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Supplementary Material

Tab. S1 - Environmental data used for the habitat prediction of *P. nigra* subsp. *salzmannii* occurrence in Andalusia (Spain): in bold type the selected variables and in italic type the variables chosen for the parametric characterization of *Pinus nigra.* Source: REDIAM-Environmental Information Network of Andalusia (http://www.juntadeandalucia.es/medioambiente/site/rediam).

Variable	**CODE**
DEM	*DEM*
Aspect	*ASP*
Slope	*SLO*
Average temperature of the warmest month	*TMC*
Average temperature of the coldest month	*TMF*
Average number of days with a minimum temperature equal to or below 0 ºC	**NDF**
Average number of days with a maximum temperature equal to or above 35 ºC	*NDC*
Average minimum temperature	*T_MIN*
Average maximum temperature	*T_MAX*
Average mean temperature	*T_MED*
Average reference evapotranspiration	**ETO**
Average snow precipitation	**SNOW**
Sum of water balances at the end of each month	*BH*
Average net primary production	*DF*
Aridity index	**IAR**
Annual precipitation	**PRC**
Annual radiation	*RN*
Autumn radiation	RN_O
Winter radiation	RN_W
Summer radiation	RN_S
Spring radiation	RN_P
Annual sum of the negative differences between precipitation and reference evapotranspiration	*SDEF*
Annual sum of the positive differences between precipitation and reference evapotranspiration	***SSUP***
Maximum of the monthly average maximum temperatures	*TMAXC*
Average maximum temperature of all months	*TMC*
Average minimum temperature of all months	*TMF*
Minimum of the monthly average minimum temperatures	*TMINF*
Soils	SOIL
Lithology	LITO

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Tab. S2 - Total (ha) and percentage (in parentheses) area loss, relative to the values for 1961-2000, of *Pinus nigra* future projections (2040, 2070, and 2099) with different scenarios (SRA2, SRA1B, and SRB1), three Global Circulation Models (GCM: BCM2, CNCM3, ECHAM5), and one Regional Circulation Model (EGMAM). The values were predicted by the Probability Mean Weight Decay and Committee Averaging ensemble models.

GCM	Scenarios	Years	Area													
			Ensemble Model Committee Averaging							Ensemble Model Probability Mean Weight Decay						
			Andalusia	Cazorla	Sierra de Baza	Sierra de las Nieves	Sierra Maria	Sierra Nevada	Sierra Almijara	Andalusia	Cazorla	Sierra de Baza	Sierra de las Nieves	Sierra Maria	Sierra Nevada	Sierra Almijara
		1961 - 2000	4618.20	2627.76	500.52	65.60	258.20	750.32	124.16	5782.84	2797.68	582.92	67.72	346.52	1122.60	124.64
			(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)
BCM2	**SRA1B**	**2011 - 2040**	3392.12	2031.28	128.36	6.48	108.88	330.60	49.32	2697.00	2188.12	225.80	4.76	166.96	631.72	48.08
			(73.45)	(77.30)	(25.65)	(9.88)	(42.17)	(44.06)	(39.72)	(46.64)	(78.21)	(38.74)	(7.03)	(48.18)	(56.27)	(38.58)
		2041 - 2070	2168.76	1516.88	19.60	0.00	37.92	109.68	8.12	1705.08	1713.76	34.48	0.00	56.80	323.44	7.72
			(46.96)	(57.73)	(3.92)	(0.00)	(14.69)	(14.62)	(6.54)	(29.49)	(61.26)	(5.92)	(0.00)	(16.39)	(28.81)	(6.19)
		2071 - 2099	1594.08	951.84	2.68	0.00	15.68	59.00	3.56	1036.36	1298.00	10.64	0.00	28.04	242.40	3.32
			(34.52)	(36.22)	(0.54)	(0.00)	(6.07)	(7.86)	(02.87)	(17.92)	(46.40)	(1.83)	(0.00)	(8.09)	(21.59)	(2.66)
	SRA2	**2011 - 2040**	3399.24	2022.88	102.40	14.64	71.16	337.04	53.64	2639.92	2187.28	191.68	12.72	112.84	699.92	47.64
			(73.61)	(76.98)	(20.46)	(22.32)	(27.56)	(44.92)	(43.20)	(45.65)	(78.18)	(32.88)	(18.78)	(32.56)	(62.35)	(38.22)
		2041 - 2070	2480.68	1618.20	38.20	0.04	45.28	192.52	9.64	1921.88	1829.72	60.40	0.04	76.12	455.04	8.20
			(53.72)	(61.58)	(7.63)	(0.06)	(17.54)	(25.66)	(7.76)	(33.23)	(65.40)	(10.36)	(0.06)	(21.97)	(40.53)	(6.58)
		2071 - 2099	755.40	351.76	0.00	0.00	2.80	3.92	0.00	359.84	718.96	0.12	0.00	6.24	25.72	0.00
			(16.36)	(13.39)	(0.00)	(0.00)	(1.08)	(0.52)	(0.00)	(6.22)	(25.70)	(0.02)	(0.00)	(1.80)	(2.29)	(0.00)
	SRB1	**2011 - 2040**	3412.52	2055.40	103.24	8.12	74.36	312.64	54.40	2678.24	2224.48	190.88	7.44	109.36	669.64	55.04
			(73.89)	(78.22)	(20.63)	(12.38)	(28.80)	(41.67)	(43.81)	(46.31)	(79.51)	(32.75)	(10.99)	(31.56)	(59.65)	(44.16)
		2041 - 2070	2786.60	1731.96	37.12	2.24	39.32	312.12	21.48	2169.96	1933.28	63.16	1.24	77.40	623.16	17.68
			(60.34)	(65.91)	(7.42)	(3.41)	(15.23)	(41.60)	(17.30)	(37.52)	(69.10)	(10.84)	(1.83)	(22.34)	(55.51)	(14.18)
		2071 - 2099	2292.08	1592.52	22.84	0.60	39.04	112.96	16.12	1798.32	1788.80	40.60	0.40	60.16	344.20	16.12
			(49.63)	(60.60)	(4.56)	(0.91)	(15.12)	(15.05)	(12.98)	(31.10)	(63.94)	(6.96)	(0.59)	(17.36)	(30.66)	(12.93)
CNCM3	**SRA1B**	**2011 - 2040**	3451.48	1993.64	108.04	0.56	85.72	370.84	52.76	2671.60	2173.84	204.00	0.36	124.88	761.88	46.88
			(74.74)	(75.87)	(21.59)	(0.85)	(33.20)	(49.42)	(42.49)	(46.20)	(77.70)	(35.00)	(0.53)	(36.04)	(67.87)	(37.61)
		2041 - 2070	1874.52	1076.24	6.40	0.00	13.08	70.40	4.56	1173.32	1439.92	17.44	0.00	24.36	372.80	3.08
			(40.59)	(40.96)	(1.28)	(0.00)	(5.07)	(9.38)	(3.67)	(20.29)	(51.47)	(2.99)	(0.00)	(7.03)	(33.21)	(2.47)
		2071 - 2099	1590.24	640.36	1.16	0.00	7.84	66.60	4.64	721.56	1182.48	9.48	0.00	14.88	368.52	4.20
			(34.43)	(24.37)	(0.23)	(0.00)	(3.04)	(8.88)	(3.74)	(12.48)	(42.27)	(1.63)	(0.00)	(4.29)	(32.83)	(3.37)
	SRA2	**2011 - 2040**	3815.68	2052.12	119.40	1.24	90.88	566.72	85.36	3021.20	2245.00	233.00	0.88	142.24	897.72	87.00
			(82.62)	(78.09)	(23.86)	(1.89)	(35.20)	(75.53)	(68.75)	(52.24)	(80.25)	(39.97)	(1.30)	(41.05)	(79.97)	(69.80)
		2041 - 2070	2041.08	1193.88	7.76	0.00	15.08	173.32	2.56	1399.16	1512.56	18.88	0.00	28.08	459.56	1.84
			(44.20)	(45.43)	(1.55)	(0.00)	(5.84)	(23.10)	(2.06)	(24.20)	(54.06)	(3.24)	(0.00)	(8.10)	(40.94)	(1.48)
		2071 - 2099	942.64	241.12	0.04	0.00	2.92	28.56	1.12	273.76	698.36	2.04	0.00	6.44	232.08	0.96

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GCM	Scenarios	Years	Area													
			Ensemble Model Committee Averaging							Ensemble Model Probability Mean Weight Decay						
			Andalusia	Cazorla	Sierra de Baza	Sierra de las Nieves	Sierra Maria	Sierra Nevada	Sierra Almijara	Andalusia	Cazorla	Sierra de Baza	Sierra de las Nieves	Sierra Maria	Sierra Nevada	Sierra Almijara
			(20.41)	(9.18)	(0.01)	(0.00)	(1.13)	(3.81)	(0.90)	(4.73)	(24.96)	(0.35)	(0.00)	(1.86)	(20.67)	(0.77)
	SRB1	2011 - 2040	3125.48	1848.72	76.68	0.44	80.88	281.40	46.68	2370.32	2027.32	142.64	0.00	119.48	660.40	30.12
			(67.68)	(70.35)	(15.32)	(0.67)	(31.32)	(37.50)	(37.60)	(40.99)	(72.46)	(24.47)	(0.00)	(34.48)	(58.83)	(24.17)
		2041 - 2070	2523.53	1455.43	43.63	0.00	54.24	155.60	41.48	1755.19	1785.82	83.52	0.00	83.58	469.03	30.12
			(54.64)	(55.39)	(8.72)	(0.00)	(21.01)	(20.74)	(33.41)	(30.35)	(63.83)	(14.33)	(0.00)	(24.12)	(41.78)	(24.17)
		2071 - 2099	1791.28	987.00	8.32	0.00	24.80	21.76	5.36	1049.44	1452.12	20.08	0.00	43.36	253.44	2.88
			(38.79)	(37.56)	(1.66)	(0.00)	(9.60)	(2.90)	(4.32)	(18.15)	(51.90)	(3.44)	(0.00)	(12.51)	(22.58)	(2.31)
ECHAM5	SRA1B	2011 - 2040	3239.60	1905.48	119.88	21.48	82.60	238.08	70.32	2412.60	2103.28	232.40	12.88	149.84	568.68	46.36
			(70.15)	(72.51)	(23.95)	(32.74)	(31.99)	(31.73)	(56.64)	(41.72)	(75.18)	(39.87)	(19.02)	(43.24)	(50.66)	(37.20)
		2041 - 2070	1259.24	552.08	1.88	0.00	10.28	9.68	2.20	574.40	1120.44	9.40	0.00	20.24	105.20	0.68
			(27.27)	(21.01)	(.38)	(0.00)	(3.98)	(1.29)	(1.77)	(9.93)	(40.05)	(1.61)	(0.00)	(5.84)	(9.37)	(.55)
		2071 - 2099	87.04	23.92	0.00	0.00	0.60	0.12	0.00	24.64	80.80	0.04	0.00	1.52	4.68	0.00
			(1.88)	(0.91)	(0.00)	(0.00)	(0.23)	(0.02)	(0.00)	(0.43)	(2.89)	(0.01)	(0.00)	(0.44)	(0.42)	(0.00)
	SRA2	2011 - 2040	3829.08	2008.40	171.44	29.00	124.20	490.12	75.68	2936.52	2183.68	306.16	24.56	199.28	851.20	66.36
			(82.91)	(76.43)	(34.25)	(44.21)	(48.10)	(65.32)	(60.95)	(50.78)	(78.05)	(52.52)	(36.27)	(57.51)	(75.82)	(53.24)
		2041 - 2070	1775.88	1017.64	14.36	0.00	31.44	50.40	7.48	1118.96	1474.36	31.04	0.00	46.56	203.80	5.04
			(38.45)	(38.73)	(2.87)	(.00)	(12.18)	(6.72)	(6.02)	(19.35)	(52.70)	(5.32)	(0.00)	(13.44)	(18.15)	(4.04)
		2071 - 2099	69.96	19.40	0.00	0.00	0.48	0.16	0.04	20.04	63.76	0.04	0.00	1.16	4.96	0.00
			(1.51)	(0.74)	(0.00)	(0.00)	(0.19)	(0.02)	(0.03)	(0.35)	(2.28)	(0.01)	(0.00)	(0.33)	(0.44)	(0.00)
	SRB1	2011 - 2040	3446.08	2049.92	137.84	19.64	95.04	263.84	65.76	2624.72	2208.84	252.32	13.16	141.12	652.08	43.28
			(74.62)	(78.01)	(27.54)	(29.94)	(36.81)	(35.16)	(52.96)	(45.39)	(78.95)	(43.29)	(19.43)	(40.72)	(58.09)	(34.72)
		2041 - 2070	2352.96	1532.20	44.72	3.84	42.64	102.44	14.08	1742.00	1836.96	75.08	0.40	66.92	325.76	3.60
			(50.95)	(58.31)	(8.93)	(5.85)	(16.51)	(13.65)	(11.34)	(30.12)	(65.66)	(12.88)	(0.59)	(19.31)	(29.02)	(2.89)
		2071 - 2099	1410.92	544.40	7.12	0.00	13.44	72.20	3.92	638.80	1162.48	15.92	0.00	26.36	197.96	2.16
			(30.55)	(20.72)	(1.42)	(0.00)	(5.21)	(9.62)	(3.16)	(11.05)	(41.55)	(2.73)	(0.00)	(7.61)	(17.63)	(1.73)
EGMAM	SRA1B	2011 - 2040	2558.88	1359.36	33.40	0.04	77.76	169.36	15.56	1651.24	1823.16	77.00	0.00	116.36	473.52	6.20
			(55.41)	(51.73)	(6.67)	(0.06)	(30.12)	(22.57)	(12.53)	(28.55)	(65.17)	(13.21)	(0.00)	(33.58)	(42.18)	(4.97)
		2041 - 2070	713.24	204.16	1.04	0.00	20.40	0.16	0.16	226.44	650.00	11.92	0.00	40.96	8.44	0.00
			(15.44)	(7.77)	(0.21)	(0.00)	(7.90)	(0.02)	(0.13)	(3.92)	(23.23)	(2.04)	(0.00)	(11.82)	(0.75)	(0.00)
		2071 - 2099	57.64	11.52	0.00	0.00	1.04	0.00	0.00	12.56	51.72	0.00	0.00	4.56	1.24	0.00
			(1.25)	(0.44)	(0.00)	(0.00)	(0.40)	(0.00)	(0.00)	(0.22)	(1.85)	(0.00)	(0.00)	(1.32)	(.11)	(0.00)
	SRA2	2011 - 2040	1996.20	1235.28	13.28	0.00	55.48	6.04	5.04	1316.40	1662.04	39.92	0.00	93.16	172.68	1.20
			(43.22)	(47.01)	(2.65)	(0.00)	(21.49)	(0.80)	(4.06)	(22.76)	(59.41)	(6.85)	(0.00)	(26.88)	(15.38)	(0.96)
		2041 - 2070	1072.32	426.56	1.40	0.00	20.04	1.64	0.32	450.24	974.72	8.08	0.00	41.36	40.72	0.04
			(23.22)	(16.23)	(0.28)	(0.00)	(7.76)	(0.22)	(0.26)	(7.79)	(34.84)	(1.39)	(0.00)	(11.94)	(3.63)	(0.03)
		2071 - 2099	47.68	7.80	0.00	0.00	1.48	0.04	0.16	9.32	41.28	0.04	0.00	5.24	1.04	0.00
			(1.03)	(0.30)	(0.00)	(0.00)	(0.57)	(0.01)	(0.13)	(0.16)	(1.48)	(0.01)	(0.00)	(1.51)	(.09)	(0.00)

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			Andalusia	Cazorla	Sierra de Baza	Sierra de las Nieves	Sierra Maria	Sierra Nevada	Sierra Almijara	Andalusia	Cazorla	Sierra de Baza	Sierra de las Nieves	Sierra Maria	Sierra Nevada	Sierra Almijara
	SRB1	**2011 - 2040**	2852.72	1787.16	80.60	0.04	67.44	124.96	20.92	2097.72	2043.88	184.24	0.04	125.88	400.00	4.44
			(61.77)	(68.01)	(16.10)	(0.06)	(26.12)	(16.65)	(16.85)	(36.27)	(73.06)	(31.61)	(0.06)	(36.33)	(35.63)	(3.56)
		2041 - 2070	1560.08	936.28	7.16	0.00	14.04	12.20	2.08	971.84	1383.72	22.00	0.00	29.20	112.20	0.52
			(33.78)	(35.63)	(1.43)	(0.00)	(5.44)	(1.63)	(1.68)	(16.81)	(49.46)	(3.77)	(0.00)	(8.43)	(9.99)	(0.42)
		2071 - 2099	1070.36	301.68	2.92	0.00	9.00	5.84	2.16	319.68	940.32	11.44	0.00	18.32	97.84	0.52
			(23.18)	(11.48)	(0.58)	(0.00)	(3.49)	(0.78)	(1.74)	(5.53)	(33.61)	(1.96)	(0.00)	(5.29)	(8.72)	(0.42)

Fig. S1 - Iberian (a), Spanish (b), and Andalusian (c) distribution of *P. nigra* subsp. *salzmannii*. The southern population of *P. nigra* subsp. *salzmannii* and the target study areas are shown in Andalusia (c).

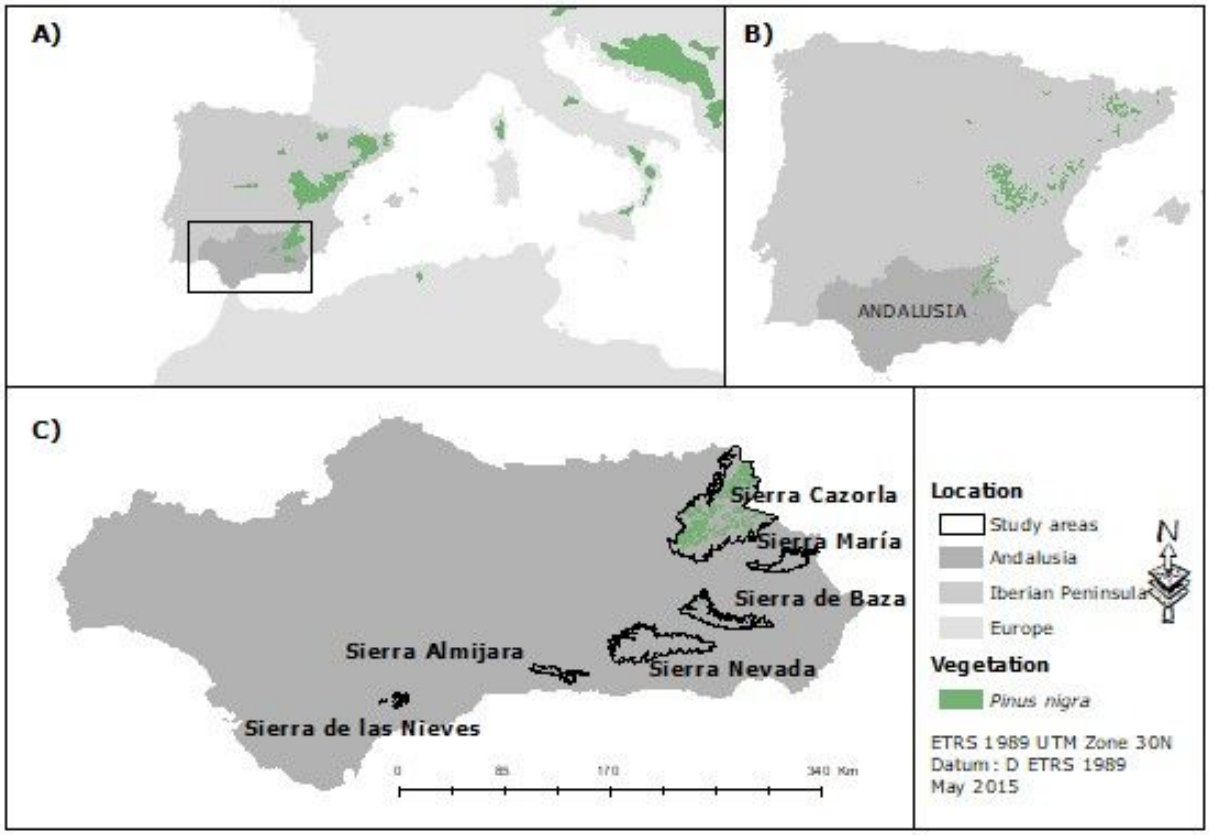

Fig. S2 - Future *P. nigra* subsp. *salzmannii* probability of occurrence prediction obtained by probability mean weight decay ensemble modeling with the Global Circulation Model EGMAM, the scenarios SRA2, SRB1, and SRA1B, and the future projections 2040, 2070, and 2099.