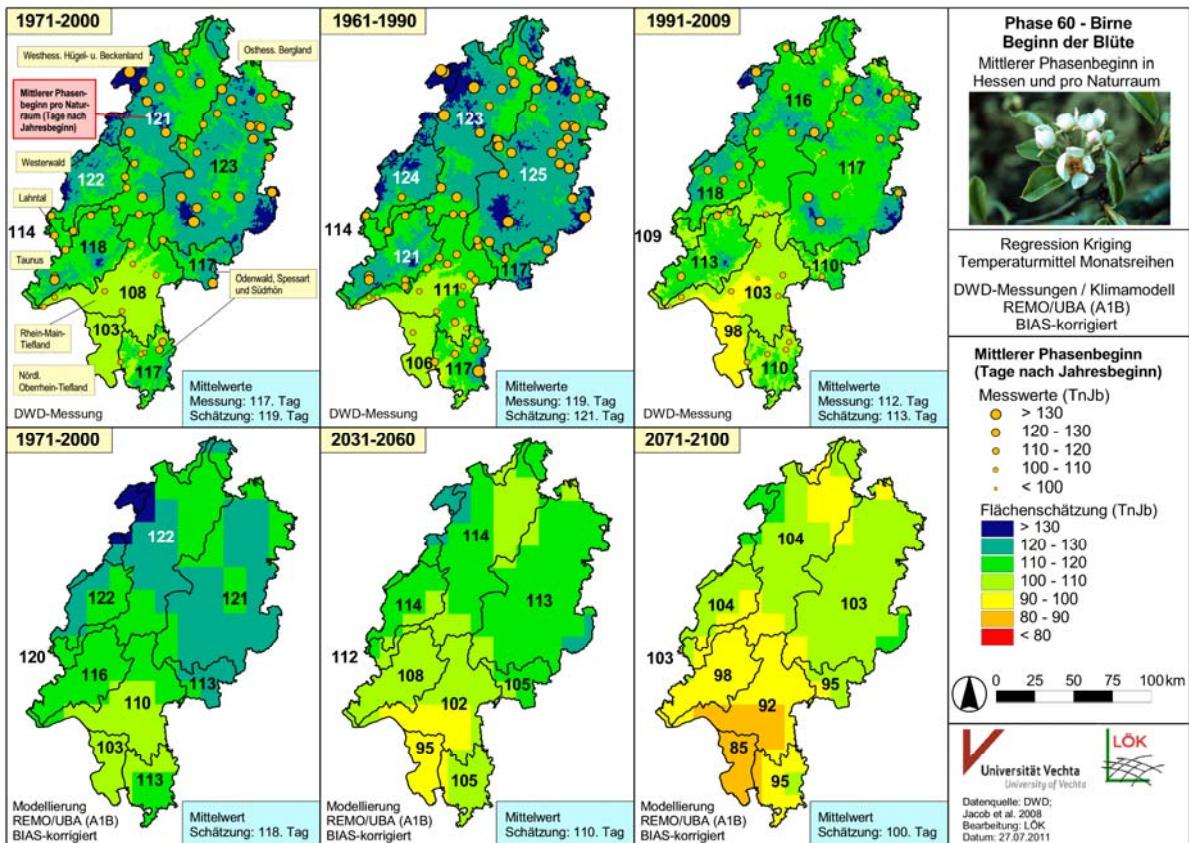
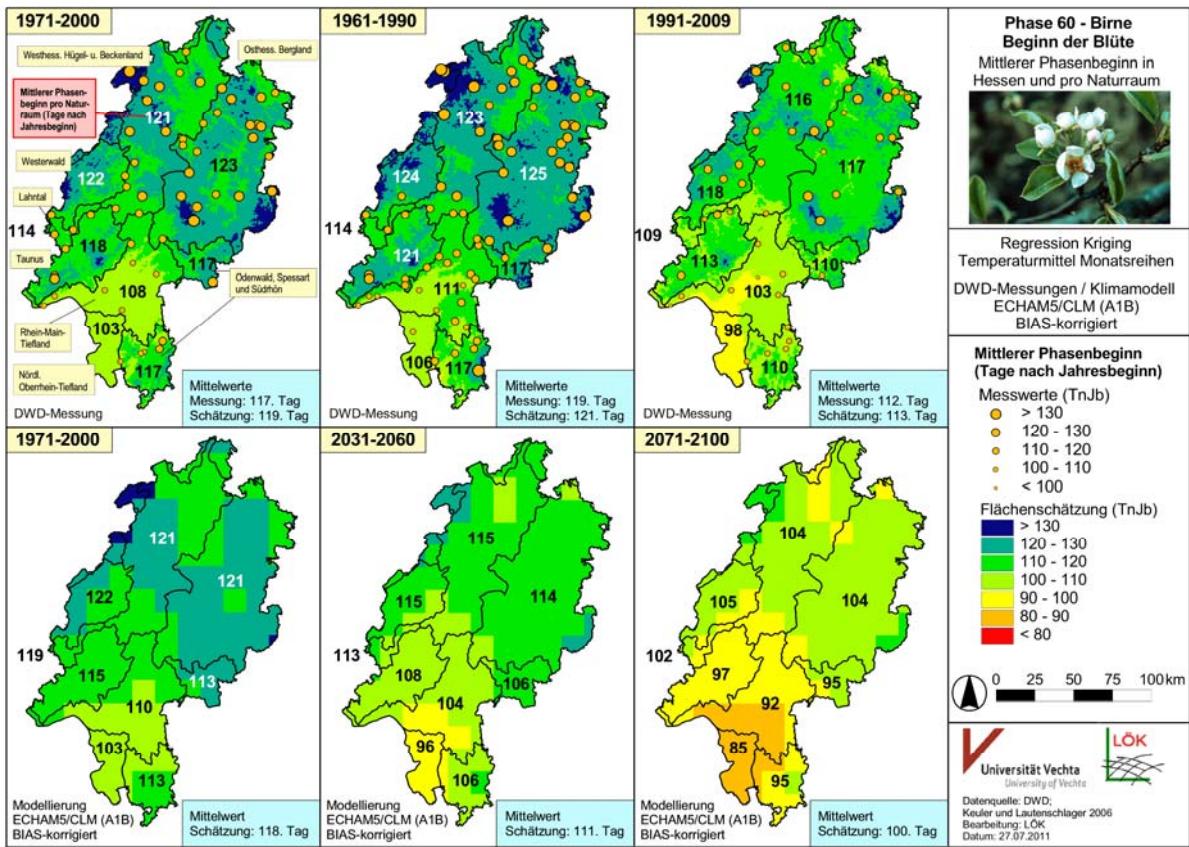


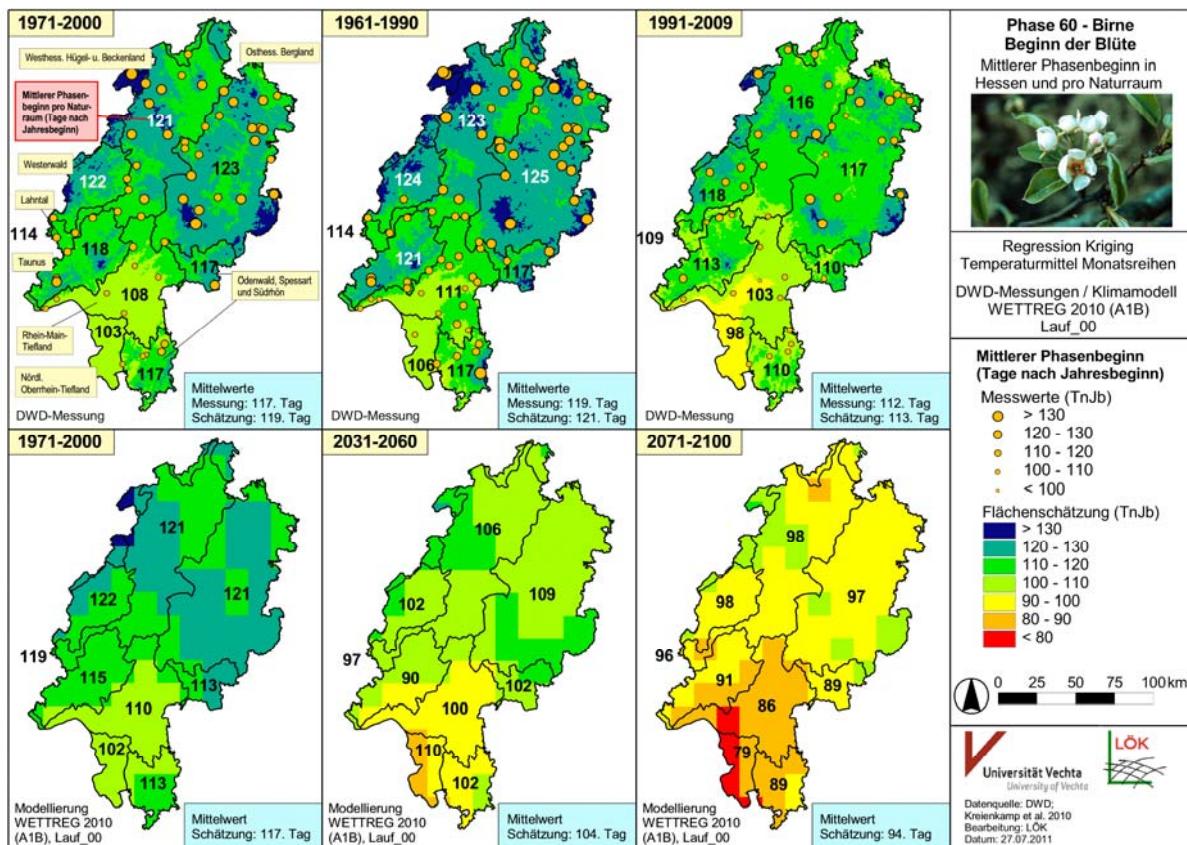
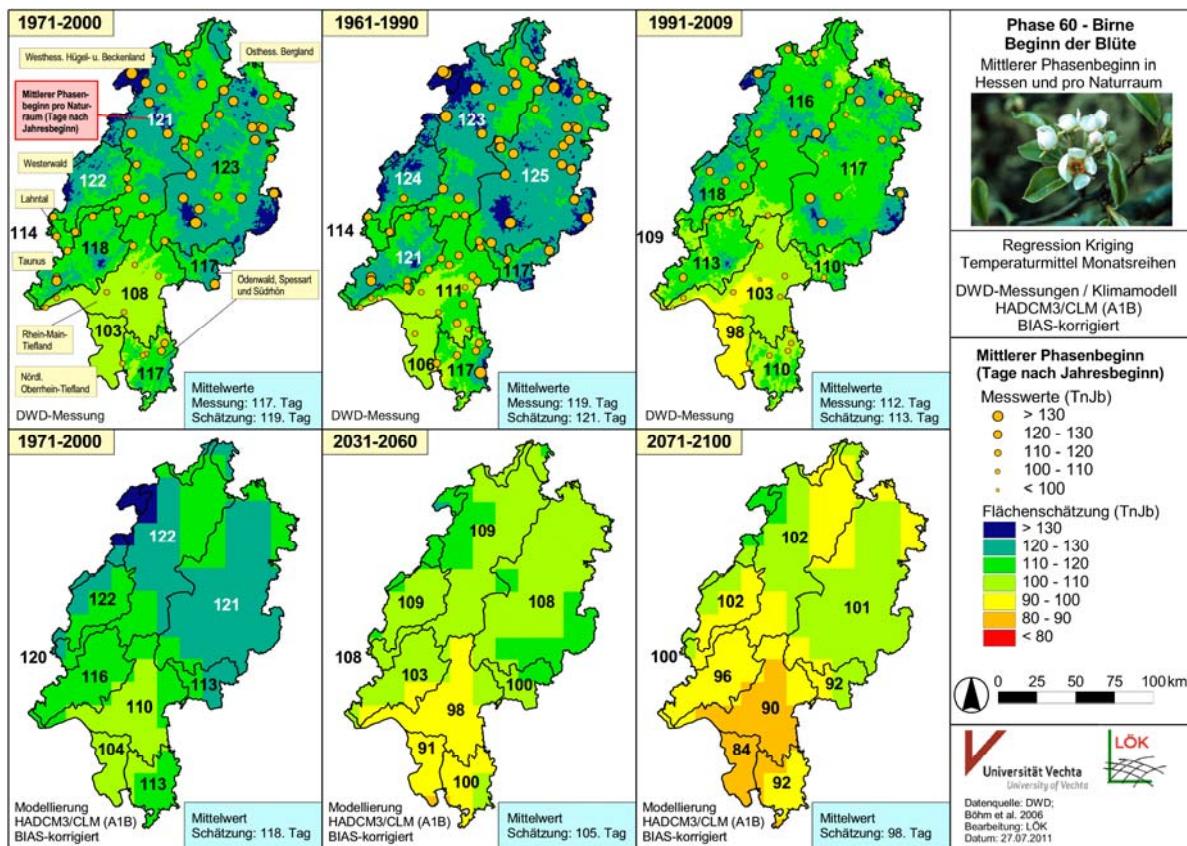


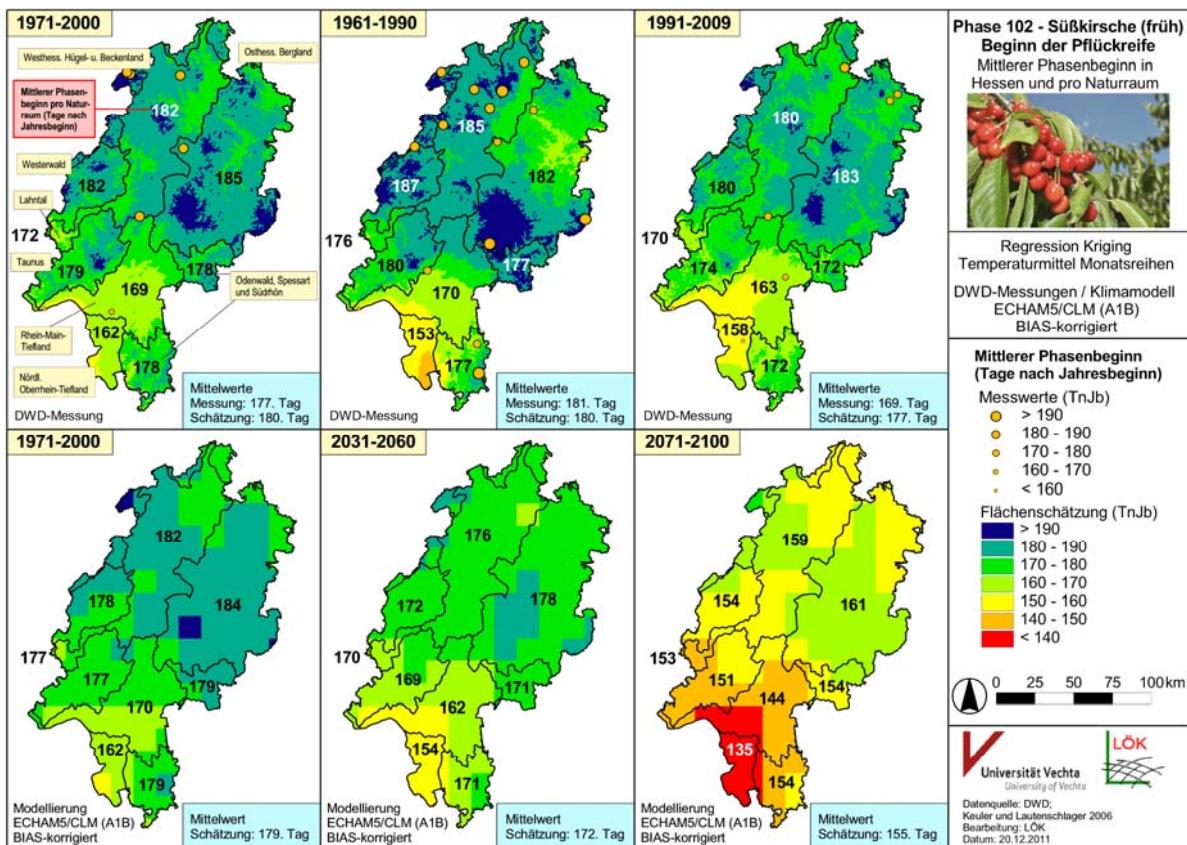
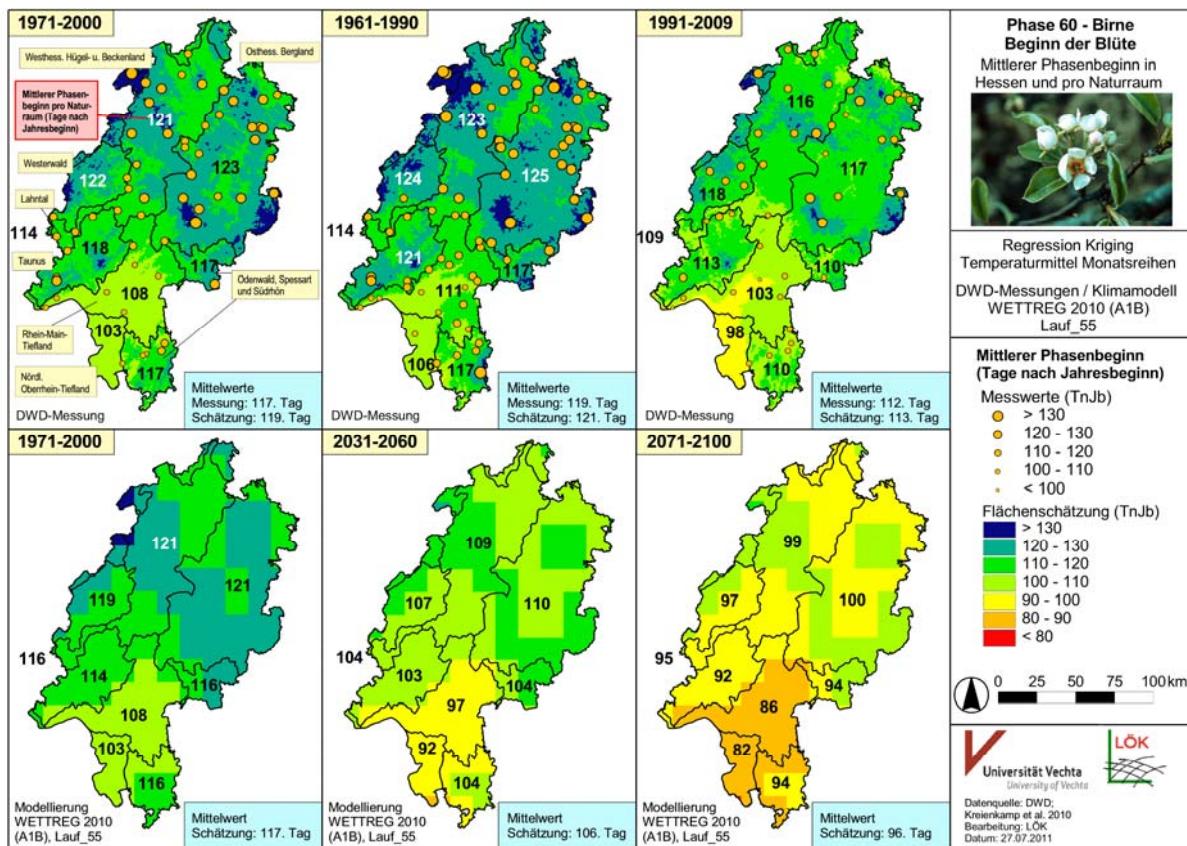


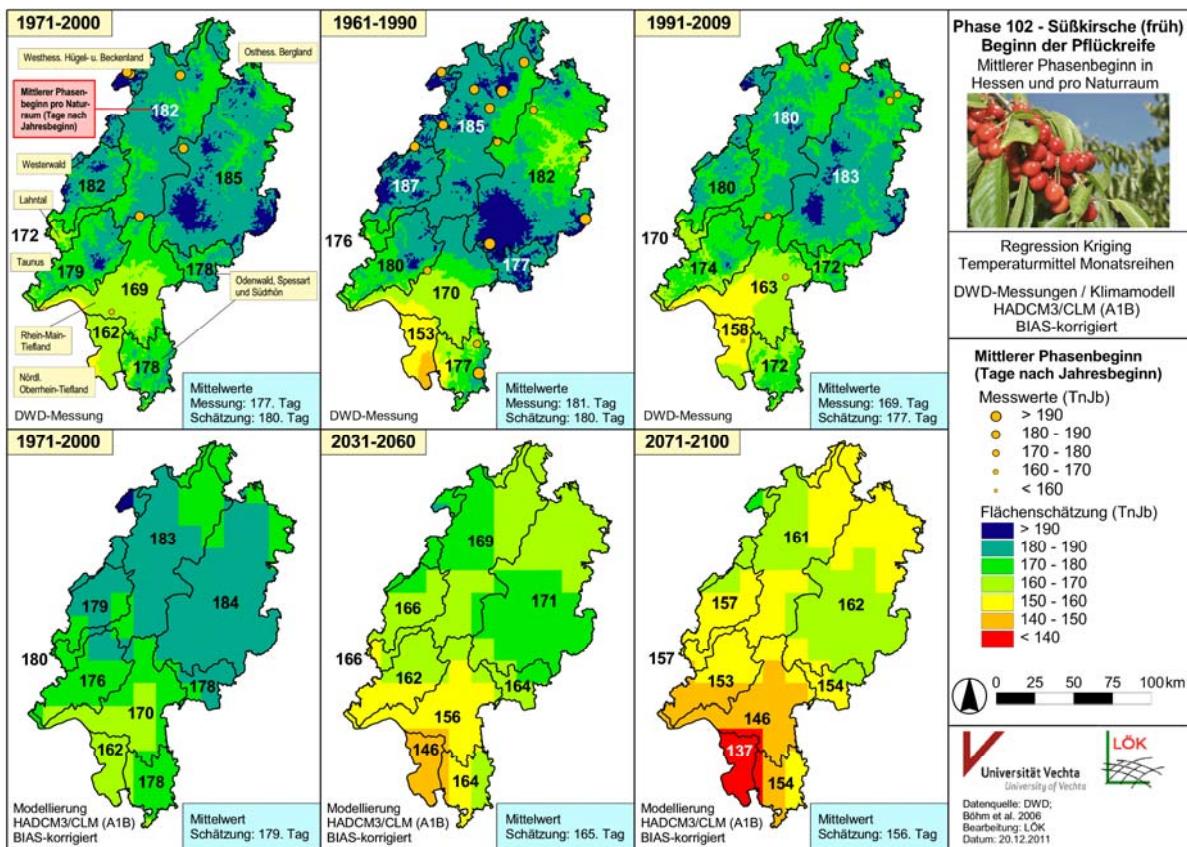
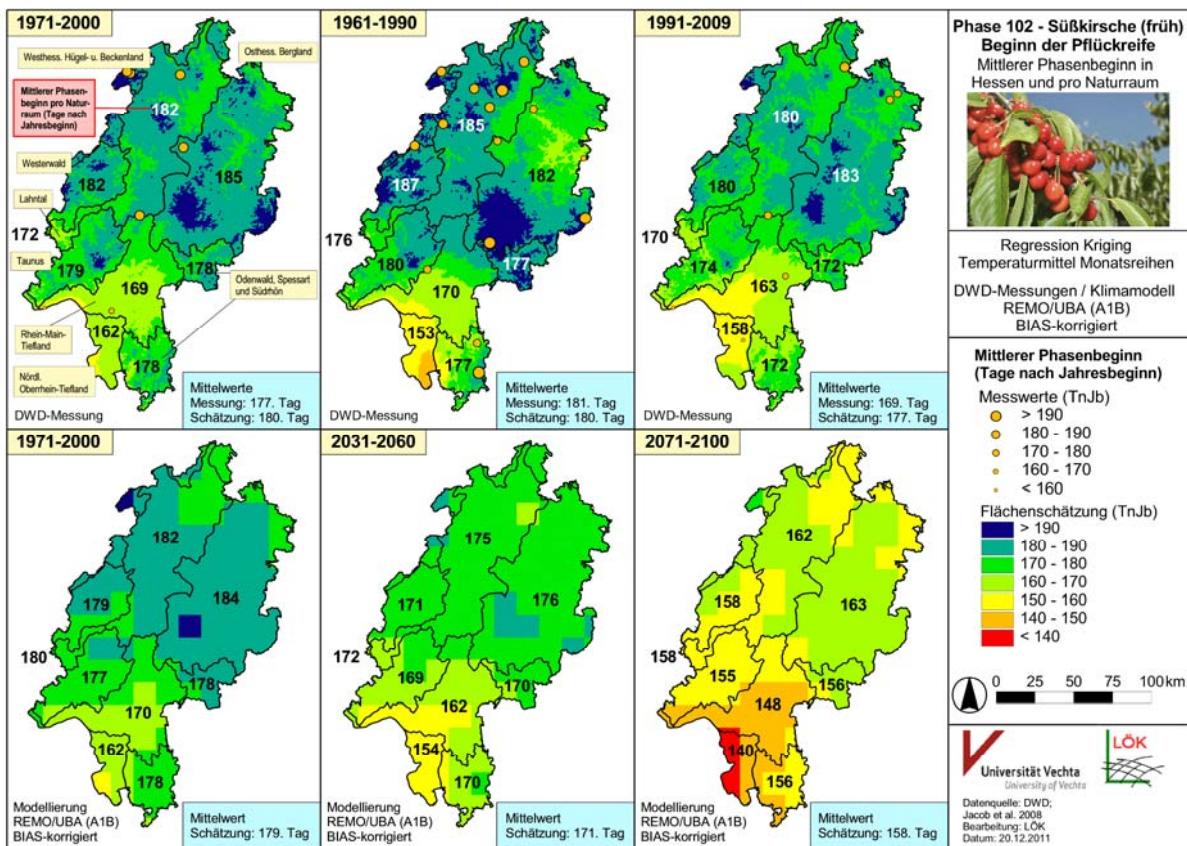


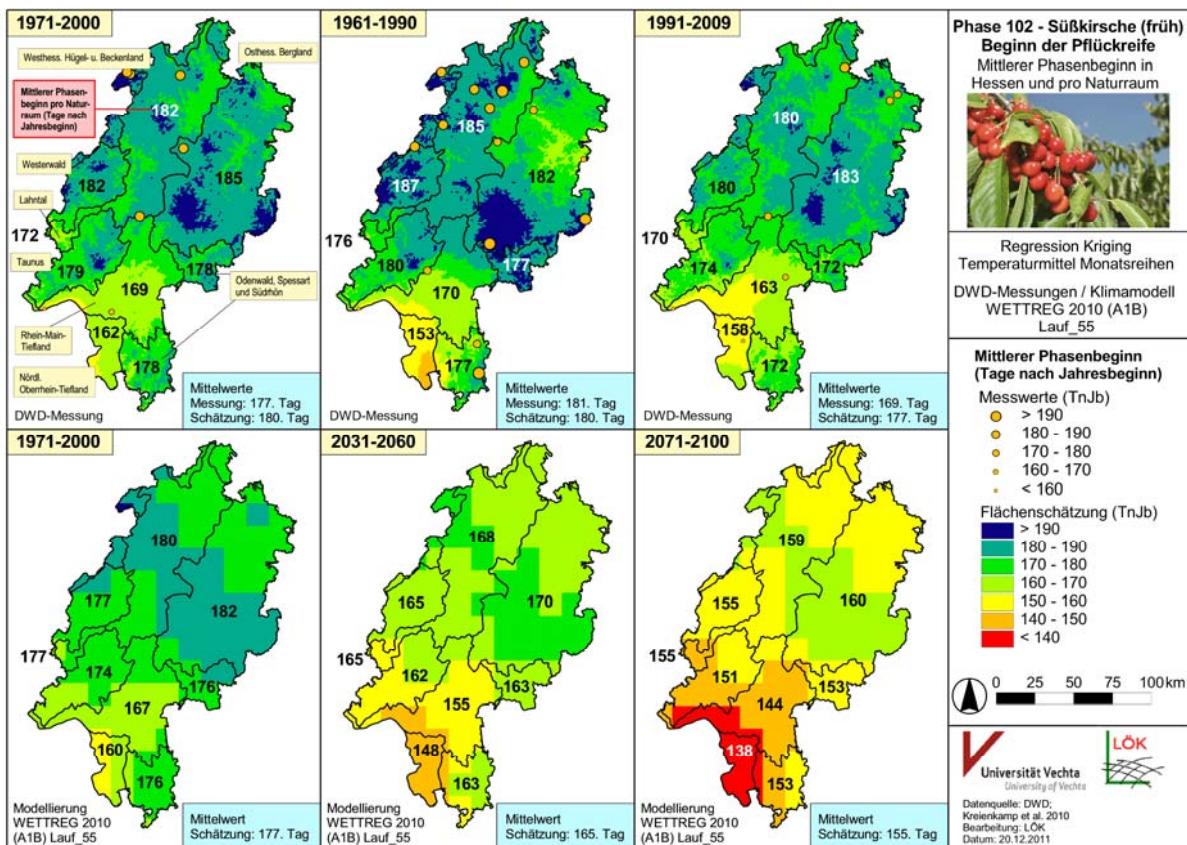
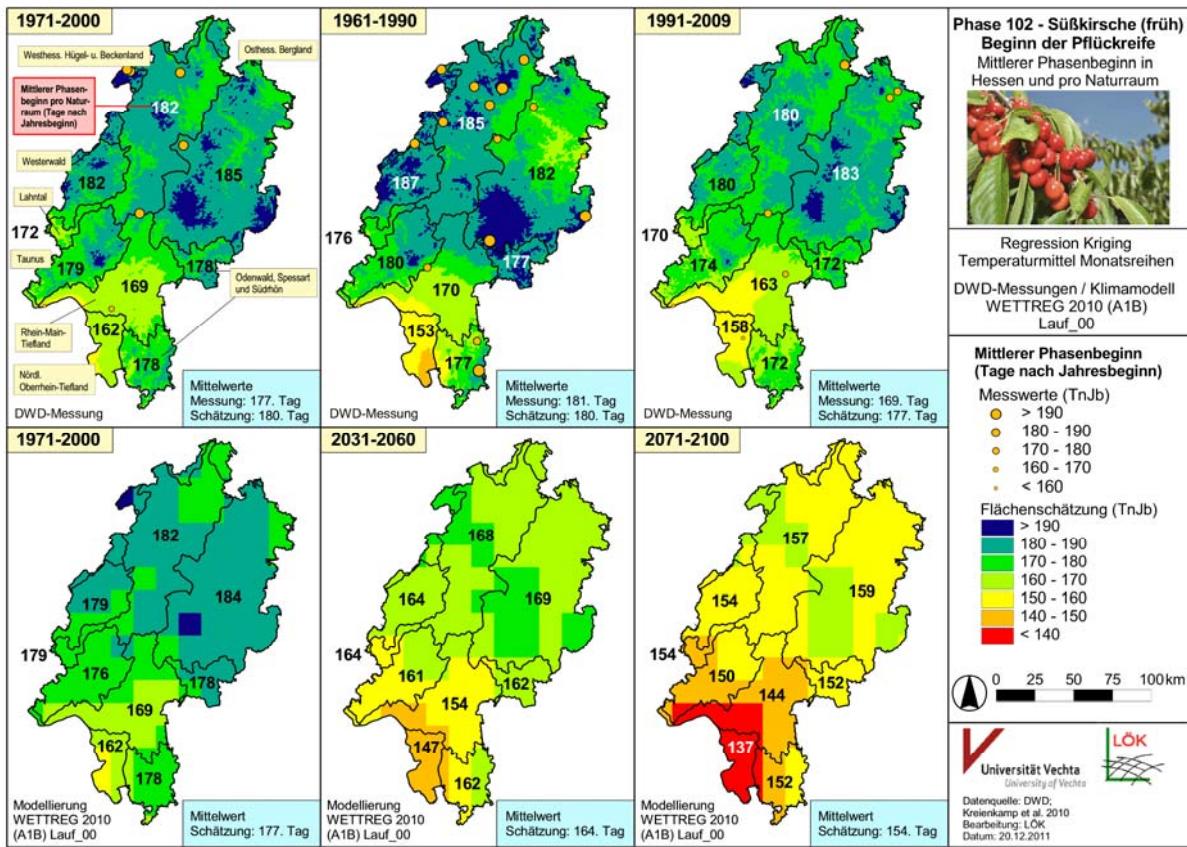


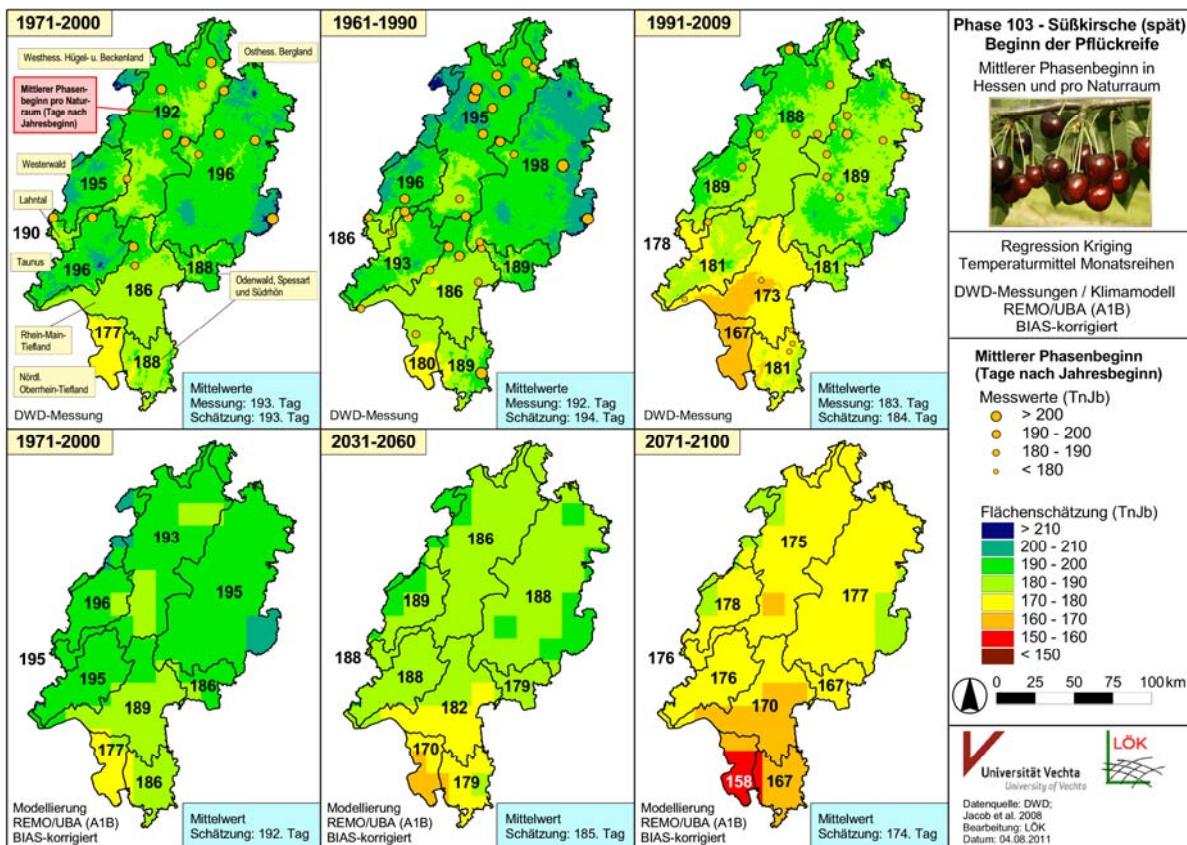
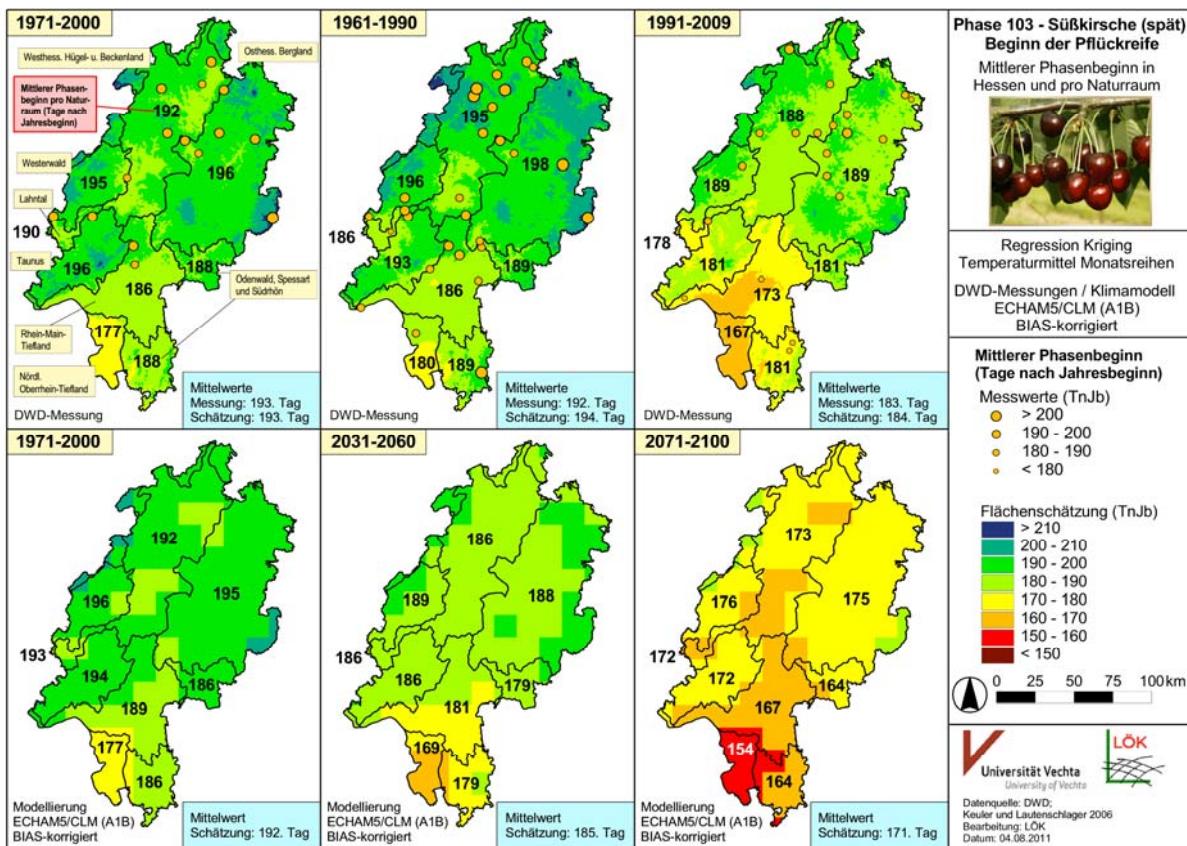


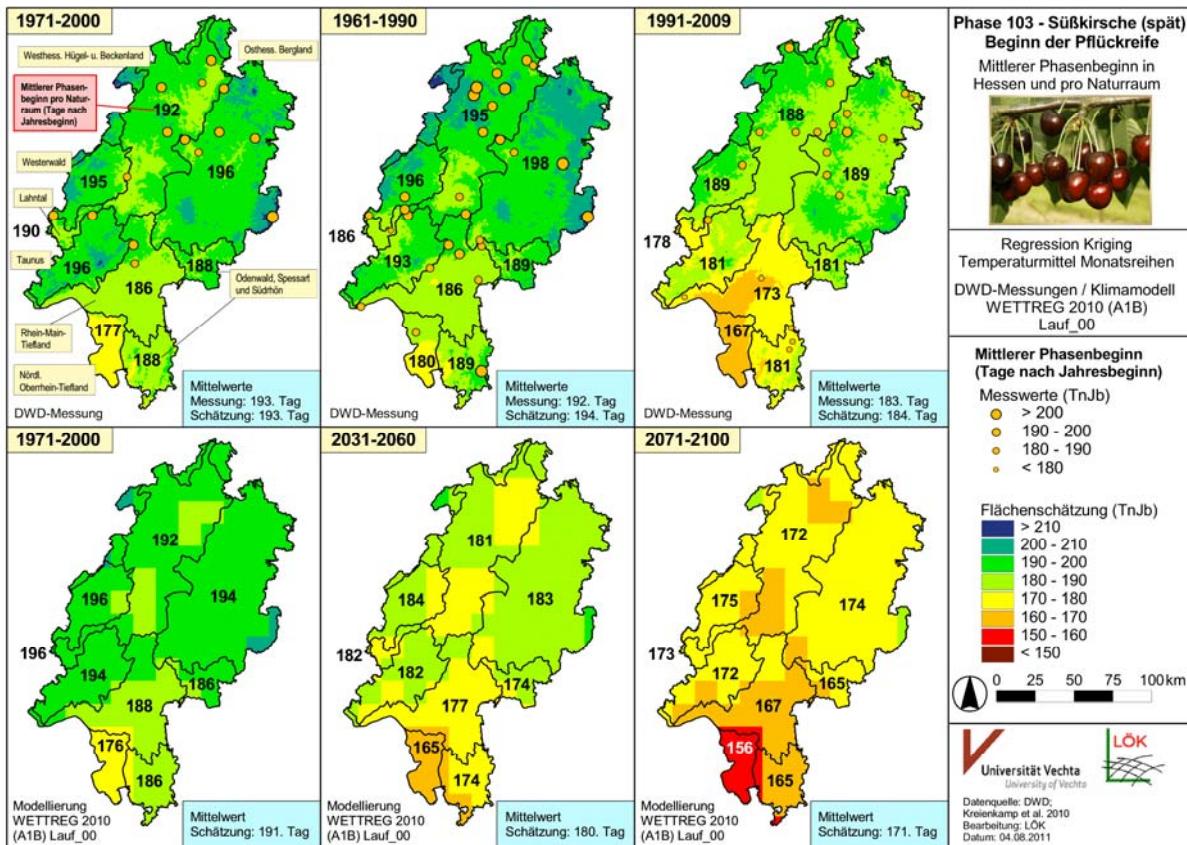
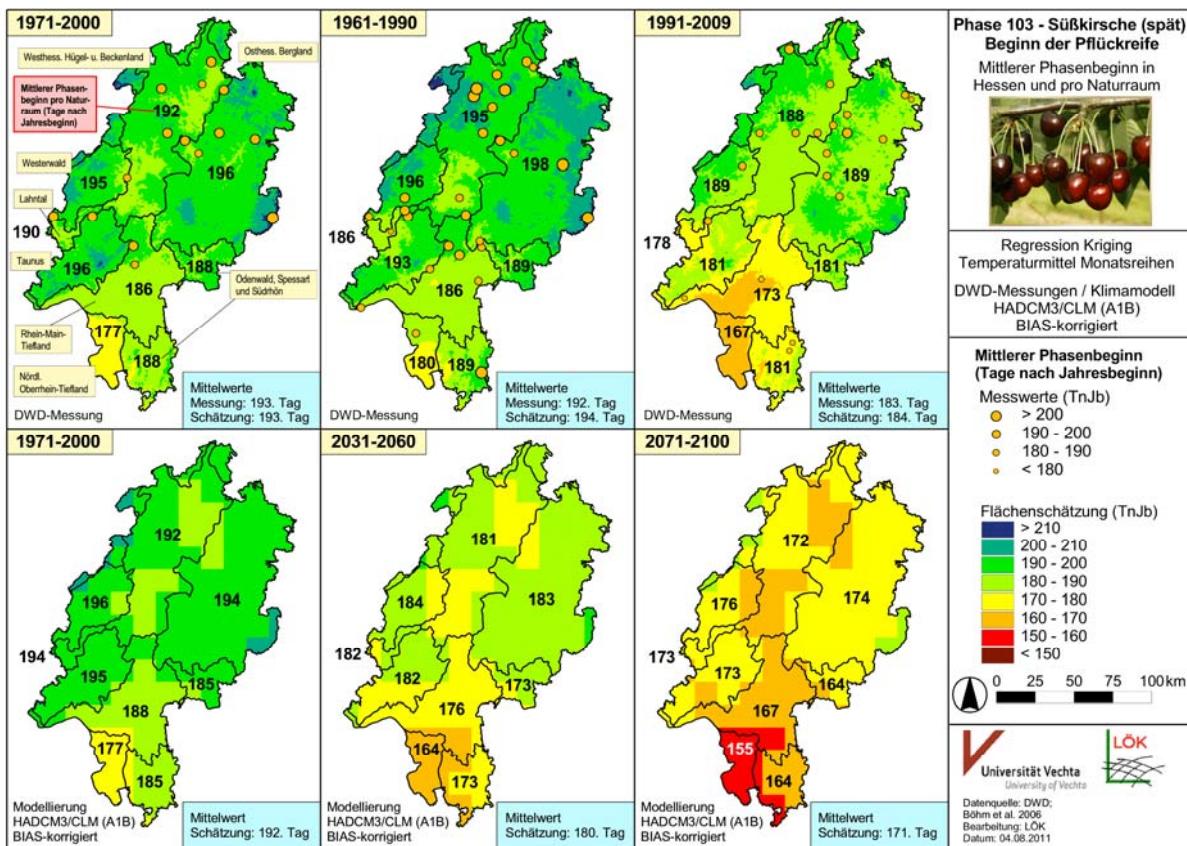


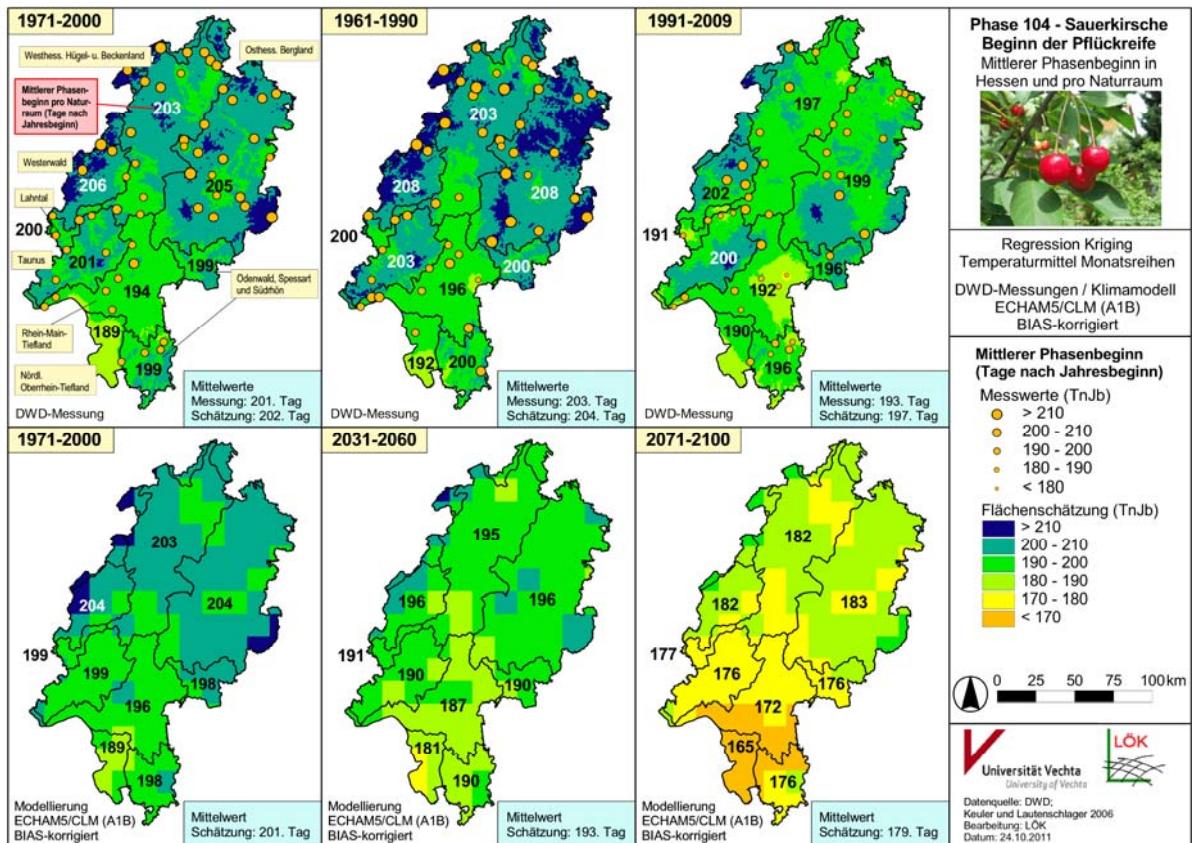
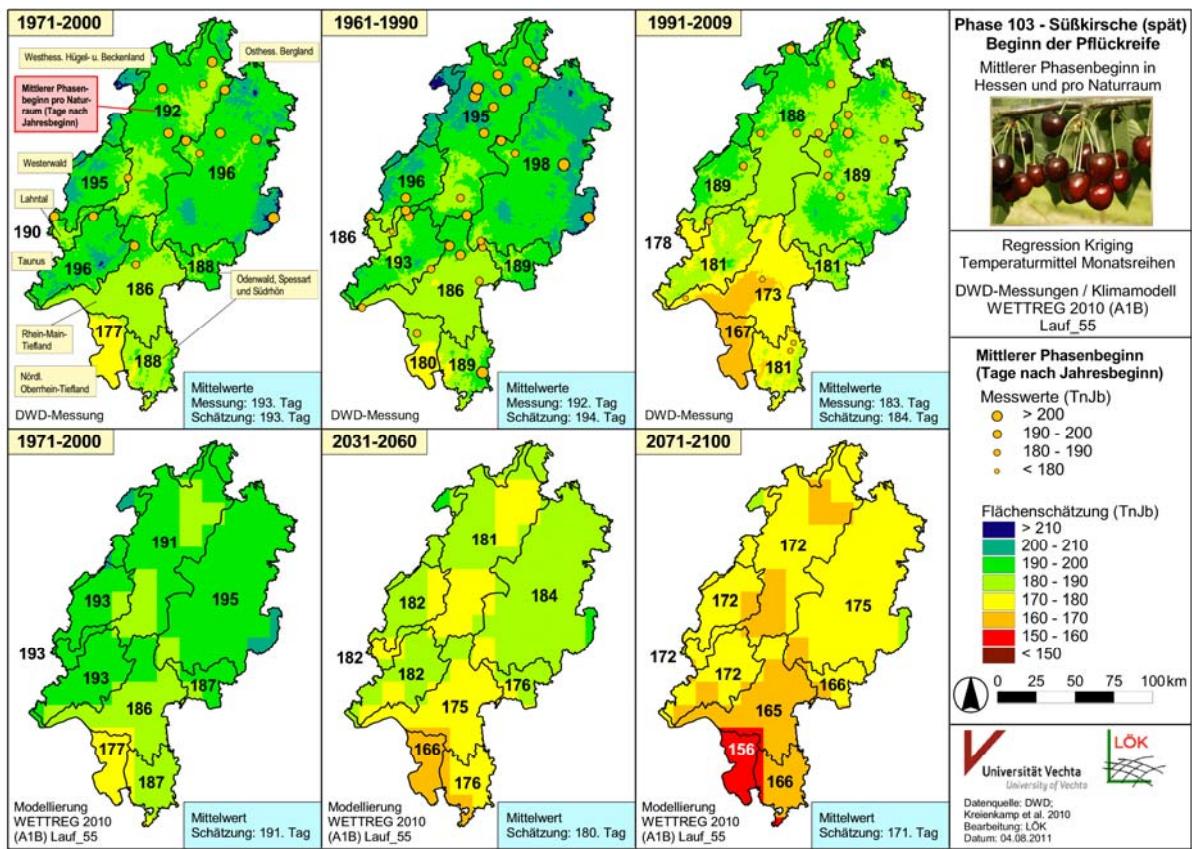


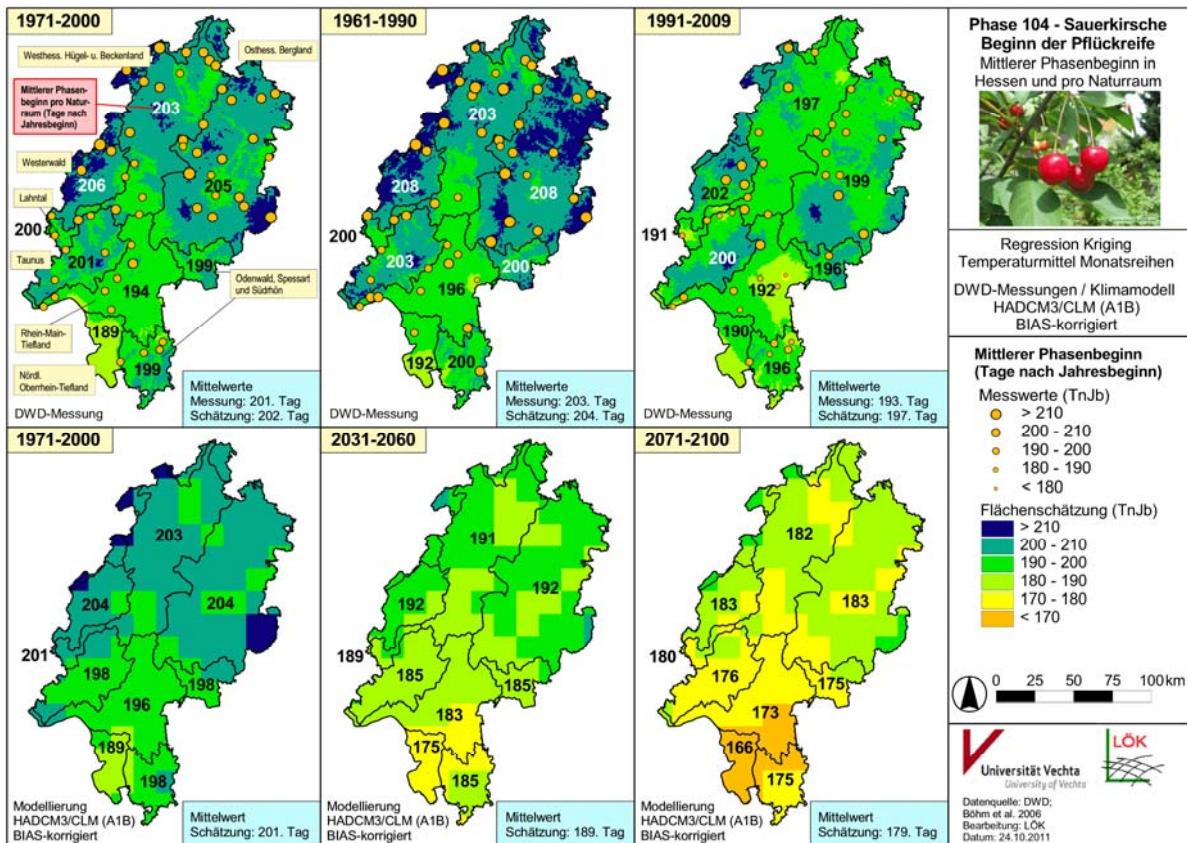
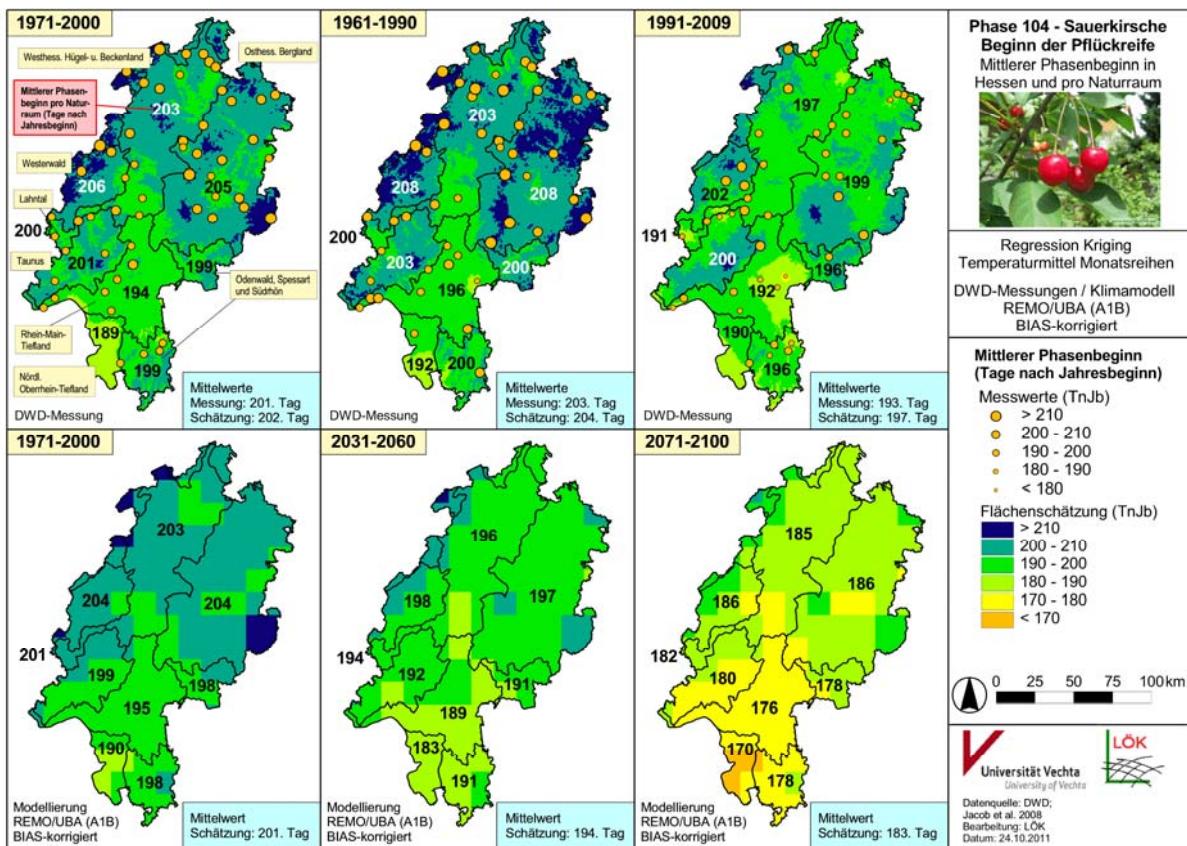


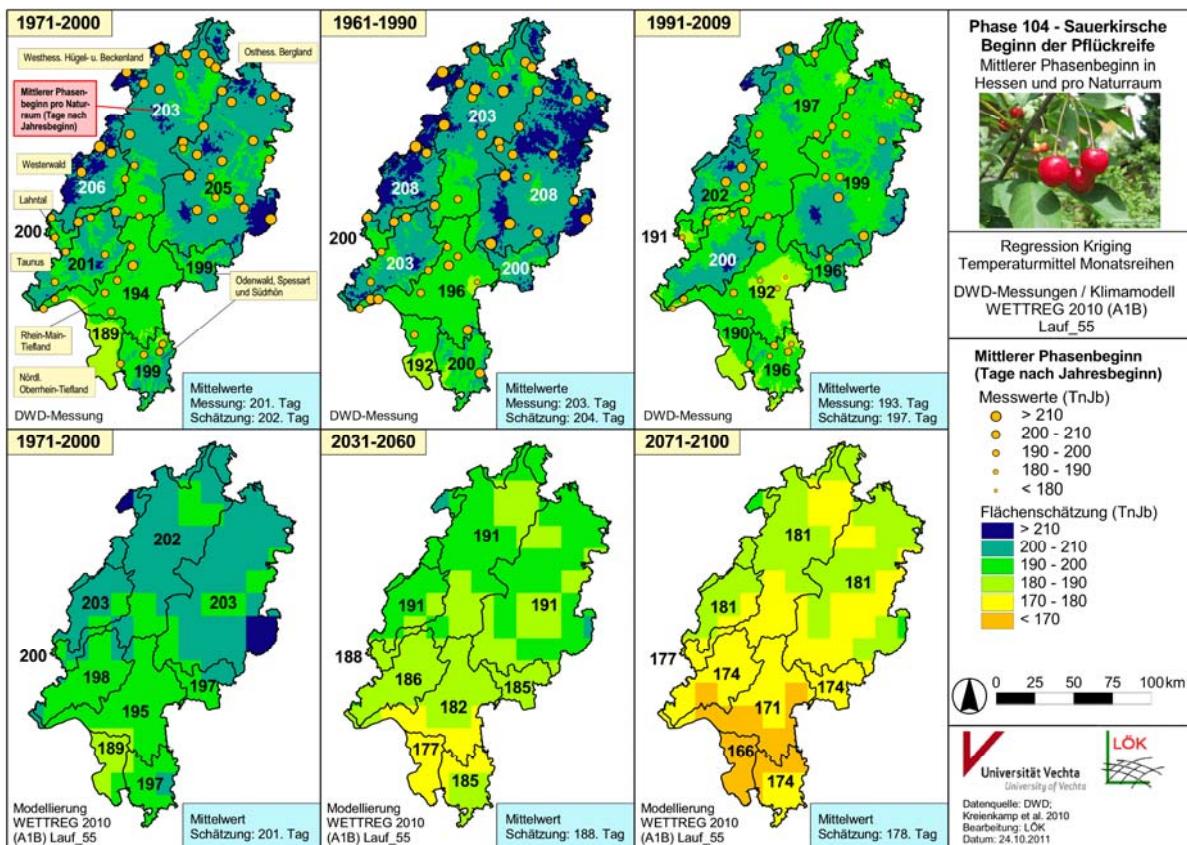
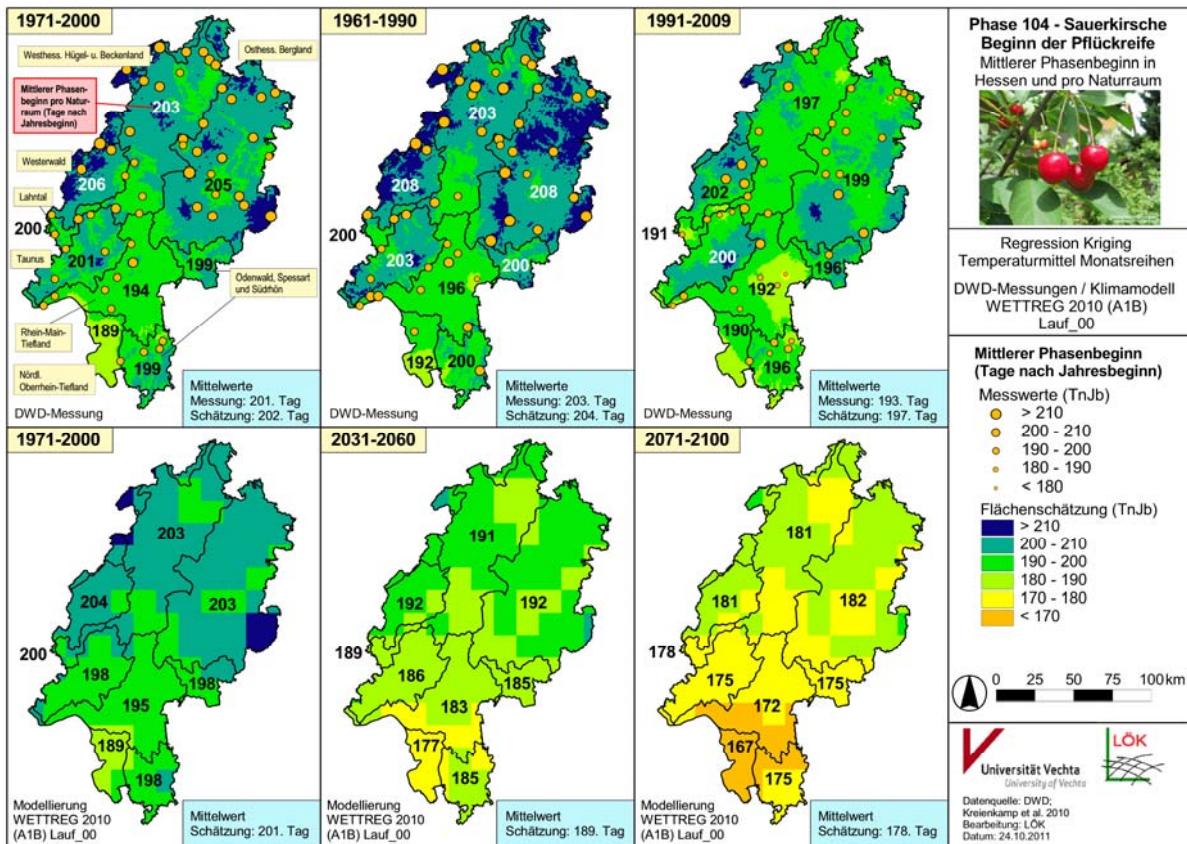






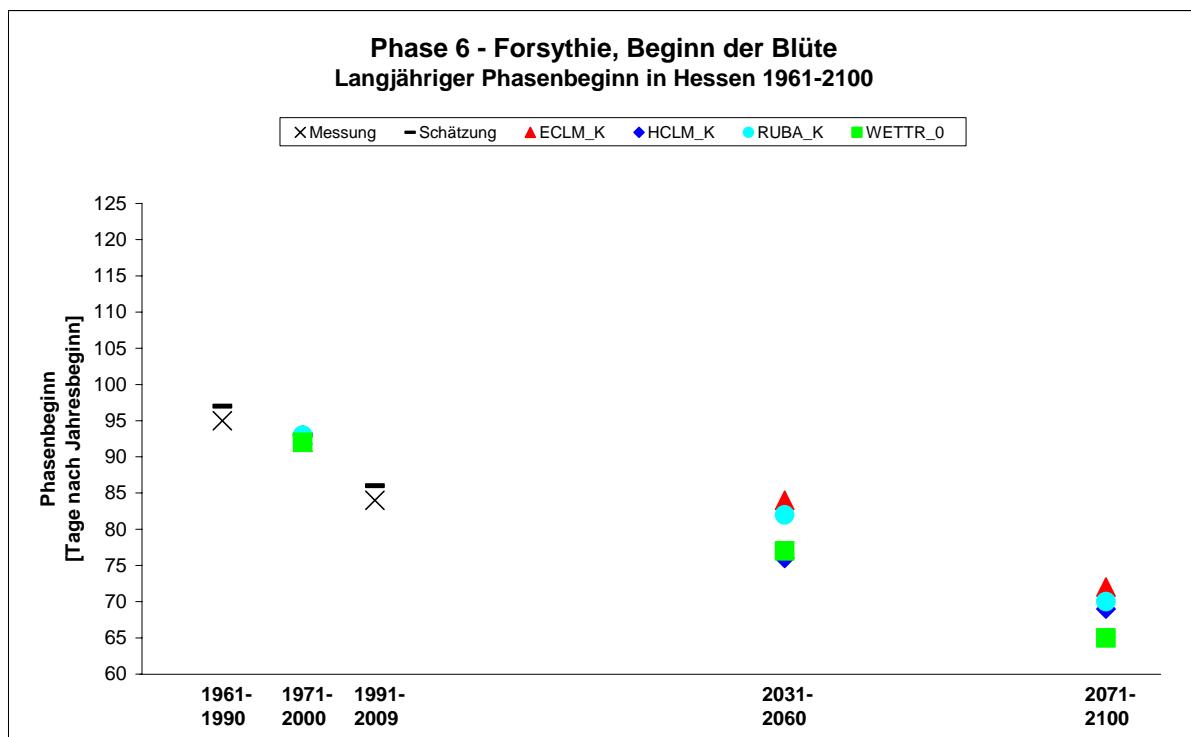
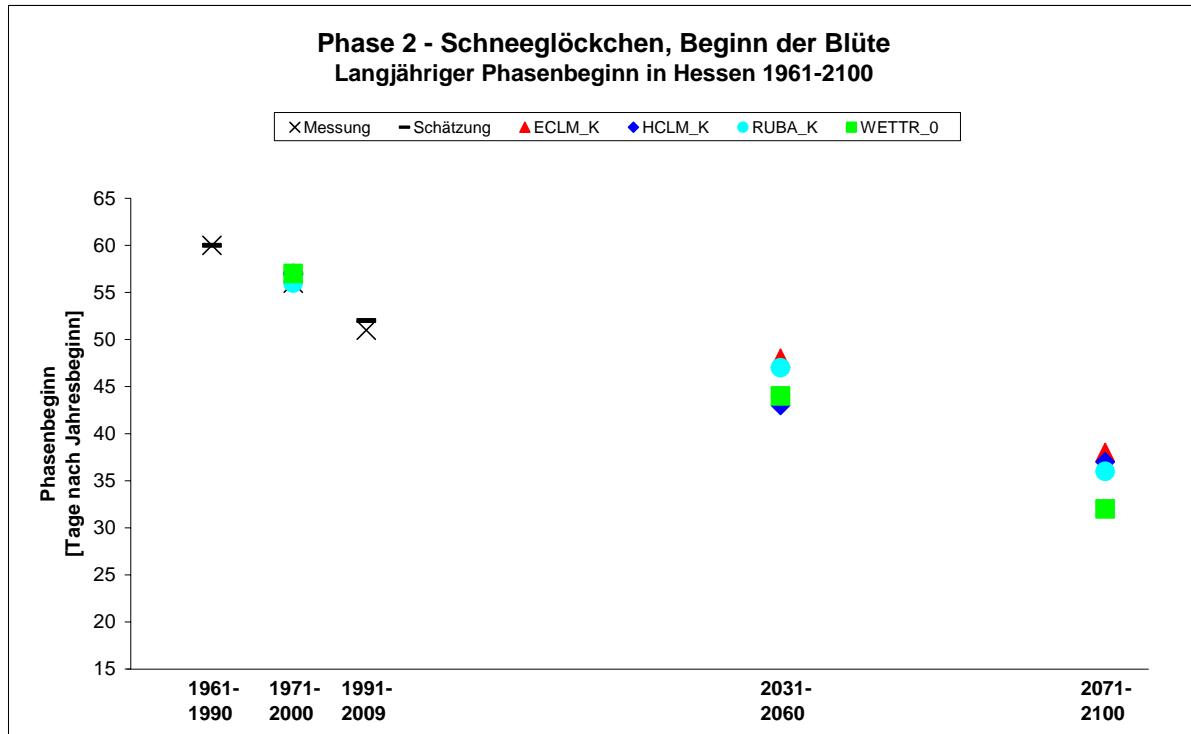


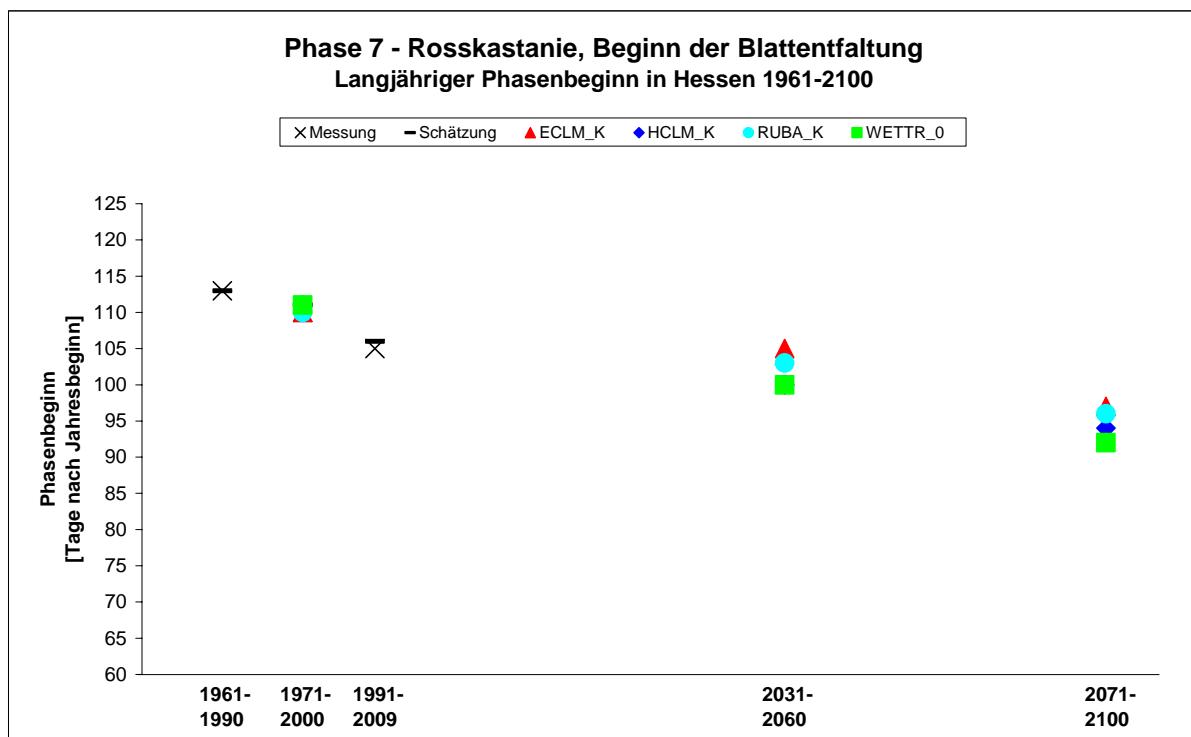
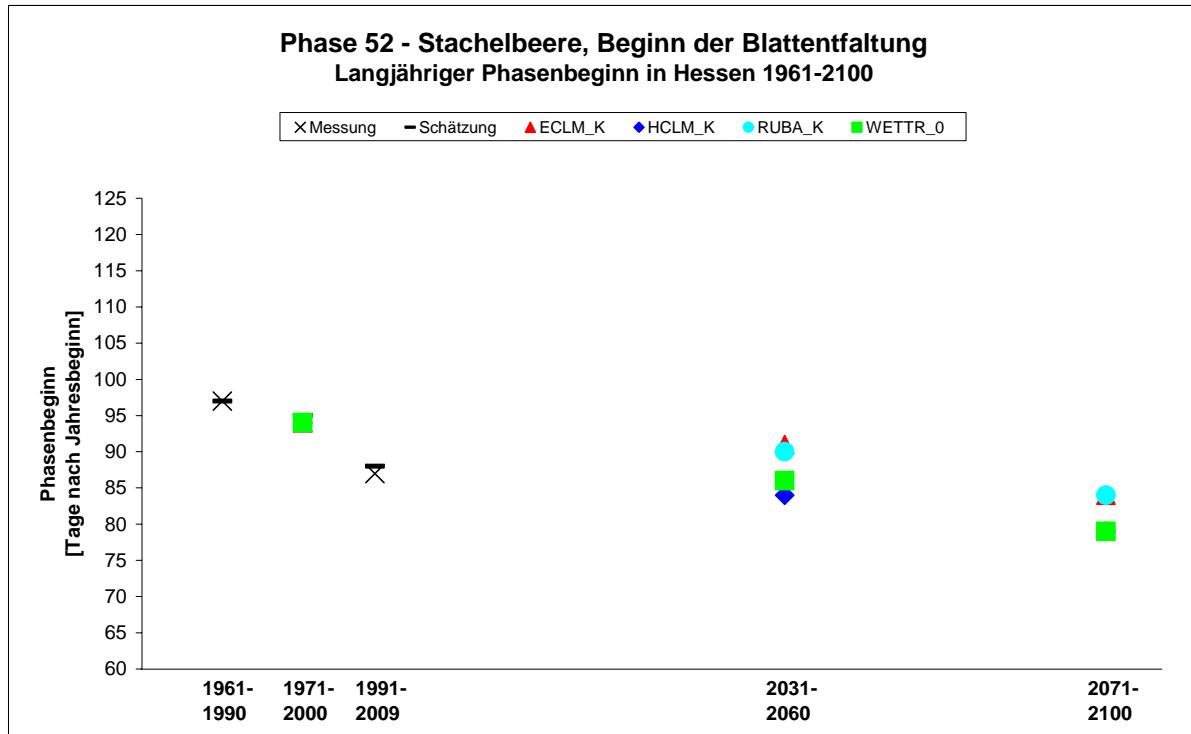


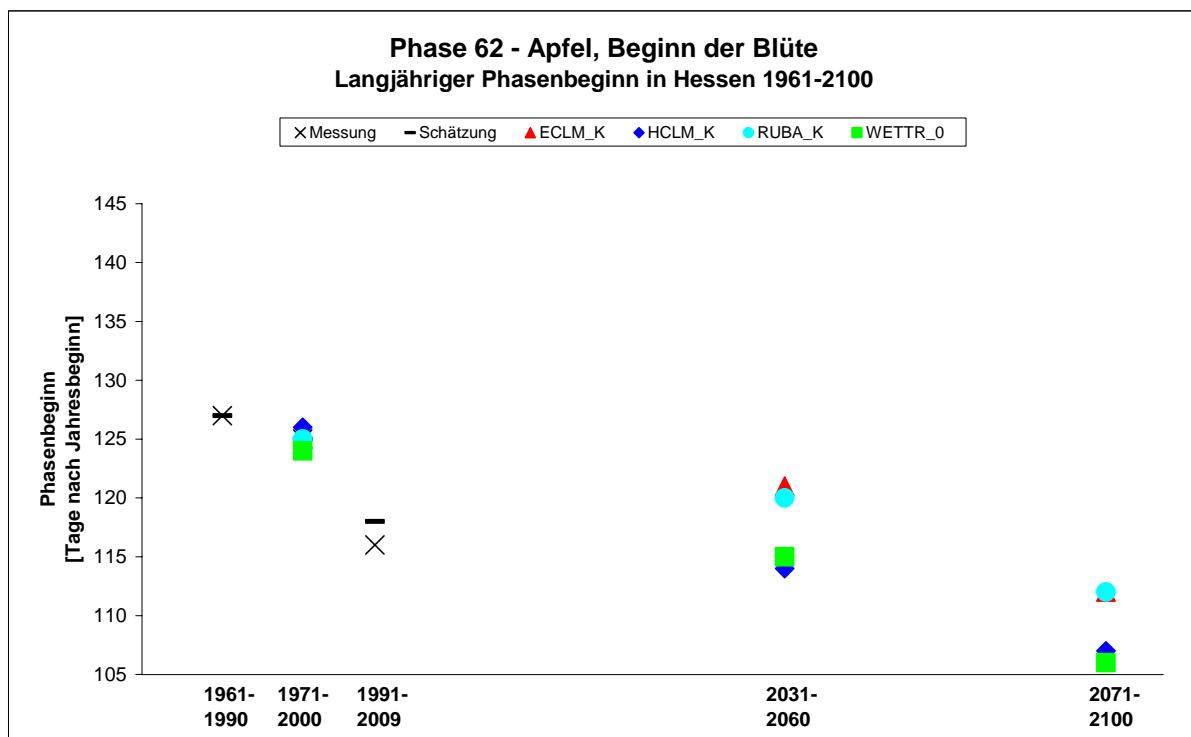
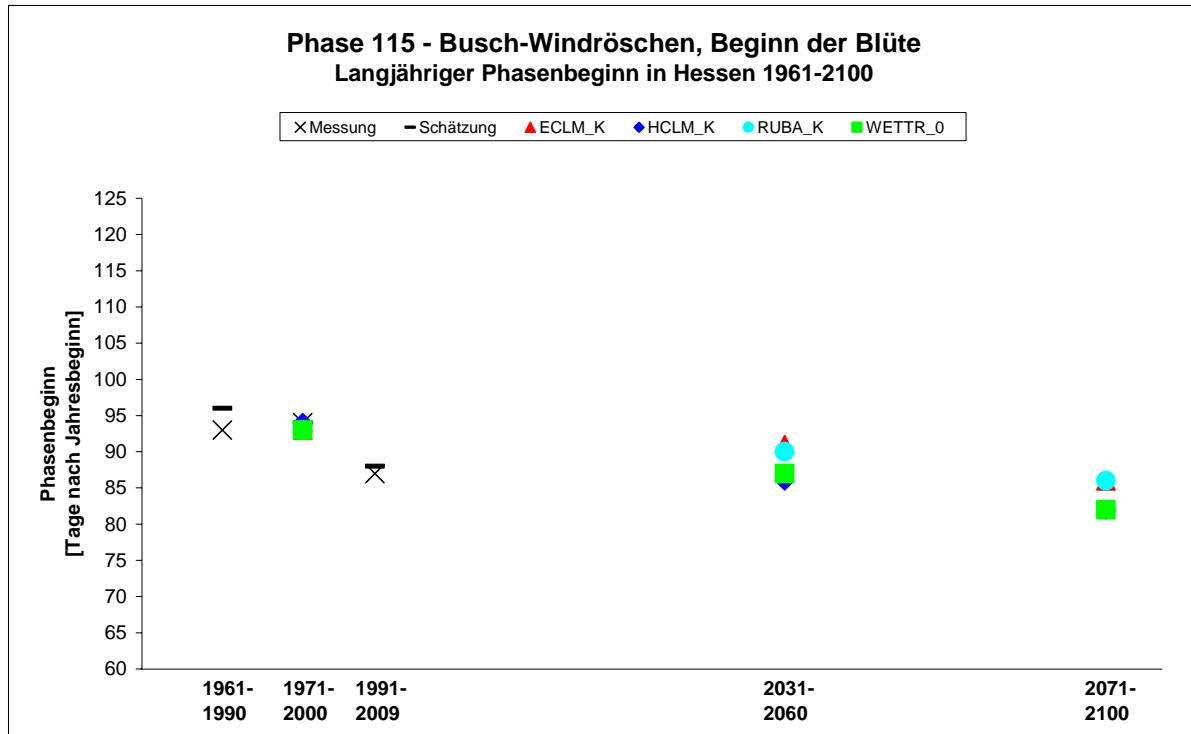


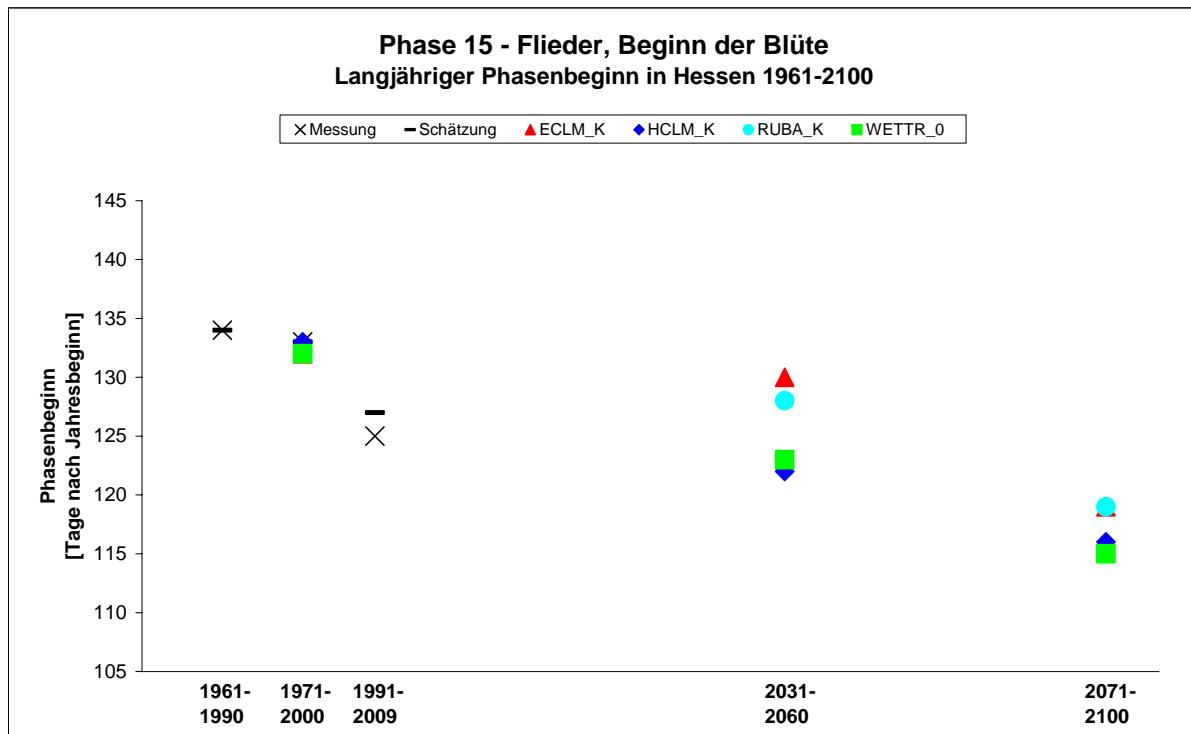
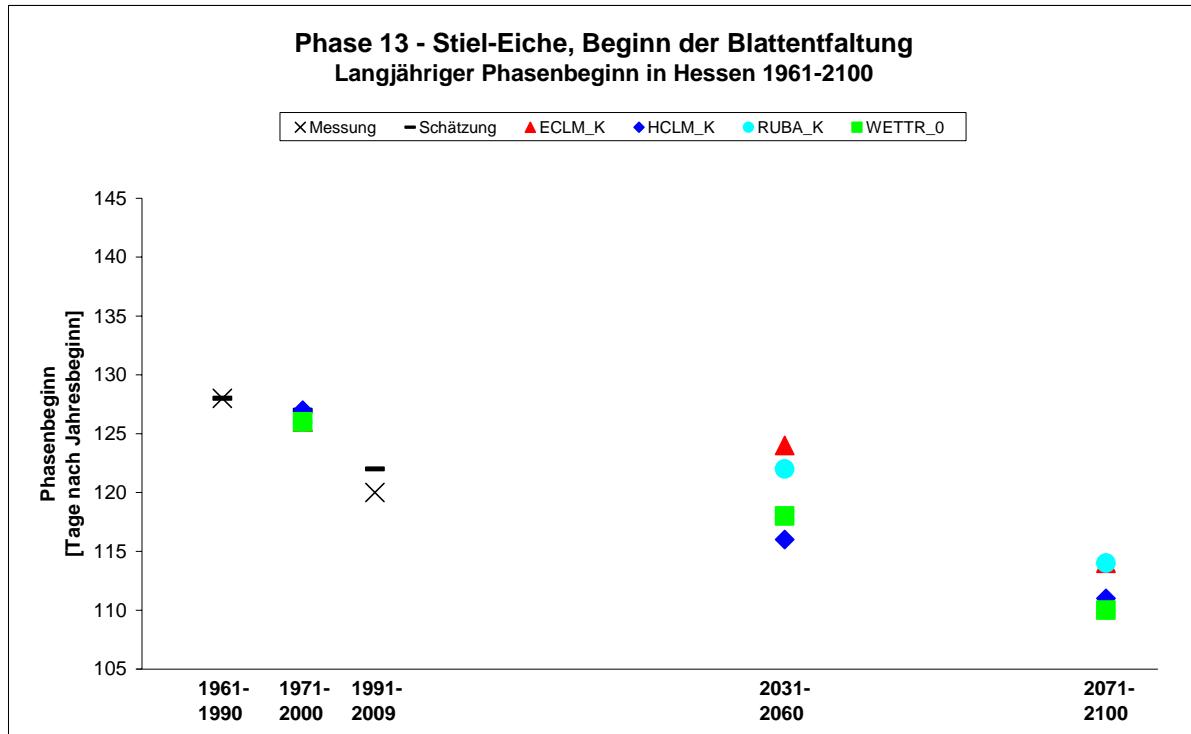
Anhang 9

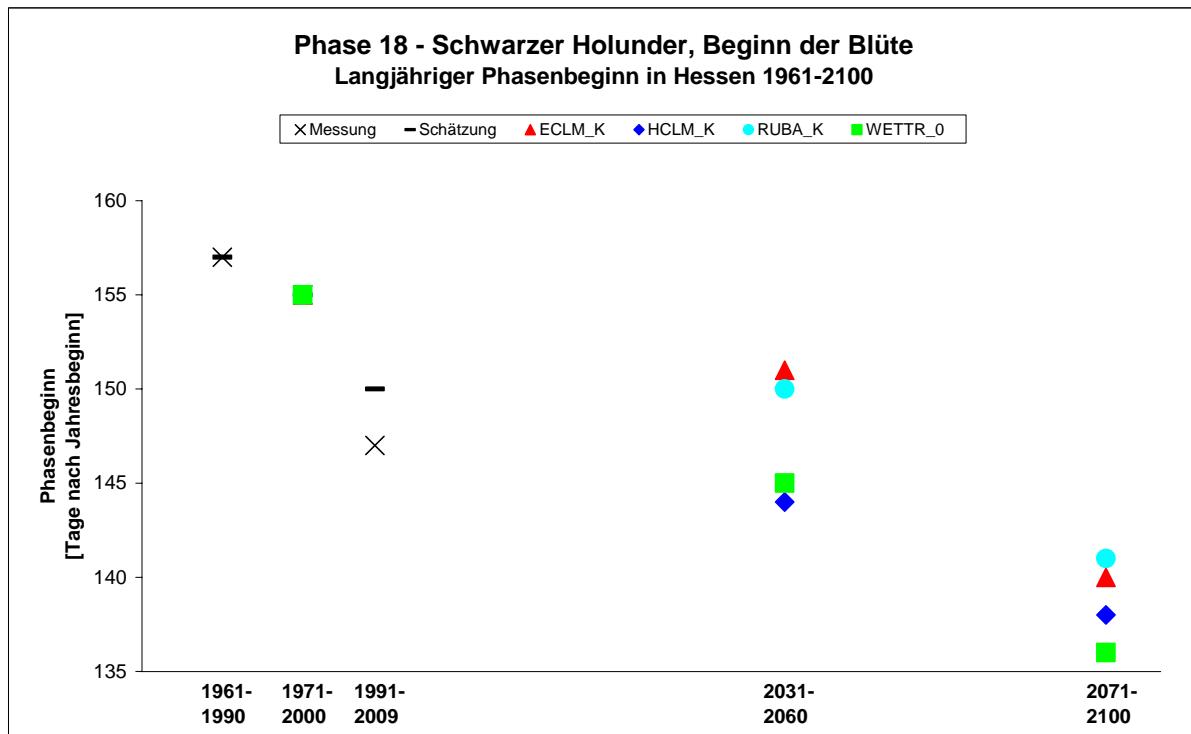
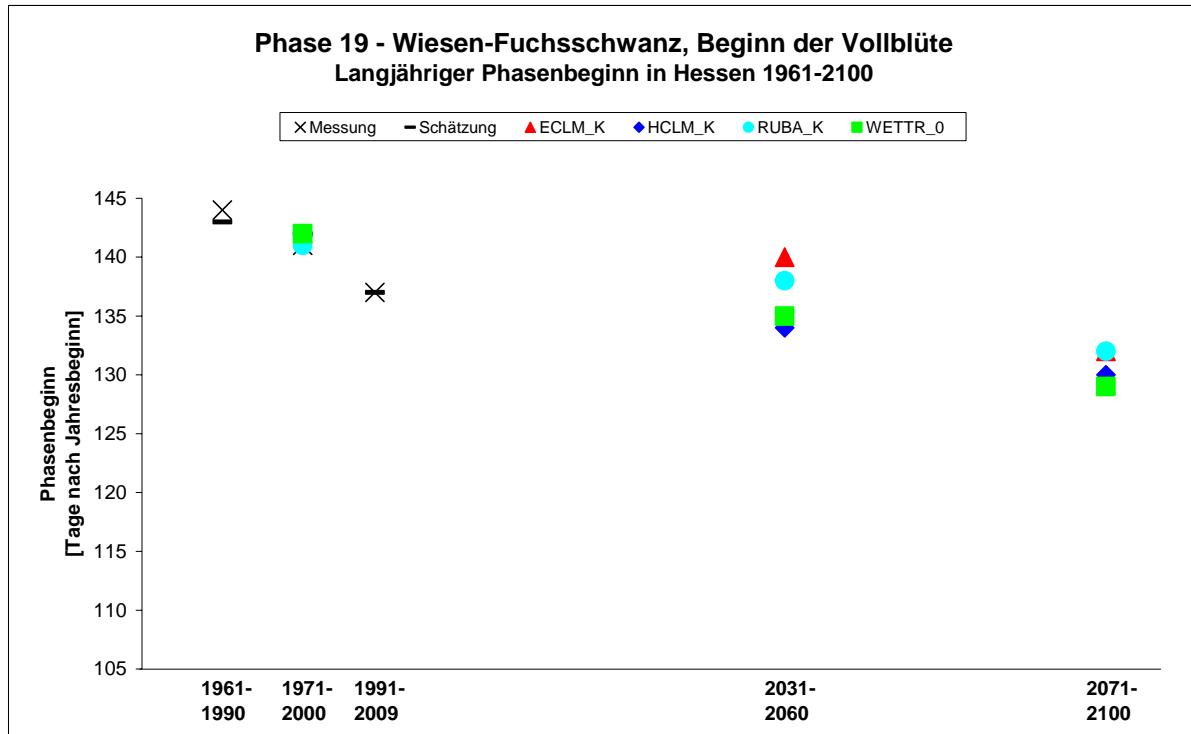
Projektion der Phänophasen:
Langjährig gemittelter Beginn ausgewählter Phänophasen in Hessen zwischen 1961 und
2100 basierend auf DWD-Messungen und vier Klimamodellen

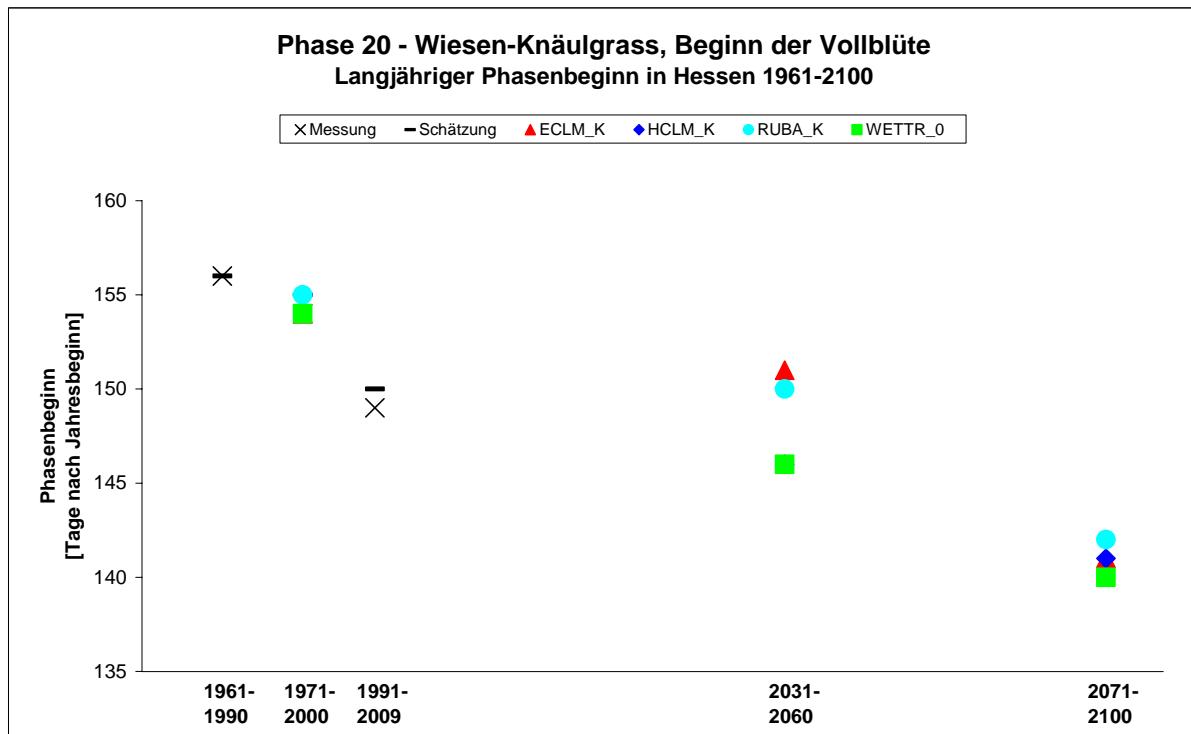
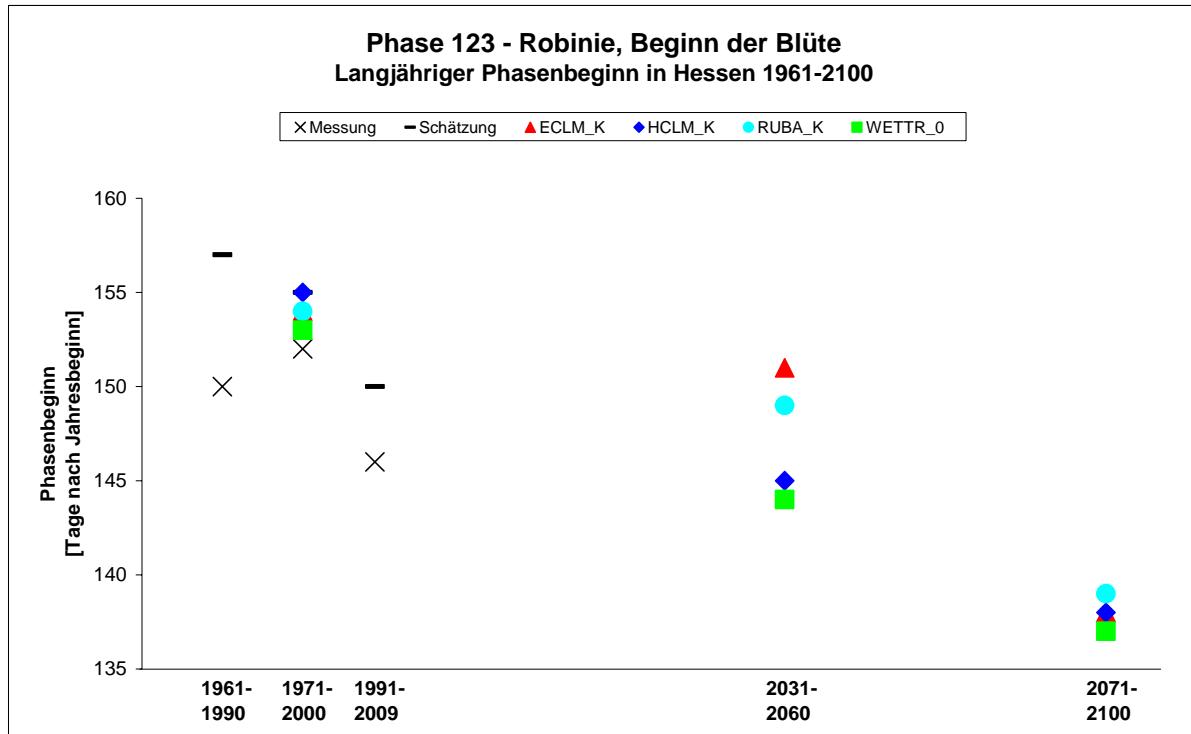


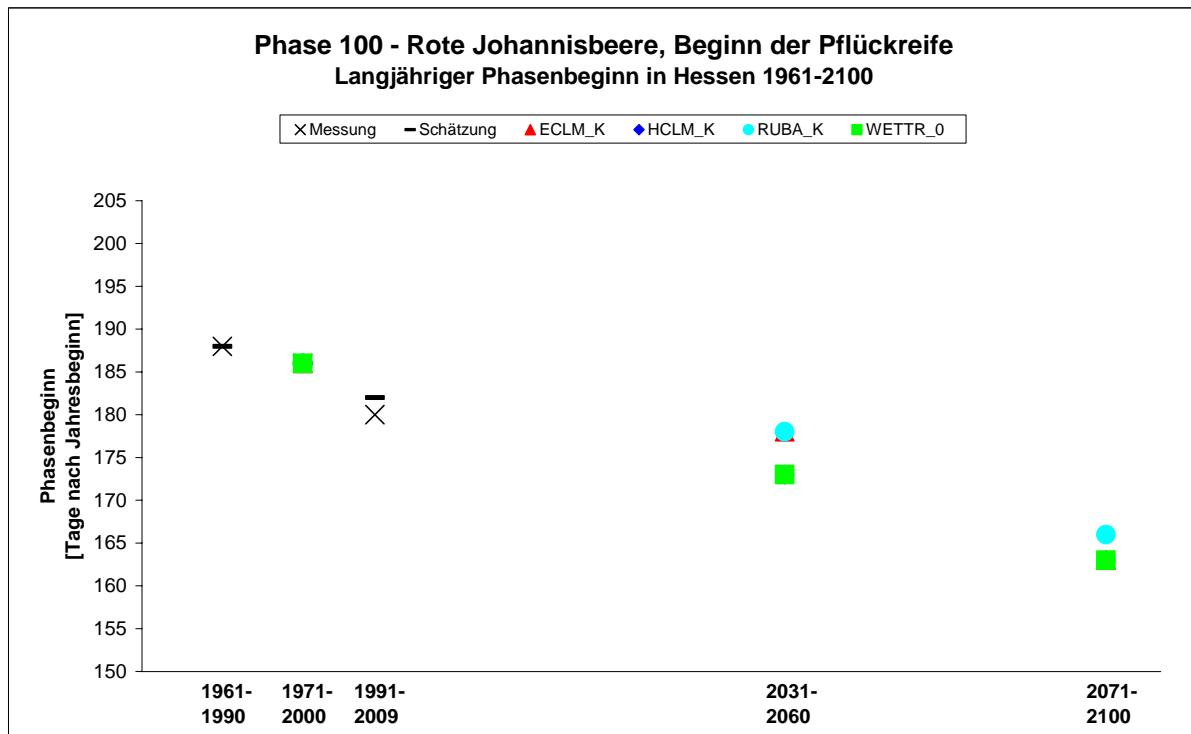
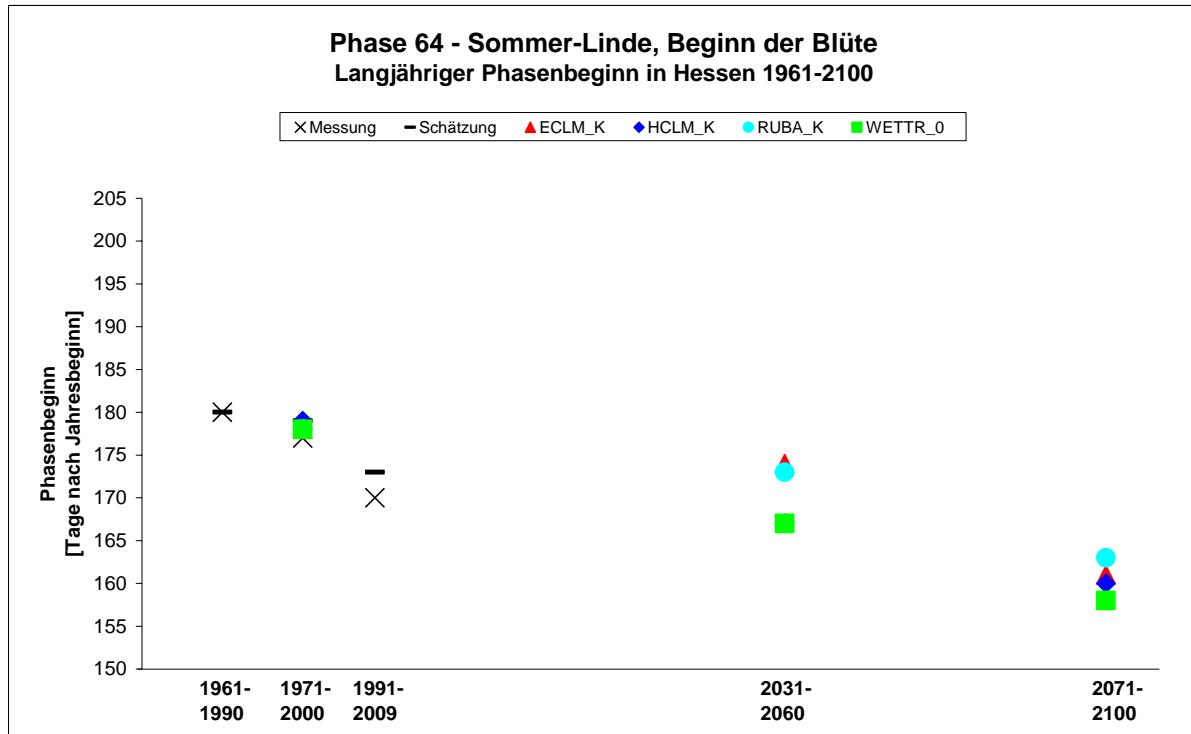


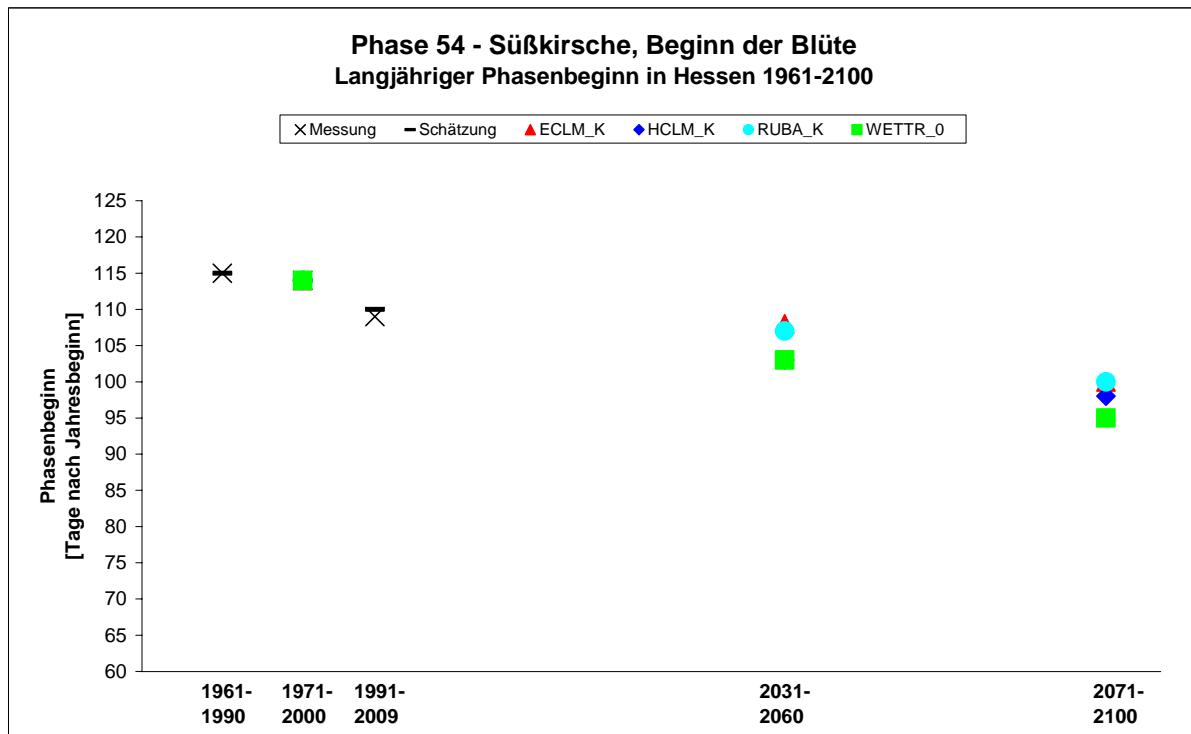
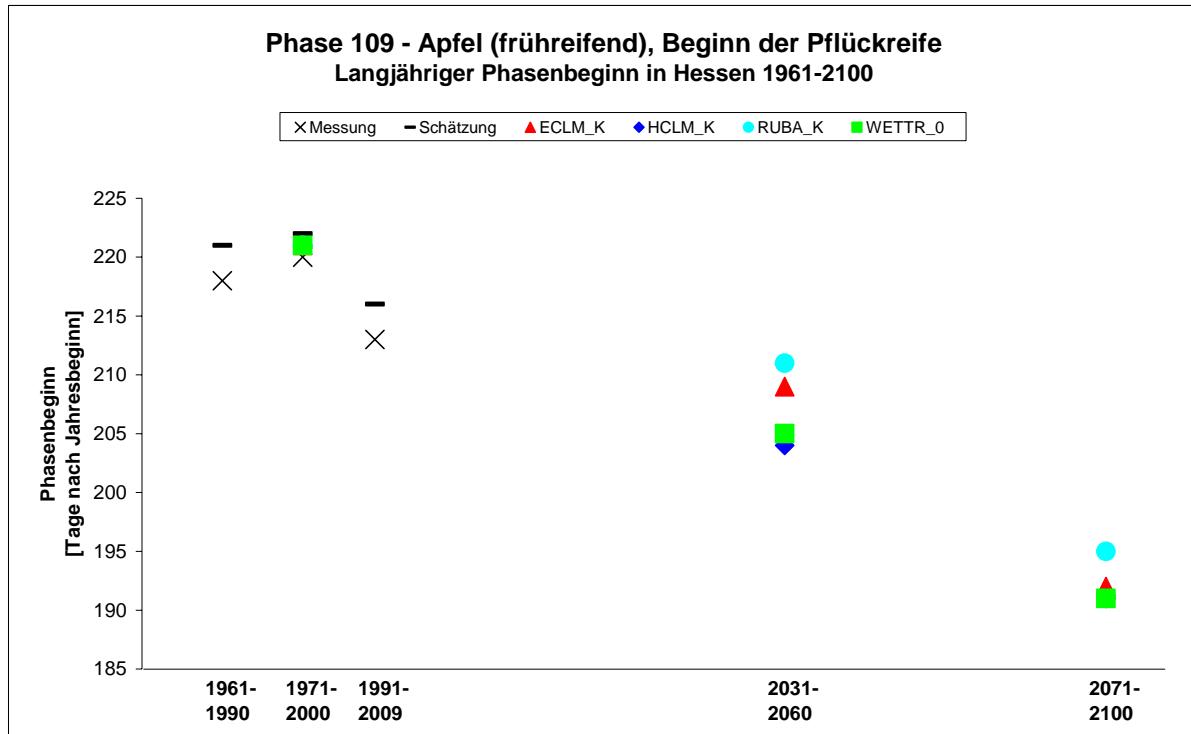


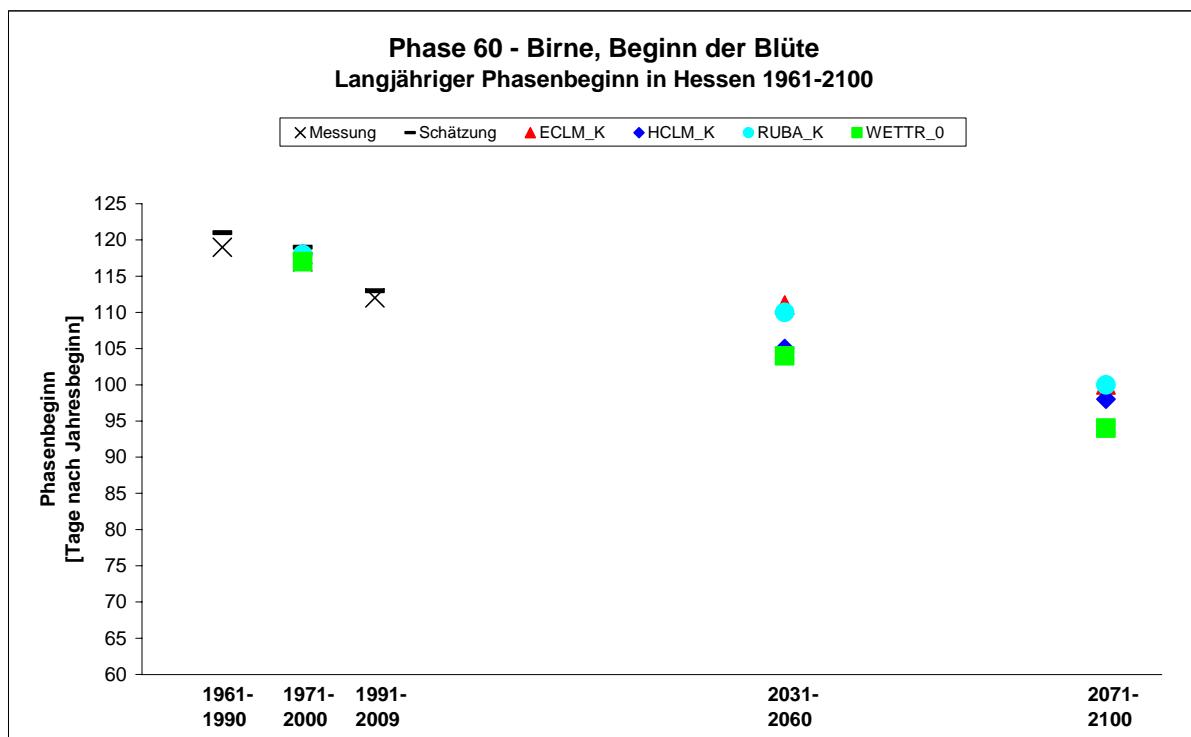
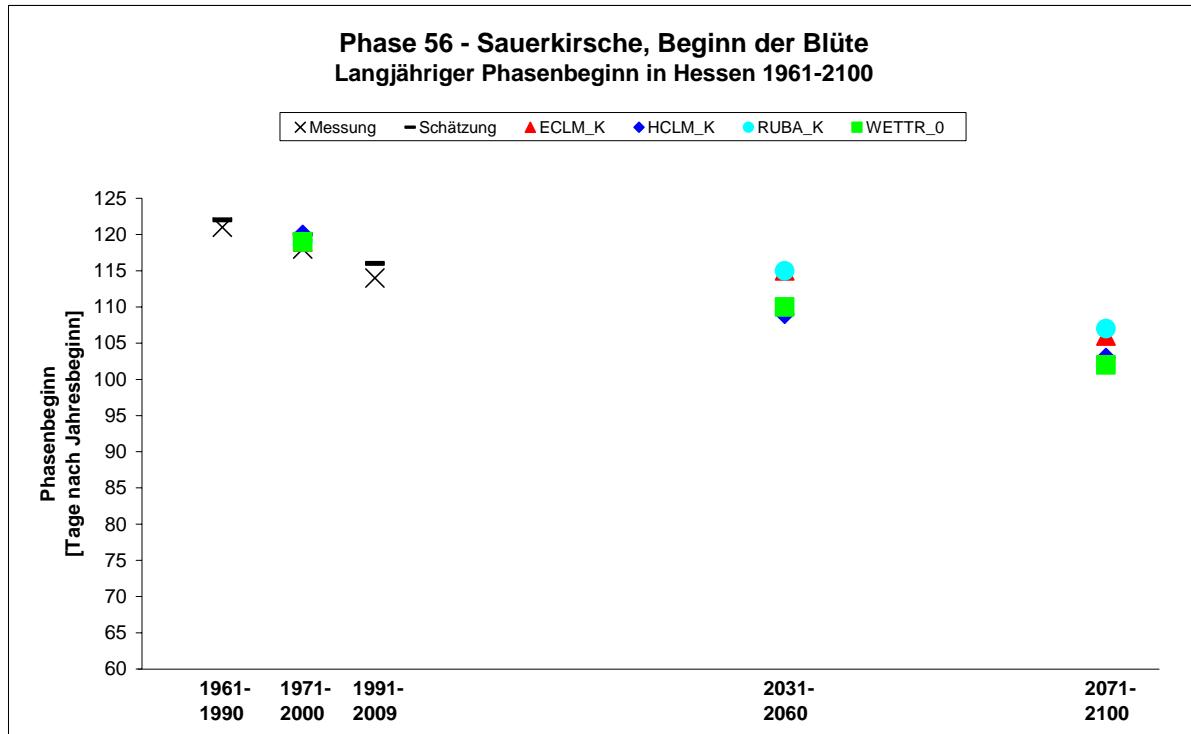




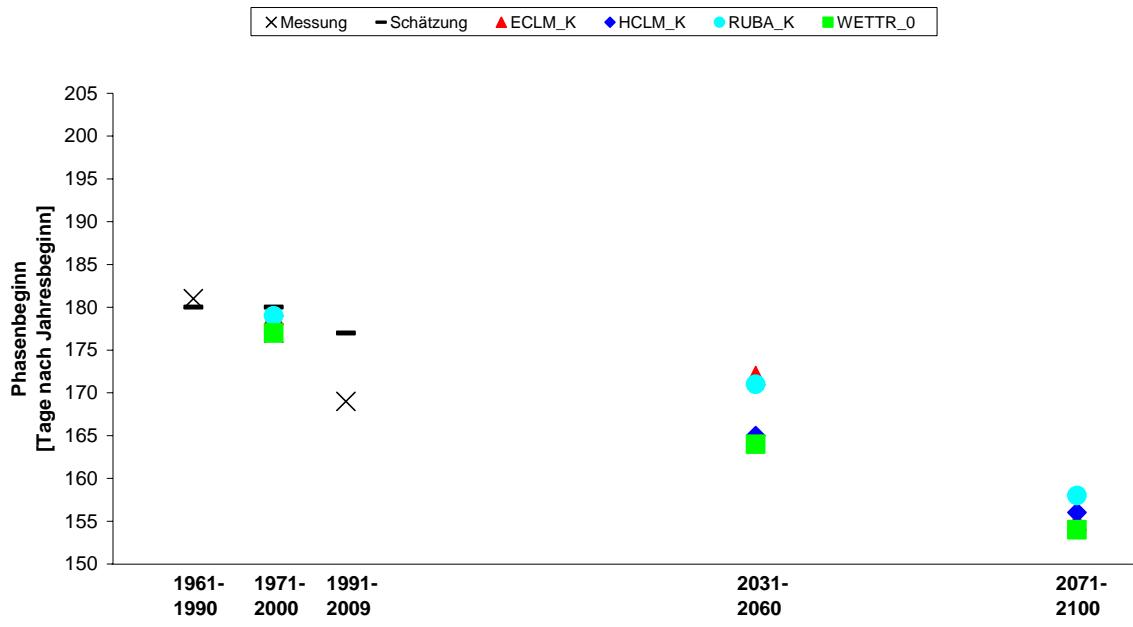




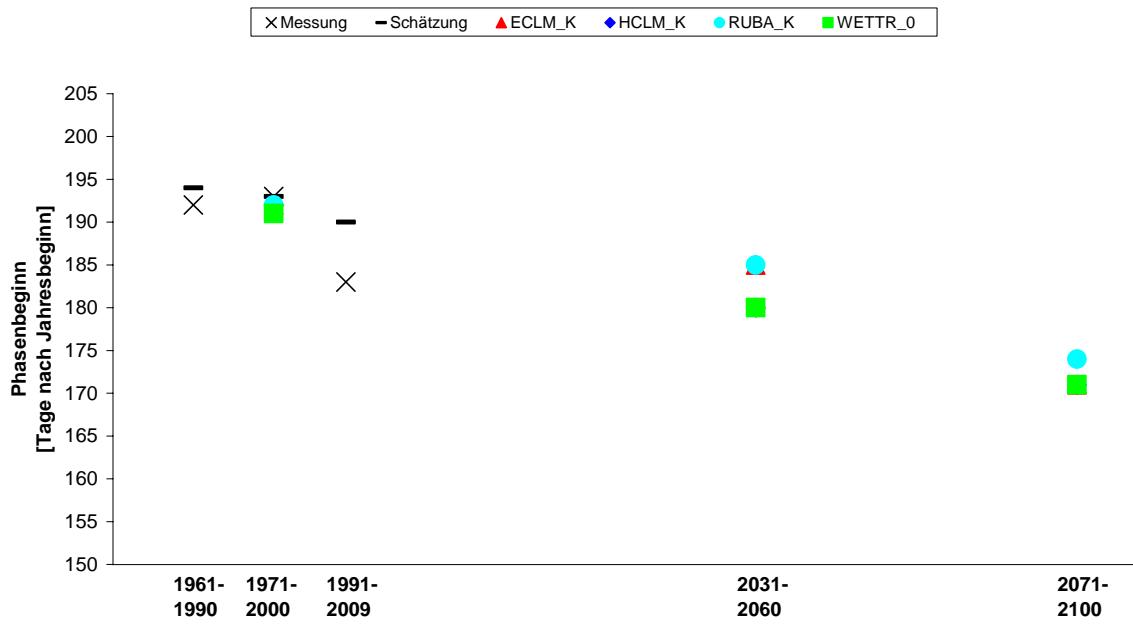


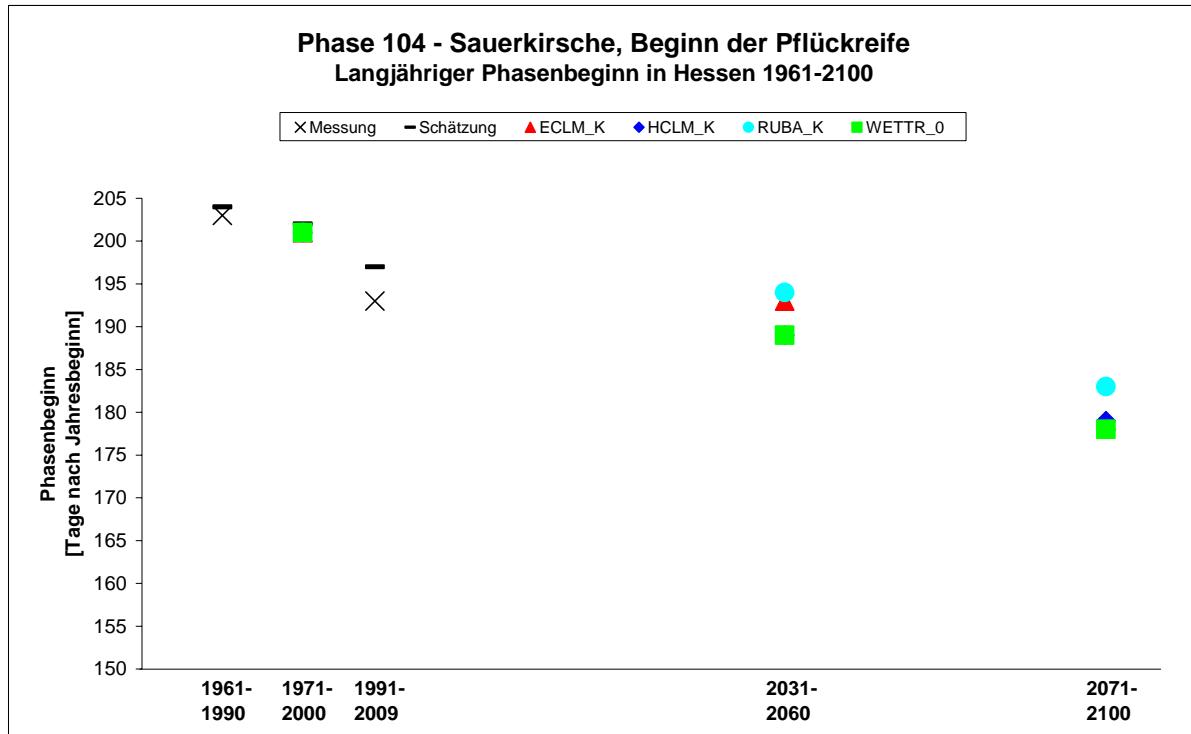


Phase 102 - Süßkirsche (frühreifend), Beginn der Pflückreife
Langjähriger Phasenbeginn in Hessen 1961-2100



Phase 103 - Süßkirsche (spätreifend), Beginn der Pflückreife
Langjähriger Phasenbeginn in Hessen 1961-2100





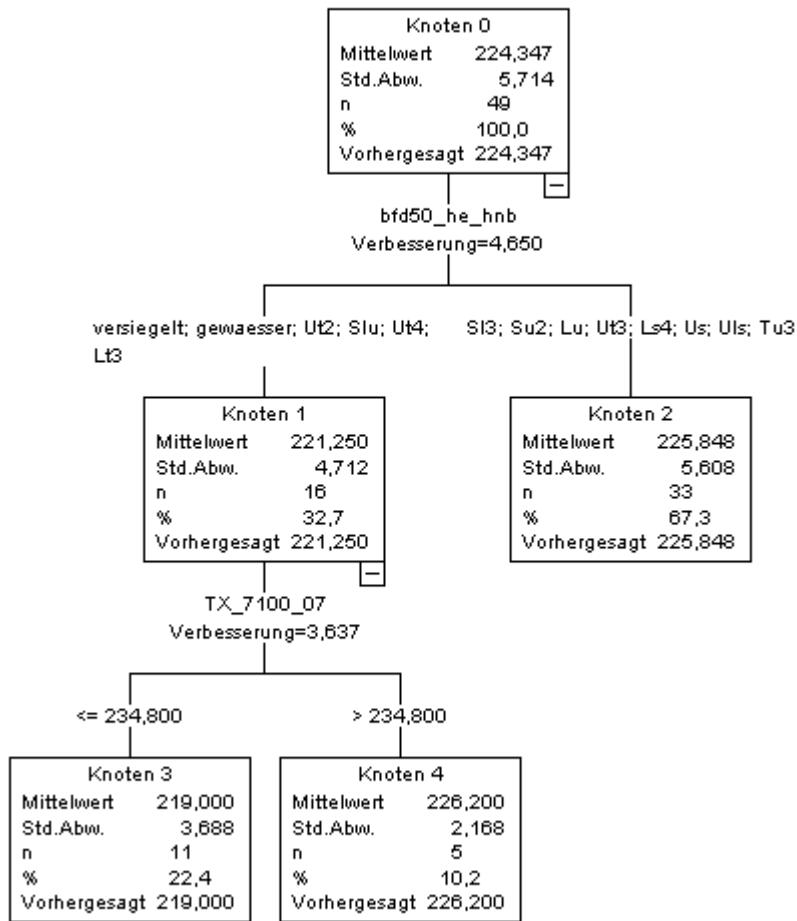
Anhang 10

Multivariate Statistik – CART-Analyse: Entscheidungsbäume ausgewählter Phänophasen für Hessen und Deutschland im Zeitraum 1971-2000

Abkürzungen der Split-Paramter in den CART-Bäumen

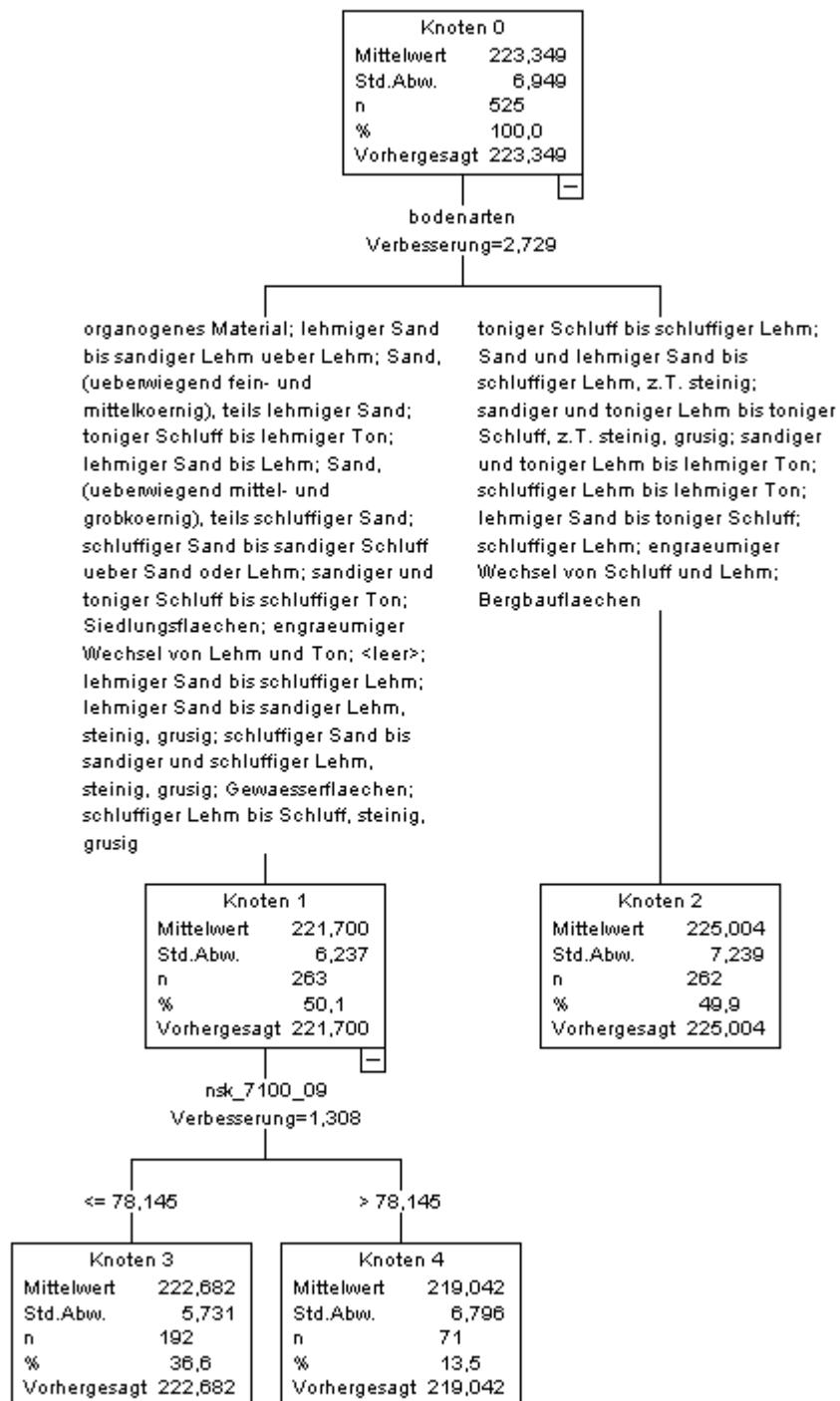
Parameter	Abkürzung
<i>Langjähriger Mittelwert der phänologischen Beobachtung</i>	MW_7100
<i>Mitteltemperatur (September 1971-2000)</i>	TP_7100_09
<i>Maximumtemperatur (September 1971-2000)</i>	TX_7100_09
<i>Minimumtemperatur (September 1971-2000)</i>	TN_7100_09
<i>Globalstrahlung (September 1971-2000)</i>	DWDGS09_GK
<i>Niederschlag (September 1971-2000)</i>	NSK_7100_09
<i>Orographische Höhe</i>	Elev_dt_gk
<i>Bodenart (BFD 50)</i>	bfd50_he_hnb
<i>Bodenart (BÜK 1000)</i>	bodenarten
<i>Nutzbare Feldkapazität bis 100 cm (BFD 50)</i>	bfd50_he_nfk
<i>Luftkapazität (BFD 50)</i>	bfd50_he_lkh
<i>k_r-Wert (BFD 50)</i>	bfd50_he_kfw

MW_7100_90



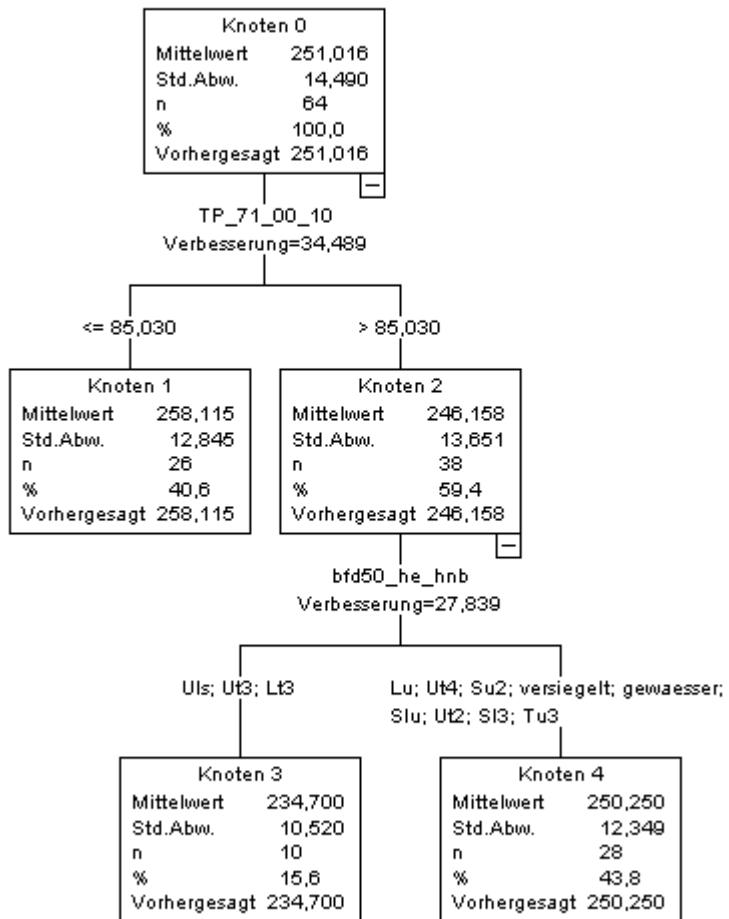
Entscheidungsbaum Phase 65 - Heide-Kraut, Beginn der Blüte, Datensatz Hessen 1971-2000

mw_7100_90



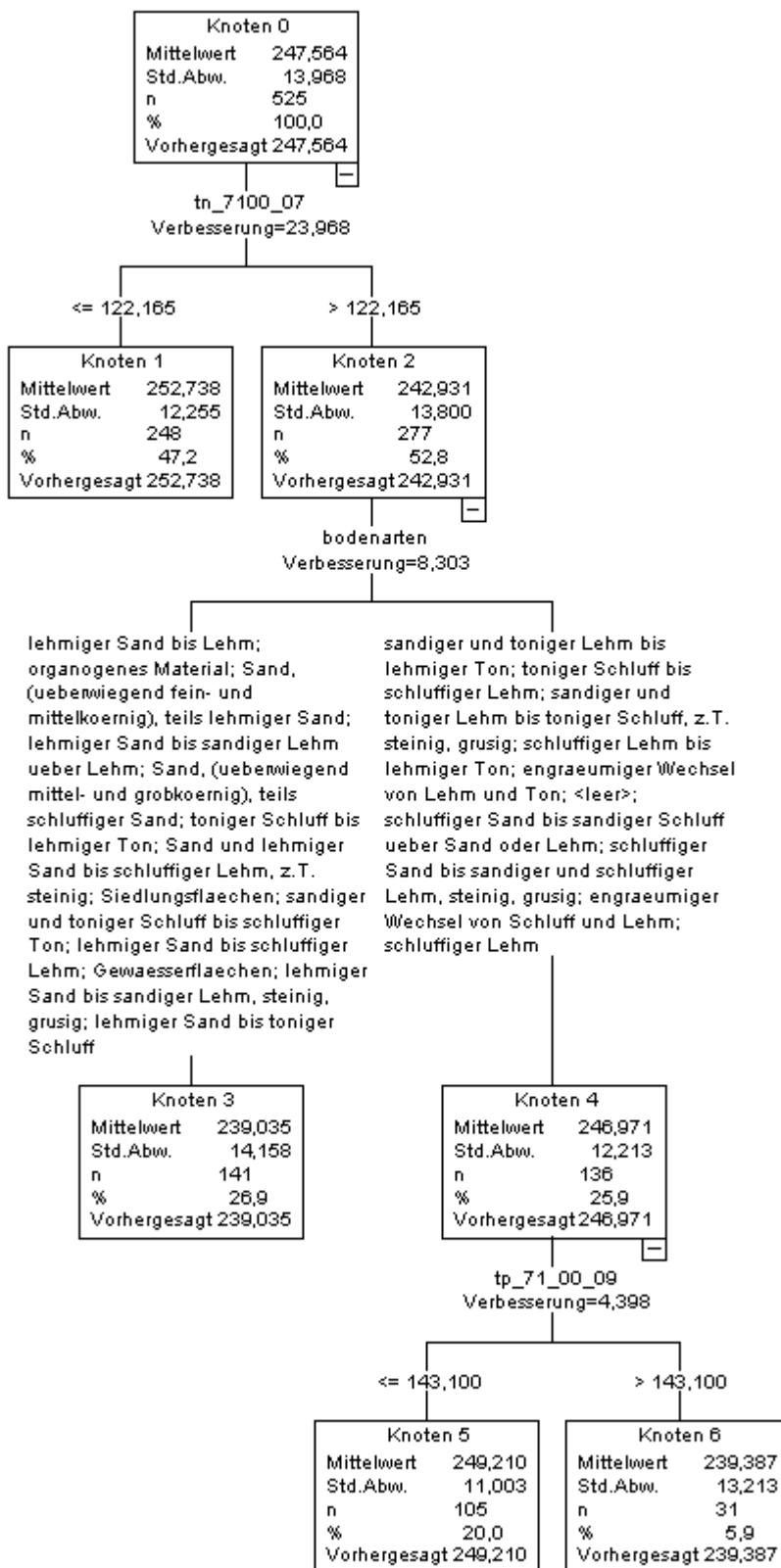
Entscheidungsbaum Phase 65 - Heide-Kraut, Beginn der Blüte, Datensatz Deutschland 1971-2000

MW_7100_90



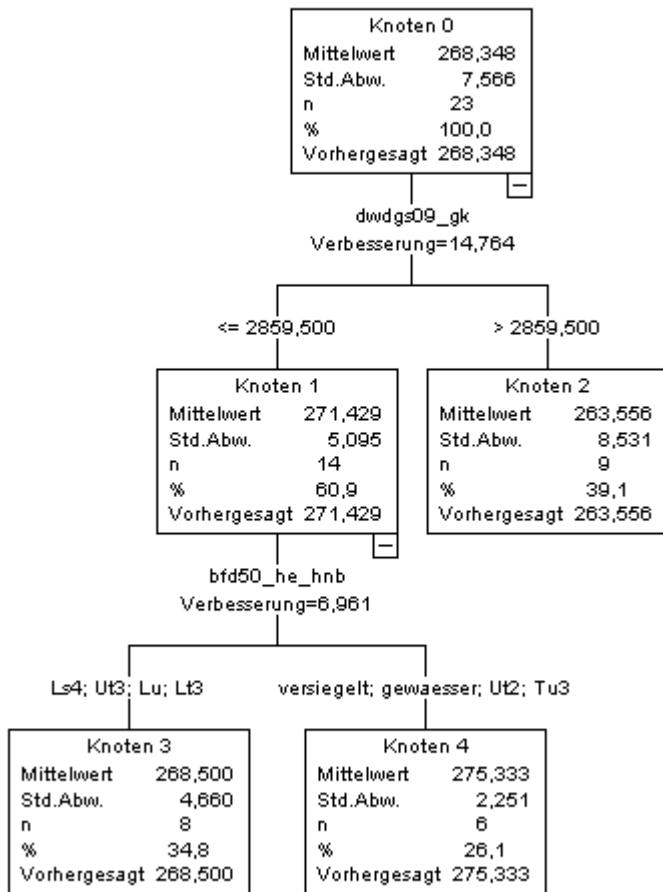
Entscheidungsbaum Phase 177 – Hunds-Rose, erste reife Früchte, Datensatz Hessen 1971-2000

mw_7100_90



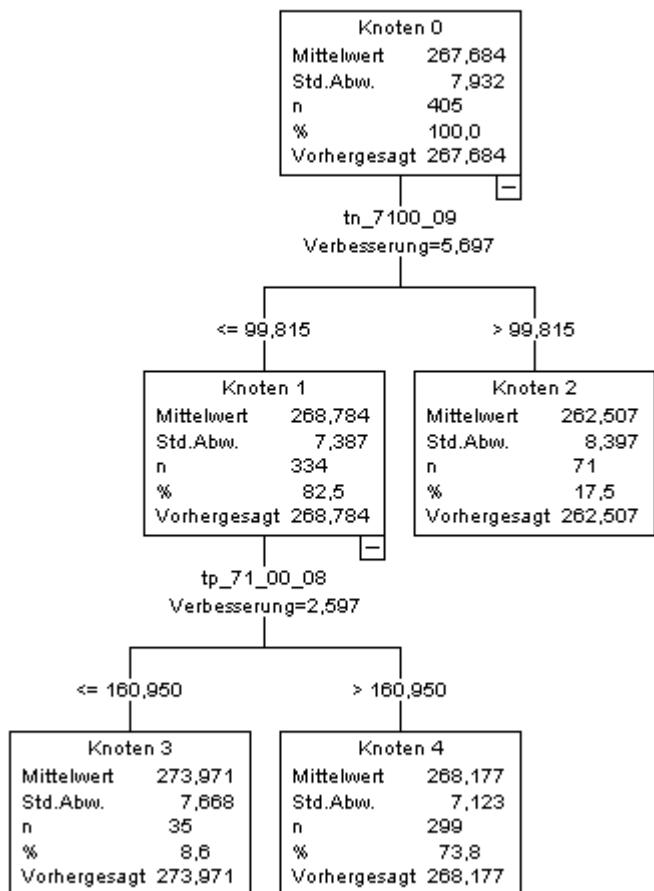
Entscheidungsbaum Phase 177 – Hunds-Rose, erste reife Früchte, Datensatz Deutschland 1971-2000

mw_7100_90



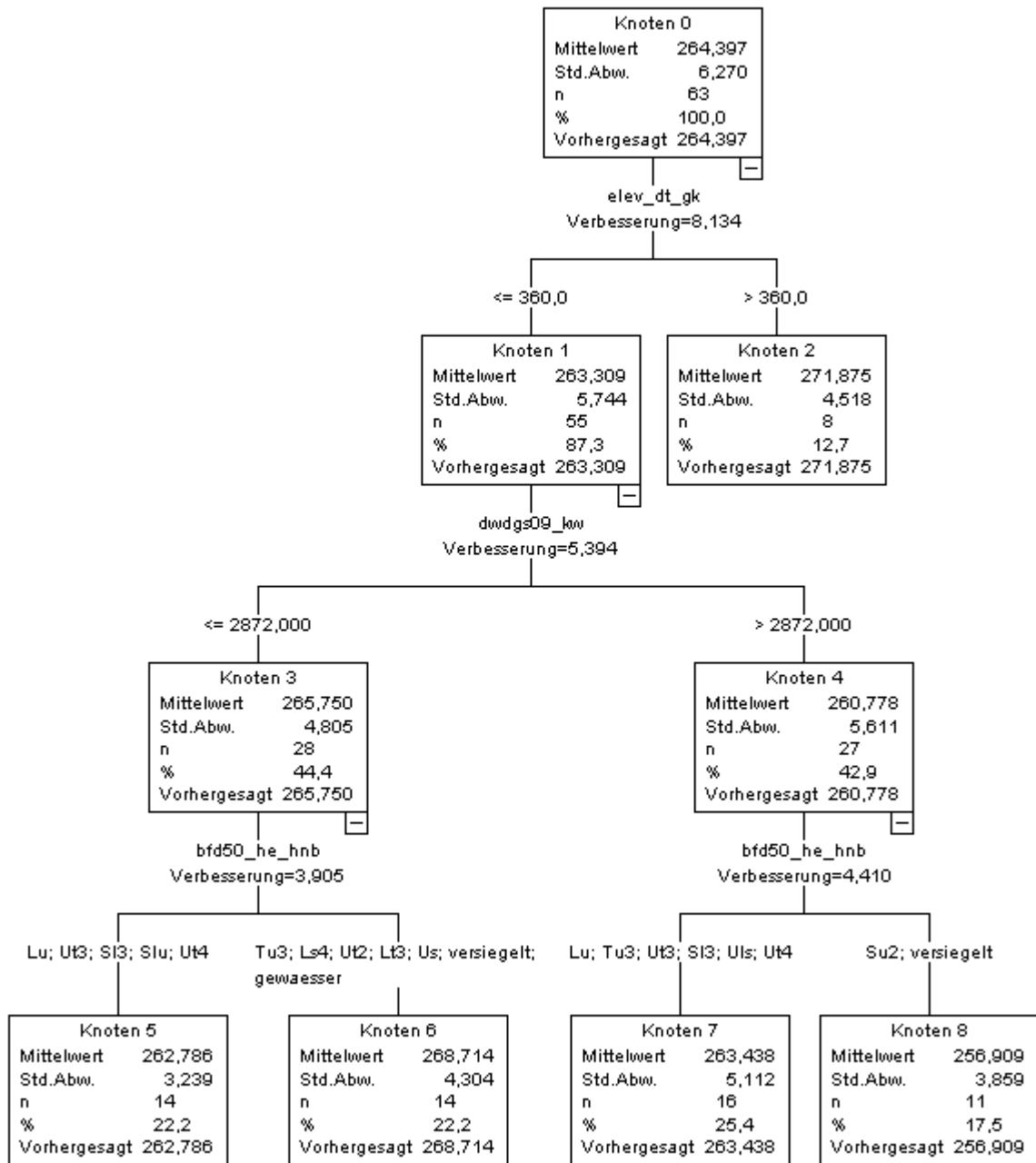
Entscheidungsbaum Phase 72 – Stiel-Eiche, erste reife Früchte, Datensatz Hessen 1971-2000

mw_7100_90

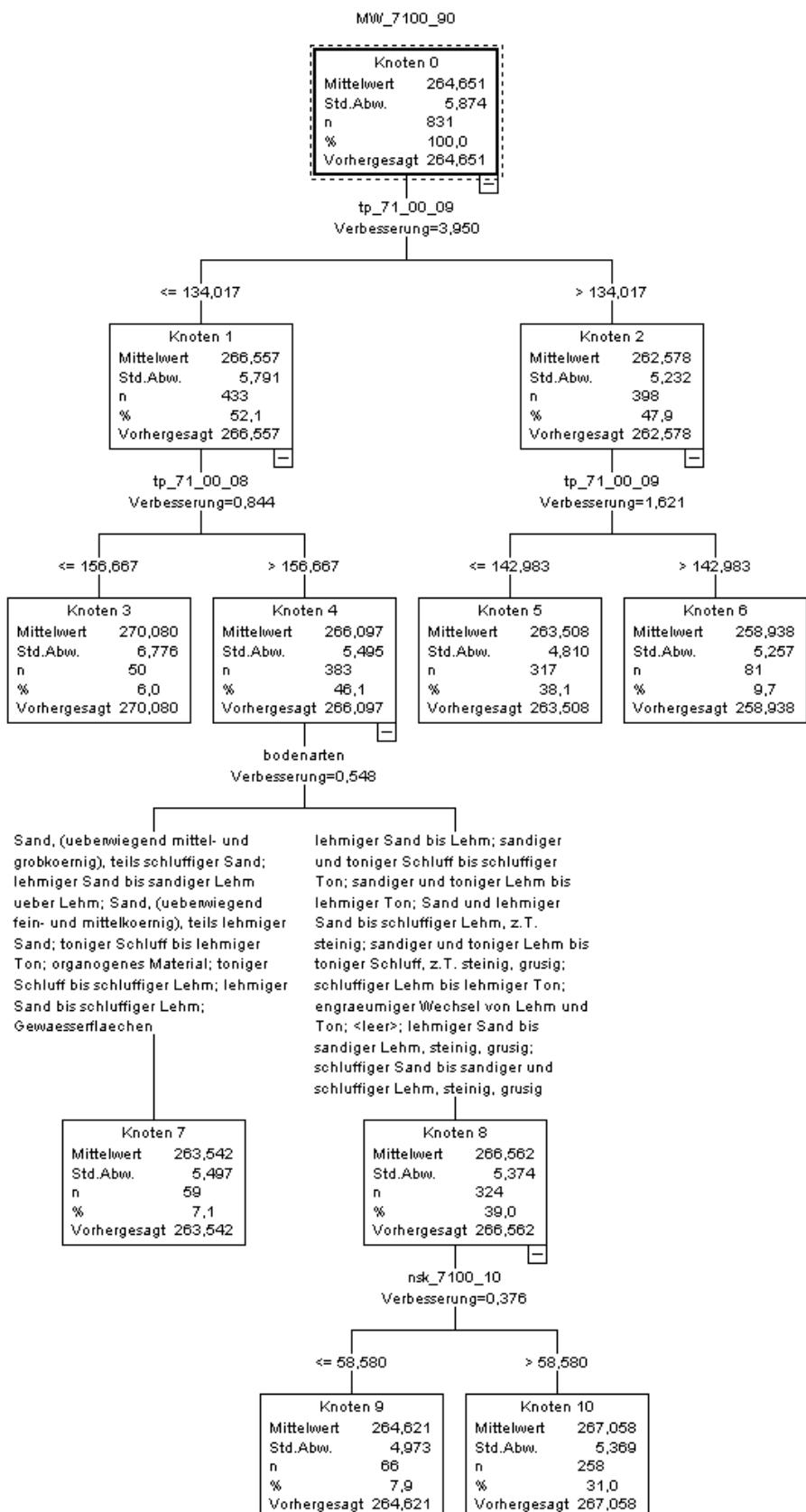


Entscheidungsbaum Phase 72 – Stiel-Eiche, erste reife Früchte, Datensatz Deutschland 1971-2000

MW_7100_90

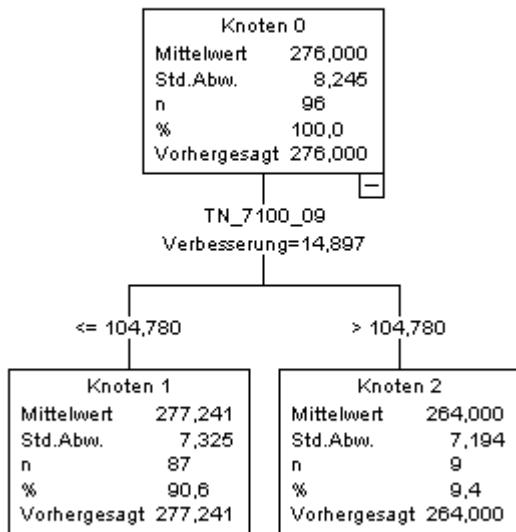


Entscheidungsbaum Phase 68 - Rosskastanie, erste reife Früchte, Datensatz Hessen 1971-2000



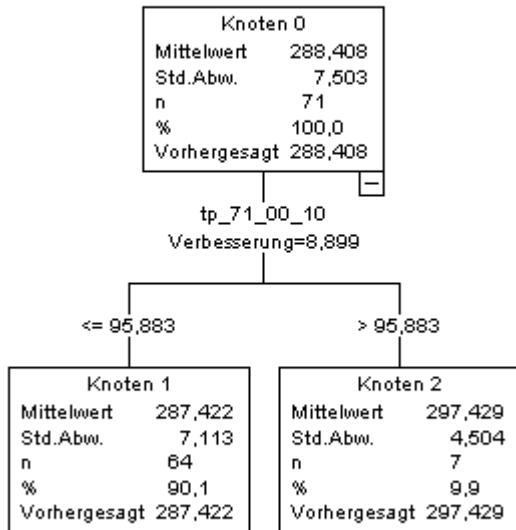
Entscheidungsbaum Phase 68 - Rosskastanie, erste reife Früchte, Datensatz Deutschland 1971-2000

MW_7100_90



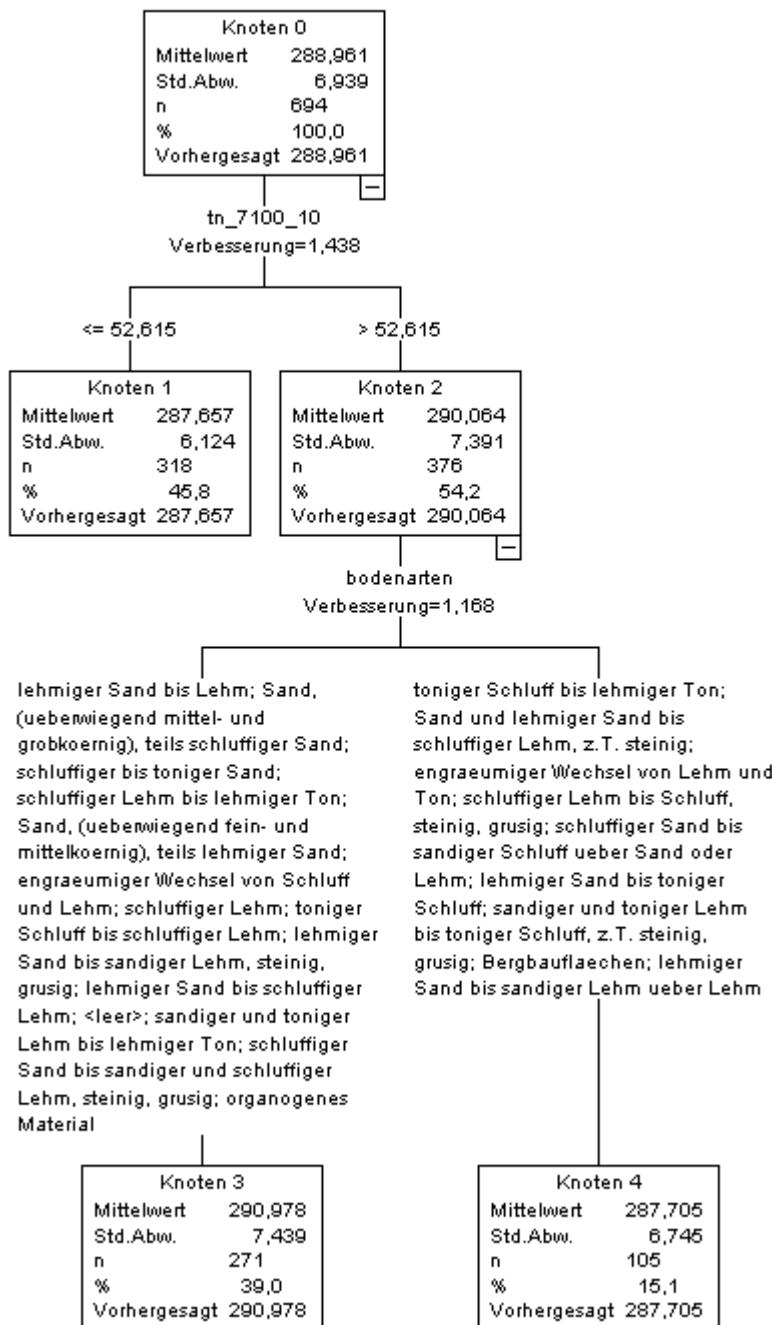
Entscheidungsbaum Phase 108 – Birne (spätreifend), Beginn der Pflückreife, Datensatz Deutschland 1971-2000

MW_7100_90



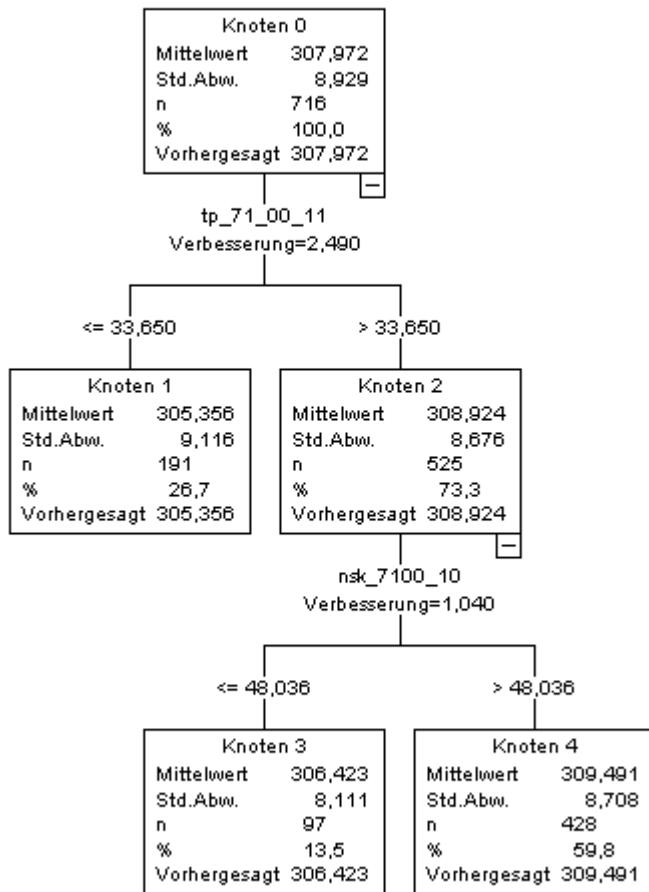
Entscheidungsbaum Phase 73 – Stiel-Eiche, Blattverfärbung, Datensatz Hessen 1971-2000

mw_7100_90



Entscheidungsbaum Phase 73 – Stiel-Eiche, Blattverfärbung, Datensatz Deutschland 1971-2000

MW_7100_90



Entscheidungsbaum Phase 226 – Stiel-Eiche, Blattfall, Datensatz Deutschland 1971-2000