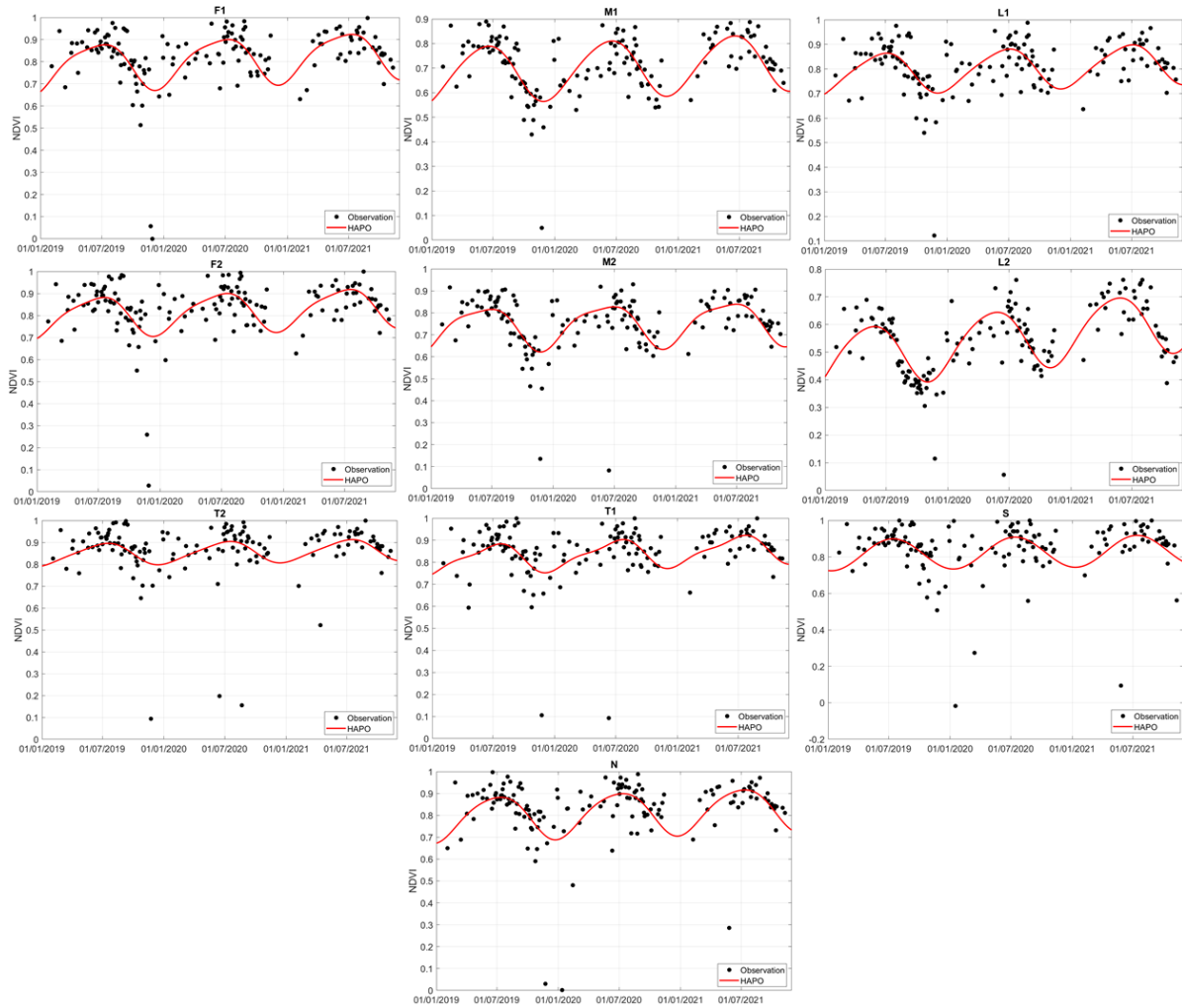


## Supplementary Material



**Figure S1.** Harmonic regression using the HAPO method (solid red line) on scattered NDVI time-series data (black dots) at point F1, F2, M1, M2, L1, L2, N, S, T1, and T2 from January 1, 2019 – December 31, 2021

**Table S1.** Dataset of Sentinel-2 L2A in KNP area used in this study

Year	Month	Day	Number of Images	Year	Month	Day	Number of Images
2019	January	-	0	2020	July	2, 5, 7, 10, 20, 22, 25, 30	8
	February	3, 26	2		August	1, 6, 9, 16, 19, 21, 24, 26, 29, 31	10
	March	15	1		September	5, 8, 10, 13, 15, 23	6
	April	2, 4, 19, 22	4		October	3, 5, 13, 25, 28	5
	May	4, 19, 22	3		November	4, 7, 12	3
	June	1, 11, 16, 18, 21, 26, 28	7		December	-	0
	July	1, 11, 13, 16, 18, 21, 23, 31	8	2021	January	-	0
	August	2, 5, 7, 10, 17, 20, 25, 27, 30	9		February	7, 27	2
	September	4, 6, 9, 14, 21, 26, 29	7		March	17, 22	2
	October	1, 4, 6, 9, 11, 14, 21, 24, 29, 31	10		April	3, 8, 13, 21, 26	5
	November	3, 5, 8, 18, 23, 28	6		May	26, 31	2
	December	18, 28, 30	3		June	5, 7, 12, 22	4
2020	January	12, 17, 27, 29	4		July	5, 7, 10, 25, 27, 30	6
	February	13	1		August	1, 4, 14, 16, 26	5
	March	4, 7, 14,	3		September	10, 18, 20, 28, 30	5
	April	3, 8	2		October	5, 8, 10, 13, 15	5
	May	6, 16, 21	3		November	2, 9	2
	June	10, 12, 15, 25, 27, 30	6		December	-	0

**Table S2.** NDVI at SOS for each sampling point

F1	F2	M1	M2	L1	L2	N	S	T1	T2
-	-	-	-	-	-	-	0.778	-	-
0.743	0.766	0.641	0.686	0.758	0.471	0.754	0.788	0.800	0.831
0.766	0.784	0.662	0.698	0.774	0.522	0.771	0.797	0.819	0.840

**Table S3.** NDVI at POS for each sampling point

F1	F2	M1	M2	L1	L2	N	S	T1	T2
0.877	0.882	0.789	0.816	0.864	0.593	0.882	0.899	0.884	0.896
0.900	0.900	0.810	0.827	0.881	0.644	0.899	0.909	0.903	0.904
0.924	0.918	0.831	0.839	0.898	0.696	0.916	0.918	0.923	0.913

**Table S4.** NDVI at EOS for each sampling point

F1	F2	M1	M2	L1	L2	N	S	T1	T2
0.730	0.756	0.630	0.677	0.748	0.448	0.743	0.781	0.790	0.826
0.753	0.774	0.651	0.688	0.765	0.500	0.760	0.791	0.810	0.834
-	-	0.671	0.700	-	0.552	-	-	-	-

**Table S5.** AOS for each sampling point

F1	F2	M1	M2	L1	L2	N	S	T1	T2
0.207	0.177	0.225	0.194	0.163	0.201	0.194	0.170	0.131	0.098
0.219	0.187	0.236	0.200	0.171	0.226	0.202	0.170	0.141	0.102
0.230	0.196	0.236	0.200	0.180	0.226	0.211	0.175	0.151	0.106

**Table S6.** SOS, average SOS for each sampling point, and Temporal average SOS in 2019, 2020, and 2021

	F1	F2	M1	M2	L1	L2	N	S	T1	T2	Temporal Avg SOS
<b>2019</b>	-	-	-	-	-	-	-	Mar 21	-	-	Mar 21
<b>2020</b>	Feb 1	Feb 9	Feb 3	Jan 17	Feb 9	Jan 5	Feb 22	Mar 20	Feb 5	Feb 24	Feb 8
<b>2021</b>	Jan 31	Feb 8	Feb 2	Jan 16	Feb 8	Jan 4	Feb 21	Mar 20	Feb 4	Feb 23	Feb 7
<b>spatial Avg SOS</b>	Jan 31	Feb 8	Feb 2	Jan 16	Feb 8	Jan 4	Feb 21	Mar 19	Feb 4	Feb 23	

**Table S7.** POS, average POS for each sampling point, and Temporal average POS in 2019, 2020, and 2021

	F1	F2	M1	M2	L1	L2	N	S	T1	T2	temporal Avg SOS
<b>2019</b>	Jul 12	Jul 20	Jun 20	Jul 2	Jul 6	May 28	Jul 14	Jul 14	Jul 25	Jul 19	Jul 6
<b>2020</b>	Jul 11	Jul 19	Jun 19	Jul 1	Jul 5	May 27	Jul 13	Jul 13	Jul 24	Jul 18	Jul 5
<b>2021</b>	Jul 11	Jul 19	Jun 19	Jul 1	Jul 5	May 27	Jul 13	Jul 13	Jul 24	Jul 18	Jul 5
<b>Spatial Avg SOS</b>	Jul 11	Jul 19	Jun 19	Jul 1	Jul 5	May 27	Jul 13	Jul 13	Jul 24	Jul 18	

**Table S8.** EOS, average EOS for each sampling point, and Temporal average EOS in 2019, 2020, and 2021

	F1	F2	M1	M2	L1	L2	N	S	T1	T2	Temporal Avg EOS
<b>2019</b>	Oct 18	Oct 23	Oct 3	Oct 8	Oct 12	Sep 11	Oct 31	Nov 7	Oct 17	Oct 22	Oct 14
<b>2020</b>	Oct 17	Oct 22	Oct 2	Oct 7	Oct 11	Sep 10	Oct 30	Nov 6	Oct 16	Oct 21	Oct 14
<b>2021</b>	-	-	Oct 2	Oct 7	-	Sep 10	-	-	-	-	Sep 25
<b>Spatial Avg EOS</b>	Oct 17	Oct 22	Oct 1	Oct 6	Oct 11	Sep 9	Oct 30	Nov 6	Oct 16	Oct 21	

**Table S9.** LOS, average LOS for each sampling point, and Temporal average LOS in 2019, 2020, and 2021

	<b>F1</b>	<b>F2</b>	<b>M1</b>	<b>M2</b>	<b>L1</b>	<b>L2</b>	<b>N</b>	<b>S</b>	<b>T1</b>	<b>T2</b>	<b>Temporal Avg LOS</b>
<b>2019</b>	254	251	237	263	240	235	248	231	244	236	243.9
<b>2020</b>	259	256	242	264	245	249	251	231	254	240	249.1
<b>2021</b>	265	261	242	264	250	249	255	234	262	244	252.6
<b>Spatial Avg LOS</b>	259	256	240	264	245	244	251	232	253	240	