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Table S1. Formalisms used to define the onset of chilling accumulation (DCA) across various studies aiming at modeling phenology in various species and location: fixed or dynamic date. Chilling models are sigmoid (Hanninen, 1990), normal (Chuine, 2000; Chuine et al., 2003), Utah (Richardson et al., 1974) and variations (smoothed Utah: Bonhomme et al., 2010, Positive Utah and positive Chill Unit for low chilling varieties: Gilreath and Buchanan, 1981), Dynamic (Fishman et al., 1987a,b), Chilling Hours (Weinberger; 1967), Bidabé (Bidabé, 1965a, b), Growing Degree Day (Ritchie and NeSmith, 1991). NH and SH mean northern and southern hemisphere, respectively.

	Onset of chilling accumulation (D_{CA})	Species	Location	Chilling model	Reference
Fixed	September 1st	Apricot Peach Walnut	France (NH)	Normal Smoothed Utah Dynamic Reverse Richardson	Chuine et al., 2016
Fixed	September 18th September 15th September 17th	Apricot	China (NH)	Chilling hours Utah Dynamic	Guo et al 2015
Fixed	October 1st (NH) April 1st (SH)	Various temperate fruit and nut species	Worldwide	Dynamic	Luedeling et al., 2011
Fixed	October 1st October 15th November 1st	Apricot	France Italy Spain (NH)	Sigmoid Growing Degree-Day Normal Smoothed Utah Bidabé	Andreini et al 2014
Fixed	November 1st November 1st November 1st July	Walnut	USA (NH)	Chilling Hours Utah Positive Utah Dynamic Model	Luedeling et al., 2009
Fixed	May 1st	Nectarine Peach	Argentina (SH)	Chilling Hours Utah Positive Chill Unit Dynamic	Maulion et al 2014
Fixed or dynamic	May 1st Appearance of chilling portion.	Cherry	Australia (SH)	Dynamic	Measham et al., 2017
Dynamic	Appearance of chilling portion. First day after the largest negative accumulation	Peach	La Réunion (France ; SH)	Dynamic Utah Modified Utah	Balandier et al 1993
Dynamic	First day after the largest negative accumulation	Almond	Spain (NH)	Utah	Alonso et al 2005
Dynamic	Leaf fall (BBCH 97).	Cherry	Germany (NH)	Dynamic	Chmielewski, et al 2017
Dynamic	Consistent chilling accumulation and rare occurrence of chilling negation	Apricot	Spain (NH)	Chilling Hours Utah Dynamic	Campoy et al., 2012
Dynamic	Leaf fall (BBCH 97).	Cherry	Australia (NH)	Chilling Hours Dynamic	Measham et al., 2014

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Table S2 Optimized parameters for different D_{CA} computations in *Juglans regia* cv Franquette. The other parameters of the model were kept as the version calibrated on walnut using DCA = 244 (Charrier et al., 2018).

			Endodormancy Release date	Budburst date	Frost Hardiness					
Type	Function	D_{CA}	CU_{crit}	FU_{crit}	T_1	T_2	NL_1	NL_2	δ	τ
Fixed		182 (Jul. 1st)	2756	19.92	27.6	-29.3	11.2	14.2	0.564	29.8
		192 (Jul. 11th)	2683	20.03	29.1	-30.1	11.4	14.2	0.571	30.0
		202 (Jul.21st)	2632	19.83	30.1	-31.0	11.4	14.2	0.575	30.2
		213 (Aug. 1st)	2565	19.83	31.4	-31.8	11.5	14.2	0.583	30.0
		223 (Aug. 11th)	2499	20.03	31.9	-31.2	11.6	14.2	0.596	29.6
		233 (Aug. 21st)	2417	20.15	33.2	-31.3	11.7	14.2	0.606	29.4
		244 (Sep. 1st)	2306	20.72	34.9	-30.5	12.0	14.2	0.625	28.8
		254 (Sep. 11th)	2231	20.44	48.6	-38.6	13.5	13.5	0.679	28.9
		264 (Sep. 21st)	2141	20.51	50.0	-37.9	13.5	13.5	0.706	28.0
		274 (Oct. 1st)	2005	20.53	50.0	-34.7	13.5	13.5	0.731	27.4
		284 (Oct. 11th)	1893	20.55	50.0	-32.4	13.5	13.5	0.765	25.0
		294 (Oct. 21st)	1738	20.67	47.5	-28.7	13.5	13.5	0.805	21.0
		305 (Nov. 1st)	1567	20.90	35.9	-19.0	13.5	13.5	0.848	13.1
		315 (Nov. 11th)	1381	21.09	32.4	-18.3	13.5	13.5	0.796	8.1
		325 (Nov. 21st)	1213	20.92	34.7	-23.2	13.5	13.5	0.723	5.5
		335 (Dec. 1st)	1001	21.19	41.6	-29.6	13.5	13.5	0.701	4.3
Dynamic	Simple	FF	1627	19.59	31.9	-15.7	13.1	14.8	0.836	6.6
		T_{min}	2751	19.93	24.9	-12.3	13.8	13.9	0.818	11.1
		T_{mean}	2756	19.94	24.9	-12.2	13.8	14.0	0.818	11.3
		Photoperiod	2574	20.45	25.4	-12.9	13.8	14.0	0.820	11.2
	Complex	CU_{min}	1970	20.23	26.9	-12.1	14.3	14.3	0.868	9.8
		LFT_{ori}	1666	19.83	37.7	-18.3	13.8	14.9	0.898	8.6
		LFT_{mod}	2043	20.02	29.4	-15.0	13.9	14.1	0.847	11.2
		$LFPT_{ori}$	1578	20.40	37.7	-16.8	13.9	13.9	0.947	9.4
		$LFPT_{mod}$	2300	20.41	26.6	-13.4	13.9	13.9	0.826	12.0
		DP_{ori}	1435	20.52	43.9	-19.4	14.2	14.2	0.974	6.0
		DP_E	2299	20.41	26.5	-13.5	13.7	13.7	0.816	13.8
		DP_L	1342	21.12	43.4	-20.0	13.9	15.2	0.938	7.0

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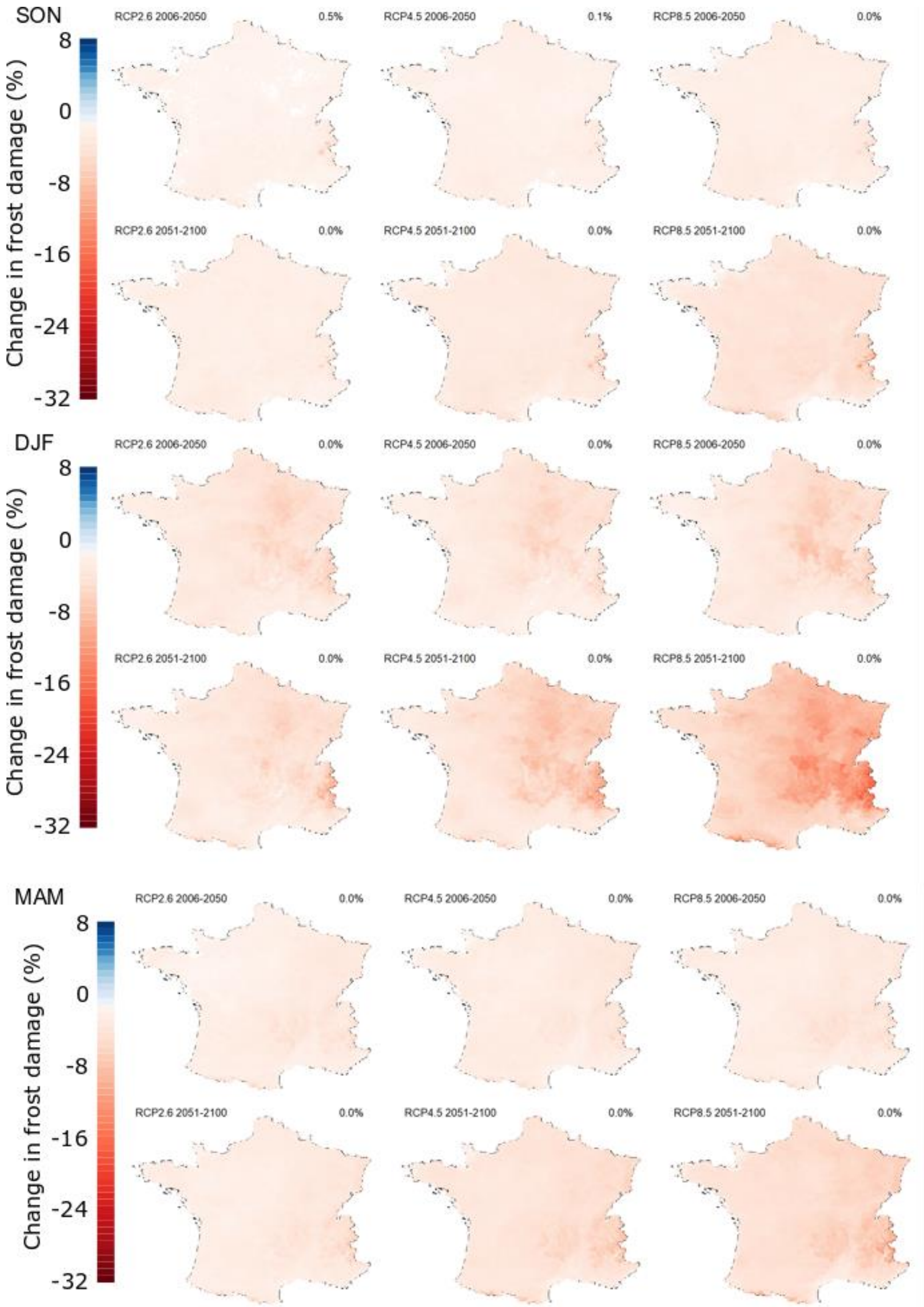

Figure S1. Relative change in predicted average frost damages across France according to different climatic *scenarii* (RCP 2.6, RCP 4.5, RCP 8.5), seasons (Early SON, Midwinter DJF and late risks MAM) and time periods (2006-2050 and 2051-2100). Lower and higher damages than the current mean are represented in in red and blue, respectively).

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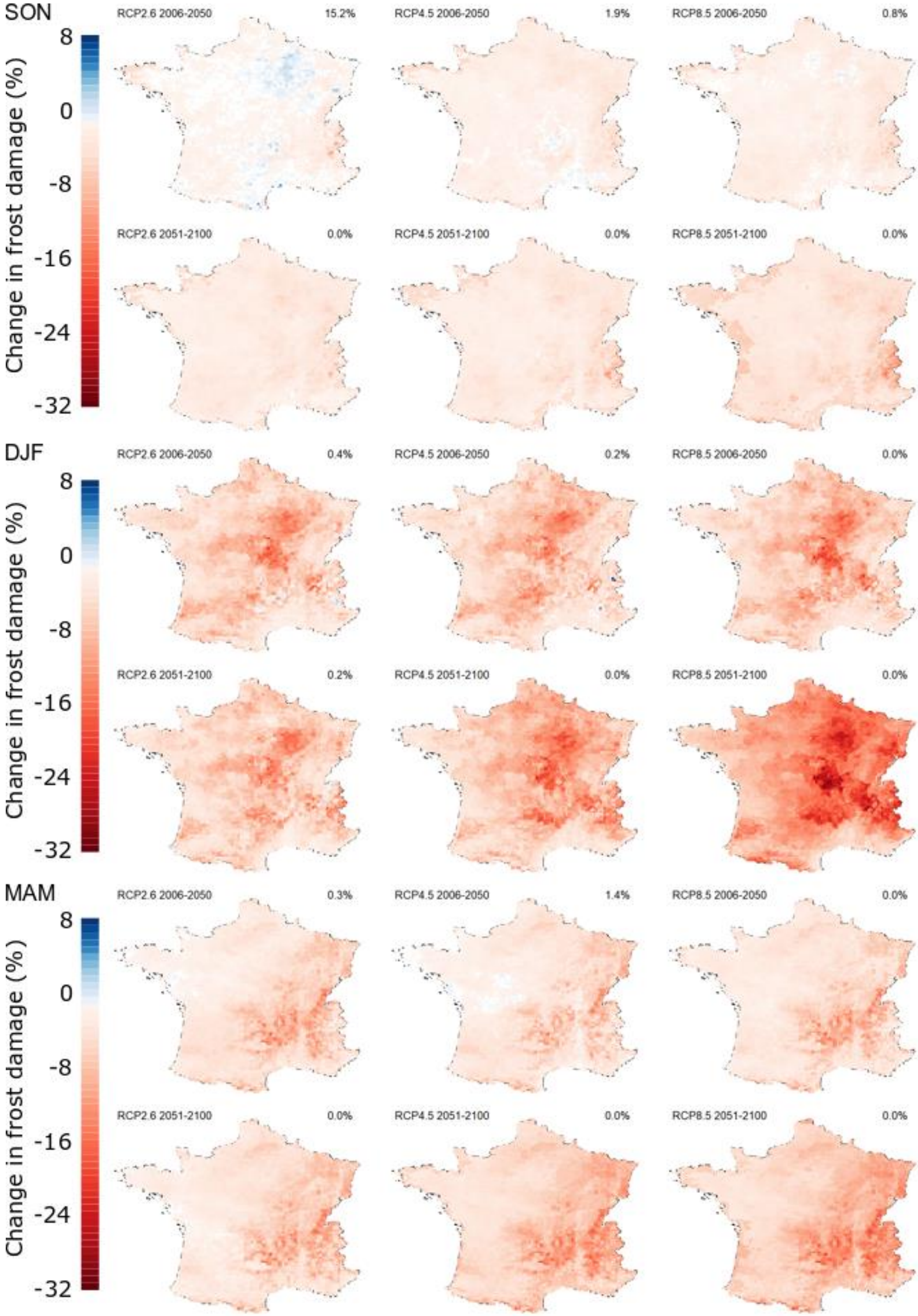

Figure S2. Relative change in predicted decennial frost damages across France according to different climatic *scenarii* (RCP 2.6, RCP 4.5, RCP 8.5), seasons (Early SON, Midwinter DJF and late risks MAM) and time periods (2006-2050 and 2051-2100). Lower and higher damages than the current 90th percentile are represented in in red and blue, respectively).

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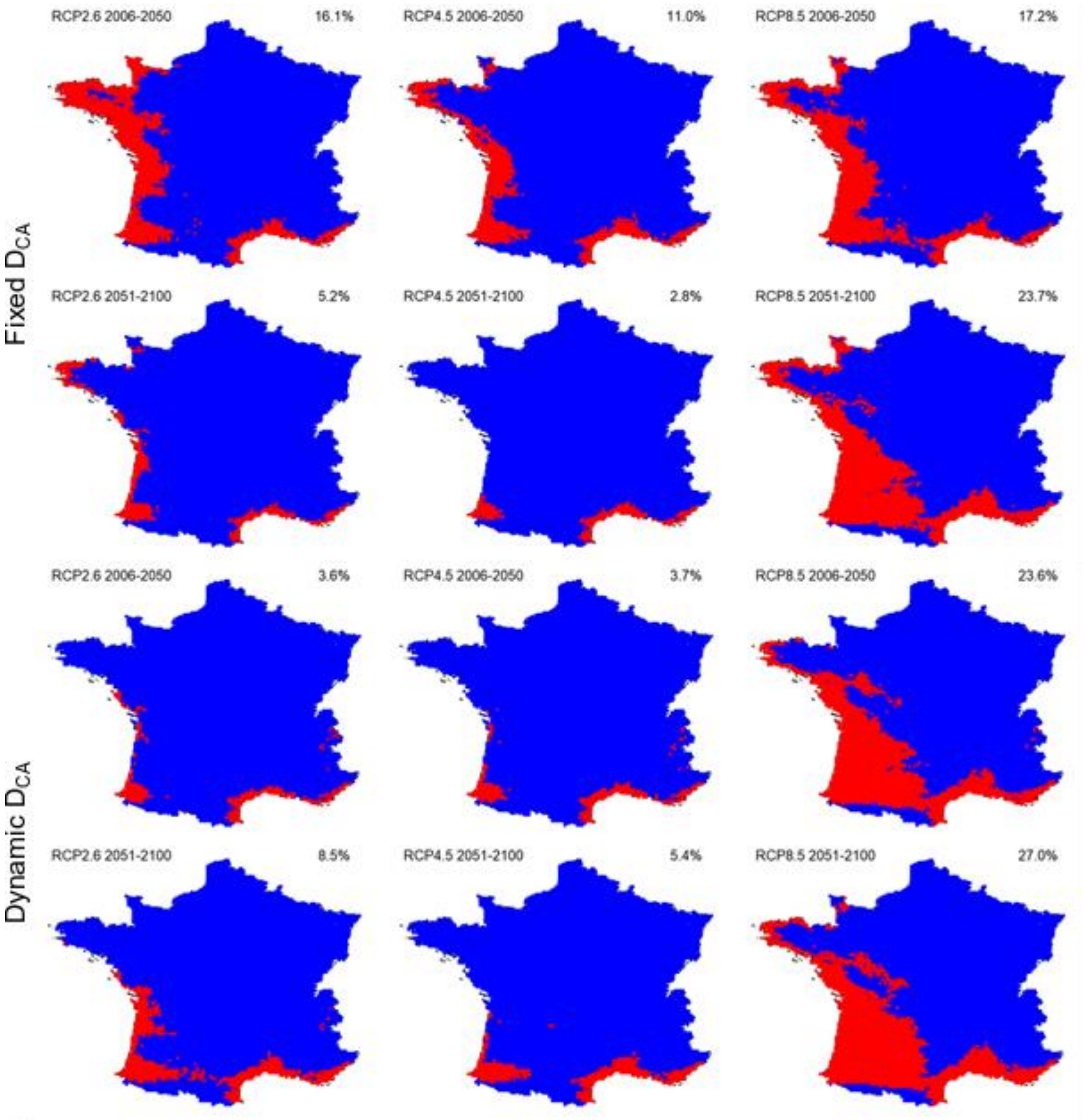

3 Relative change in predicted budburst date across France according to different climatic *scenarii* (RCP 2.6, RCP 4.5, RCP 8.5), time periods (2006-2050 and 2051-2100) and D_{CA} (September 1st vs DORMPHOT computation) Later and earlier budburst than currently are represented in in red and blue, respectively. The proportion of area showing delayed budburst is indicated for each map.

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