





# Tree-ring based climate reconstruction and growth–climate analysis of *Pinus kesiya* Royle ex Gordon in Doi Khuntan National Park, northern Thailand

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## Electronic Supplementary Material (ESM)

The authors are fully responsible for both the content and the formal aspects of the Electronic Supplementary Material. No editorial adjustments were made.

Table S1. Correlation coefficient ( $r$ ) between the residual chronology of *Pinus kesiya* at Doi Khuntan National Park with the monthly, seasonal, and annual climatic variables

Period	Climatic variables <sup>3</sup>									
	<i>RF</i> (mm)	<i>MT</i> (°C)	<i>MMT</i> (°C)	<i>MMaT</i> (°C)	<i>EMT</i> (°C)	<i>EMaT</i> (°C)	<i>RH</i> (%)	<i>EQ_SST</i>	<i>EQ_SOI</i>	
Monthly data	Jan	0.11	-0.12	0.01	-0.19	-0.07	-0.18	0.20	-0.32	0.33
	Feb	-0.11	-0.09	0.04	-0.16	0.05	0.05	0.30	-0.30	0.17
	Mar	0.39	-0.15	0.03	-0.22	0.03	-0.17	0.31	-0.27	0.29
	Apr	0.21	-0.42	-0.27	-0.39	-0.22	-0.43	0.41	-0.23	0.21
	May	0.27	-0.29	-0.30	-0.24	-0.15	-0.23	0.29	-0.18	-0.05
	Jun	0.16	-0.40	-0.30	-0.36	-0.27	-0.42	0.40	-0.14	0.14
	Jul	0.05	-0.32	-0.28	-0.29	-0.20	-0.24	0.18	-0.13	0.07
	Aug	0.01	-0.25	-0.32	-0.16	-0.22	-0.12	0.06	-0.09	-0.01
	Sep	0.15	-0.24	-0.16	-0.16	-0.12	-0.20	0.31	-0.07	-0.03
	Oct	0.11	-0.17	-0.13	-0.10	-0.02	-0.09	0.18	-0.05	0.06
	Nov	0.04	0.06	0.07	0.01	0.21	0.00	0.18	-0.04	0.00
	Dec	-0.13	-0.09	0.03	-0.18	-0.06	-0.03	0.10	-0.04	-0.01
	pJan	0.15	0.04	0.11	-0.01	0.06	-0.01	0.12	0.09	-0.20
	pFeb	-0.11	-0.13	-0.13	-0.01	-0.16	0.02	-0.01	0.09	-0.15
	pMar	0.13	-0.01	-0.04	0.03	-0.04	-0.06	0.05	0.06	-0.04
	pApr	-0.10	0.08	-0.04	0.17	-0.19	-0.04	-0.13	0.01	-0.10
	pMay	0.08	0.05	0.07	0.08	-0.02	0.21	-0.06	0.02	0.15
	pJun	-0.08	0.09	0.08	0.12	0.04	0.00	-0.09	-0.11	0.12
	pJul	0.26	-0.17	-0.03	-0.16	-0.03	-0.17	0.24	-0.21	0.13
	pAug	0.03	-0.24	-0.09	-0.21	-0.14	-0.24	0.29	-0.25	0.17
	pSep	-0.01	-0.23	-0.07	-0.17	-0.11	-0.01	0.12	-0.24	0.21
	pOct	0.08	-0.16	0.02	-0.19	-0.08	-0.09	0.17	-0.30	0.15
	pNov	0.04	-0.06	0.09	-0.15	0.07	-0.09	0.24	-0.29	0.33
	pDec	0.14	0.01	0.14	-0.09	0.02	0.00	0.29	-0.30	0.26
Seasonal data	Apr–Oct	0.31	-0.43	-0.34	-0.37	-0.26	-0.40	0.45	-0.13	0.06
	Nov–Mar	-0.03	-0.03	0.01	-0.06	0.06	-0.09	0.16	-0.04	0.03
	Apr–Jul	0.31	-0.47	-0.35	-0.43	-0.30	-0.45	0.45	-0.18	0.12
	Aug–Oct	0.14	-0.25	-0.22	-0.16	-0.13	-0.16	0.22	-0.07	0.01
	pApr–pOct	0.09	-0.07	-0.03	-0.03	-0.16	-0.04	0.04	-0.18	0.15
	pNov–pMar	0.31	-0.09	0.09	-0.20	0.03	-0.08	0.33	-0.30	0.32
	pApr–pJul	0.10	-0.03	0.02	0.10	-0.12	0.03	-0.05	-0.08	0.10
pAug–pOct	0.04	-0.24	-0.06	-0.21	-0.15	-0.15	0.25	-0.27	0.19	
Annual data	Jan–Dec <sup>1</sup>	0.33	-0.31	-0.13	-0.32	-0.08	-0.29	0.45	-0.18	0.17
	Apr–Mar <sup>2</sup>	0.30	-0.26	-0.14	-0.25	-0.07	-0.29	0.36	-0.09	0.05
	pJan–pDec	0.13	-0.06	0.02	-0.05	-0.08	-0.04	0.12	-0.15	0.11
	pApr–pMar	0.17	-0.10	0.05	-0.13	-0.05	-0.07	0.22	-0.25	0.25

<sup>1,2</sup>annual cycles, with the first month of each cycle defined by either the calendar year or the beginning of the wet season; orange – a significant correlation ( $P < 0.05$ ); green – a highly significant correlation ( $P < 0.01$ ); the prefix ‘p’ – the previous year; *RF* – rainfall; *MT* – mean temperature; *MMT* – mean minimum temperature; *MMaT* – mean maximum temperature; *EMT* – extreme minimum temperature; *EMaT* – extreme maximum temperature; *RH* – relative humidity; *EQ\_SST* – equatorial sea surface temperature; *EQ\_SOI* – equatorial southern oscillation index

Table S2. Correlation coefficient ( $r$ ) between the stabilised false ring frequencies of *Pinus kesiya* at Doi Khuntan National Park with the monthly, seasonal, and annual climatic variables

Period	Climatic variables									
	<i>RF</i> (mm)	<i>MT</i> (°C)	<i>MMT</i> (°C)	<i>MMaT</i> (°C)	<i>EMT</i> (°C)	<i>EMaT</i> (°C)	<i>RH</i> (%)	<i>EQ_SST</i>	<i>EQ_SOI</i>	
Monthly data	Jan	0.12	-0.26	-0.17	-0.36	-0.03	-0.24	0.15	0.01	0.03
	Feb	-0.02	-0.23	-0.18	-0.30	-0.23	-0.28	0.18	0.03	0.00
	Mar	0.09	-0.44	-0.20	-0.48	-0.34	-0.45	0.27	0.04	-0.14
	Apr	-0.04	-0.35	-0.42	-0.26	-0.49	-0.29	0.00	0.05	-0.19
	May	-0.31	0.05	-0.17	0.05	0.01	-0.04	-0.22	0.11	-0.35
	Jun	-0.16	-0.06	-0.18	-0.10	-0.04	-0.05	-0.25	0.17	-0.31
	Jul	-0.22	0.09	-0.04	0.02	-0.16	0.21	-0.45	0.15	-0.29
	Aug	0.16	0.00	-0.19	-0.09	-0.12	0.09	-0.25	0.15	-0.31
	Sep	0.02	-0.16	0.11	-0.29	0.08	-0.28	0.00	0.19	-0.34
	Oct	0.04	-0.03	-0.03	-0.15	0.04	-0.17	0.02	0.17	-0.30
	Nov	0.00	0.04	0.01	0.00	-0.01	-0.10	-0.04	0.18	-0.24
	Dec	0.00	0.00	-0.03	-0.11	-0.05	-0.08	-0.10	0.17	-0.19
	pJan	-0.01	-0.31	-0.29	-0.25	-0.22	-0.28	0.00	-0.12	-0.04
	pFeb	0.09	-0.26	-0.24	-0.22	-0.16	-0.38	-0.02	-0.09	-0.02
	pMar	0.01	-0.27	-0.37	-0.14	-0.32	-0.04	0.00	-0.09	-0.10
	pApr	-0.25	-0.08	-0.26	0.03	-0.27	-0.11	-0.21	-0.08	0.07
	pMay	-0.21	-0.04	-0.14	-0.05	0.03	-0.18	-0.13	-0.06	0.10
	pJun	-0.07	-0.12	-0.30	-0.08	-0.09	0.17	-0.17	-0.07	0.14
	pJul	0.06	-0.22	-0.32	-0.25	-0.16	0.00	-0.09	-0.11	-0.06
	pAug	-0.14	-0.17	-0.33	-0.19	-0.20	-0.19	-0.07	-0.16	0.02
	pSep	0.01	-0.23	0.00	-0.20	-0.02	-0.19	-0.03	-0.13	-0.09
	pOct	0.15	-0.23	-0.10	-0.37	-0.09	-0.25	0.15	-0.10	0.11
	pNov	0.03	-0.16	-0.08	-0.24	-0.14	-0.22	0.03	-0.06	-0.06
	pDec	0.33	-0.13	-0.11	-0.18	0.00	-0.30	0.13	-0.06	-0.11
Seasonal data	Apr–Oct	-0.17	-0.11	-0.15	-0.16	-0.17	-0.11	-0.26	0.16	-0.38
	Nov–Mar	0.04	-0.05	-0.10	-0.10	-0.15	-0.14	-0.11	0.17	-0.25
	Apr–Jul	-0.35	-0.11	-0.30	-0.10	-0.34	-0.07	-0.26	0.12	-0.36
	Aug–Oct	0.13	-0.07	0.04	-0.20	0.05	-0.13	-0.12	0.17	-0.34
	pApr–pOct	-0.15	-0.19	-0.23	-0.19	-0.19	-0.15	-0.17	-0.11	0.04
	pNov–pMar	0.22	-0.32	-0.20	-0.40	-0.20	-0.37	0.19	-0.01	-0.07
	pApr–pJul	-0.21	-0.13	-0.30	-0.09	-0.21	-0.05	-0.21	-0.08	0.07
pAug–pOct	-0.01	-0.24	-0.09	-0.29	-0.11	-0.27	0.01	-0.13	0.01	
Annual data	Jan–Dec <sup>1</sup>	-0.14	-0.21	-0.18	-0.28	-0.21	-0.23	-0.07	0.14	-0.31
	Apr–Mar <sup>2</sup>	-0.16	-0.09	-0.14	-0.15	-0.18	-0.14	-0.22	0.17	-0.34
	pJan–pDec	-0.11	-0.29	-0.33	-0.25	-0.28	-0.26	-0.09	-0.11	-0.02
	pApr–pMar	-0.09	-0.30	-0.24	-0.33	-0.23	-0.29	0.02	-0.07	-0.01

<sup>1,2</sup>annual cycles, with the first month of each cycle defined by either the calendar year or the beginning of the wet season; orange – a significant correlation ( $P < 0.05$ ); green – a highly significant correlation ( $P < 0.01$ ); the prefix ‘p’ – the previous year; *RF* – rainfall; *MT* – mean temperature; *MMT* – mean minimum temperature; *MMaT* – mean maximum temperature; *EMT* – extreme minimum temperature; *EMaT* – extreme maximum temperature; *RH* – relative humidity; *EQ\_SST* – equatorial sea surface temperature; *EQ\_SOI* – equatorial southern oscillation index