

Supplementary Data

Kinematics of active landslides in Achaia (Peloponnese, Greece) through InSAR Time Series analysis and relation to rainfall patterns

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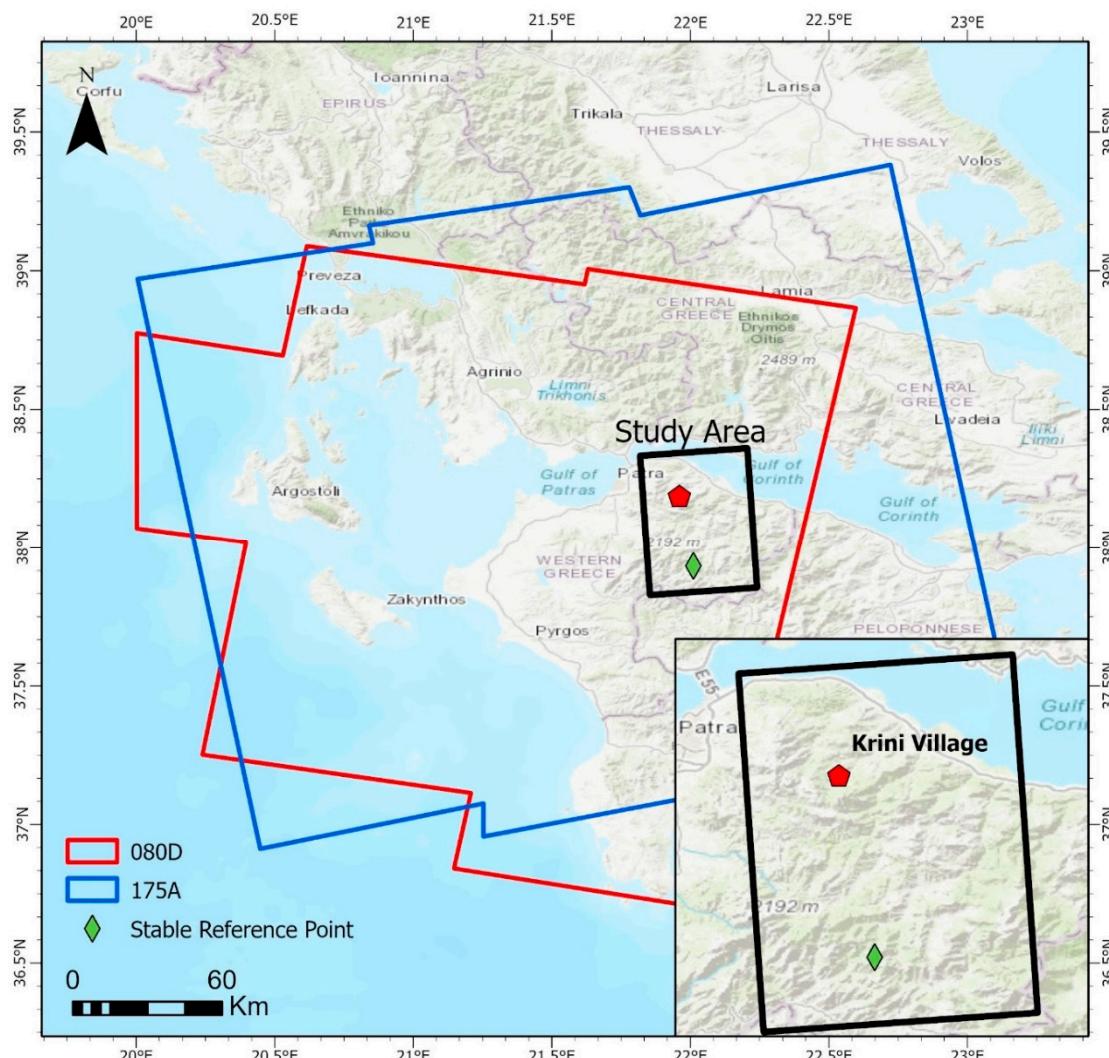


Figure S1. ESRI map with the ID frames of LicSAR Portal (red outline is descending; blue outline is ascending frame). Green rhomb indicates the location of the reference point used in the InSAR analysis.



Data & Methods - Flow Chart

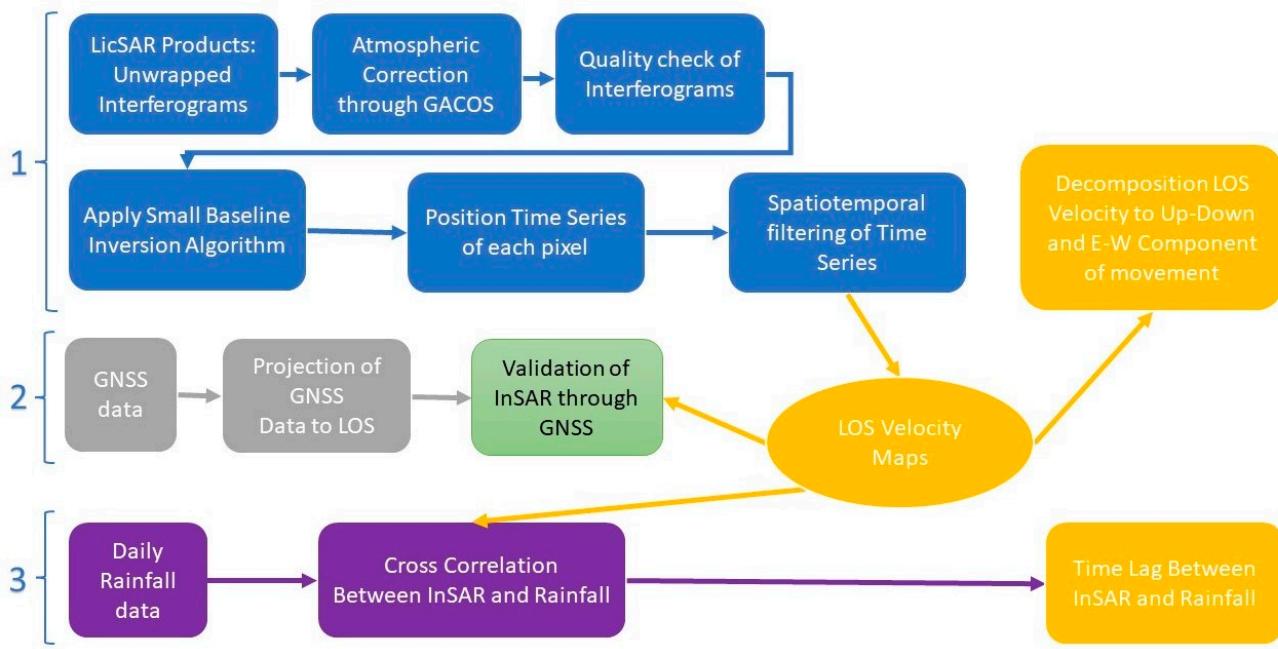


Figure S2. Data processing flow chart used in this study. The arrows indicate input/output actions. The products are shown in orange.

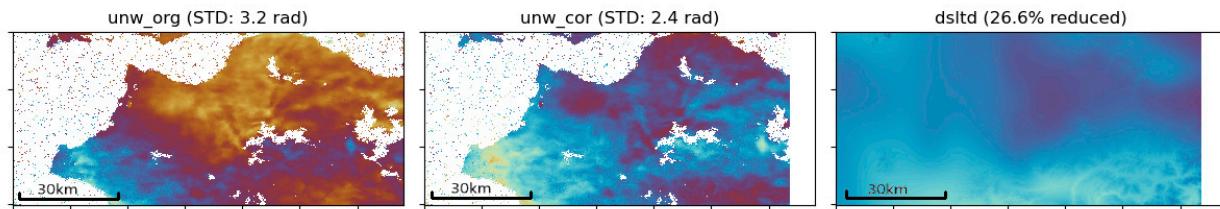


Figure S3. Unw_{org} corresponds to the interferogram before the GACOS correction, and Unw_{cor} corresponds to the interferogram after the GACOS correction. The standard deviation (STD) decreased from 3.2 rad to 2.4 rad. The reduction rate for this interferogram is 26.6%. The dates of the interferometric pair are 2019/01/24 and 2019/02/17. (Ascending Orbit).

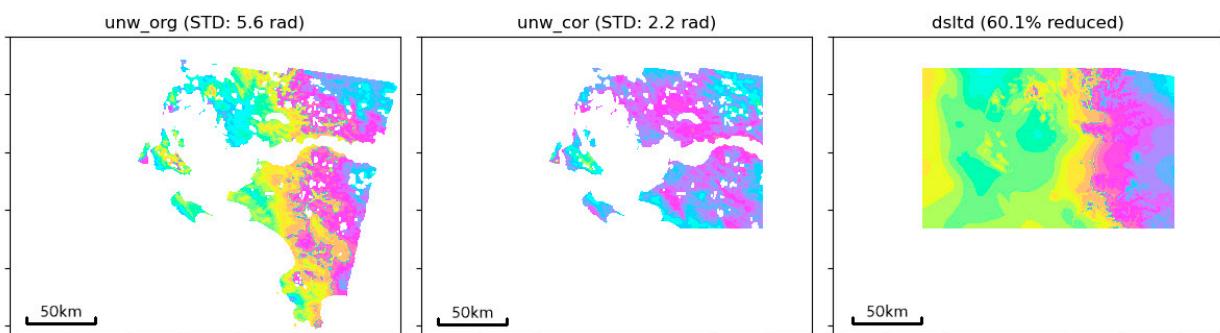


Figure S4. Unw_{org} corresponds to the interferogram before the GACOS correction, and Unw_{cor} corresponds to the interferogram after the GACOS correction. The standard deviation (STD) decreased from 5.2 rad to 2.2 rad. The reduction rate for this interferogram is 60.1%. The dates of the interferometric pair are 2016/12/13 and 2017/01/04. (Descending Orbit).

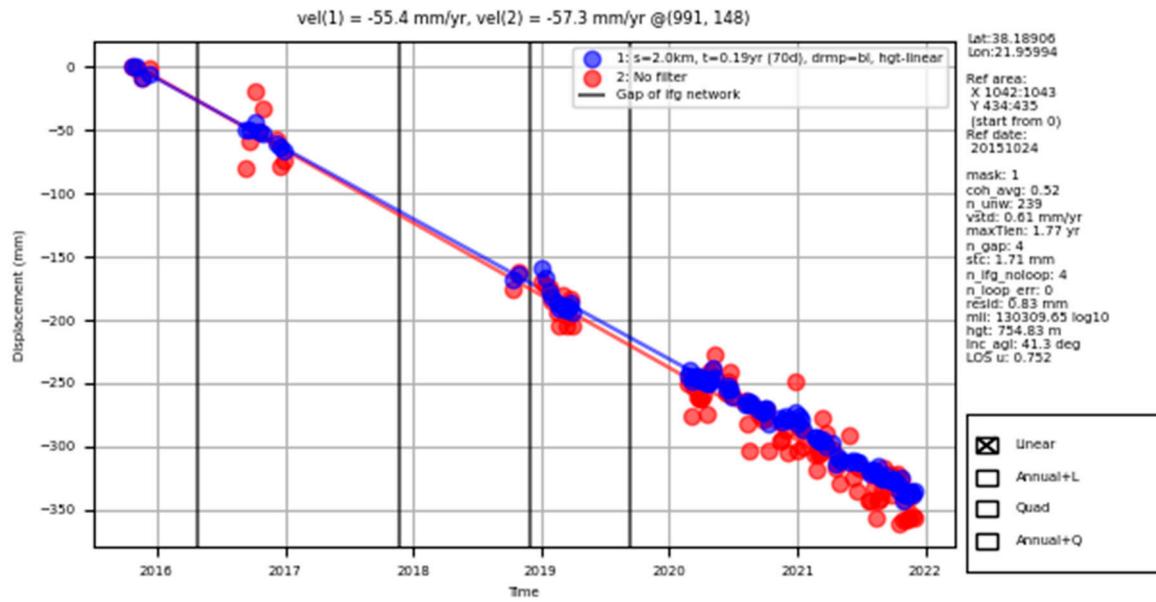


Figure S5. Graph showing the time series of displacement of the village of Krini corresponding to the pixel enclosing the GNSS station (ascending orbit). Vel(1) indicates the velocity of this pixel (blue line) after the spatio-temporal filtering and deramping.

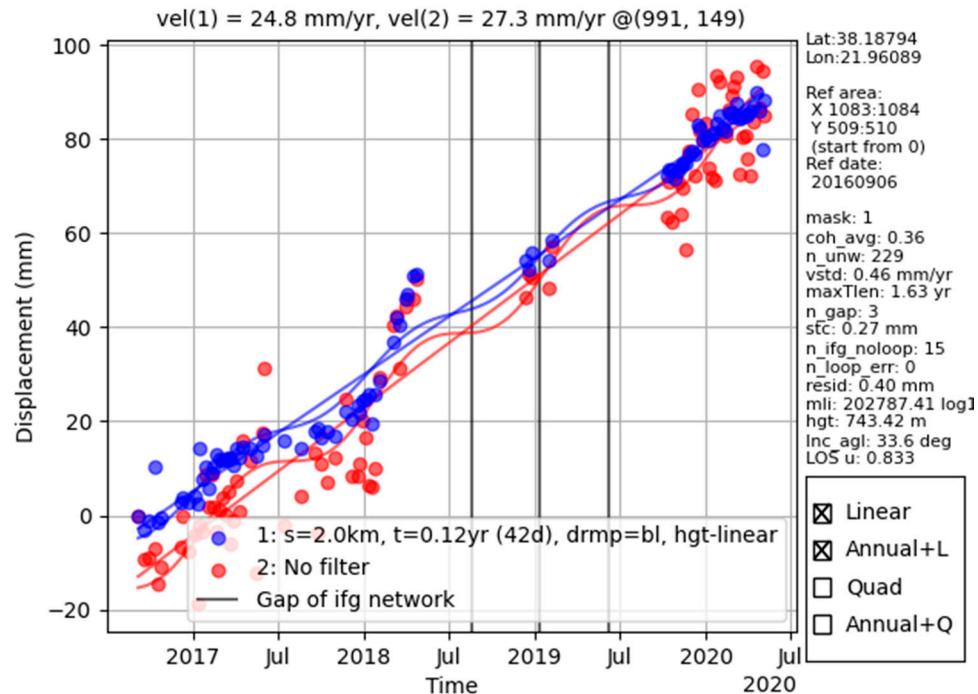


Figure S6. Graph showing the time series of displacement of the village of Krini corresponding to the pixel enclosing the GNSS station (descending orbit). Vel(1) indicates the velocity of this pixel (blue line) after the spatio-temporal filtering and deramping.



Figure S7. Field photograph showing the antenna of KRIN GNSS Station. View to the northeast. Photograph was taken on 7 May 2021.

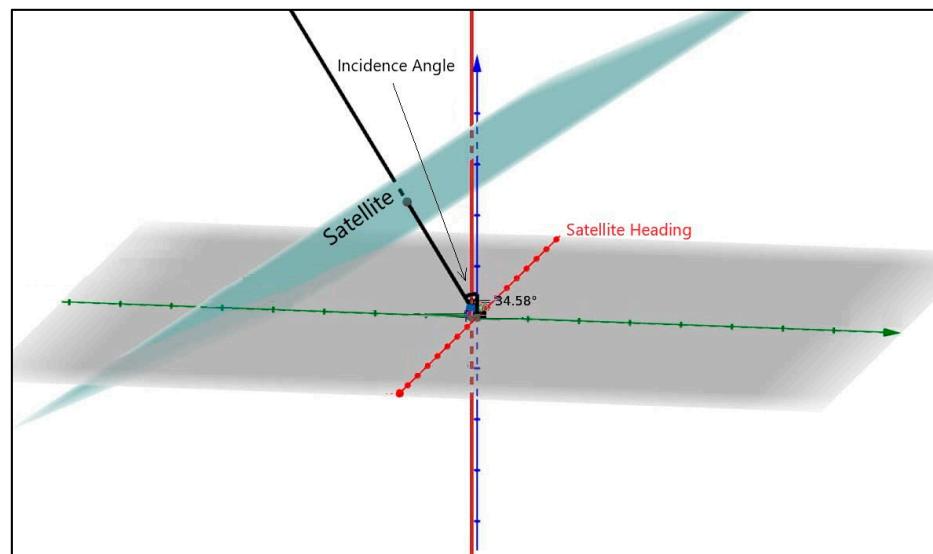


Figure S8. Graph showing the geometry of the LOS velocity vector. 34.58° is the incidence angle in the Krini study area.

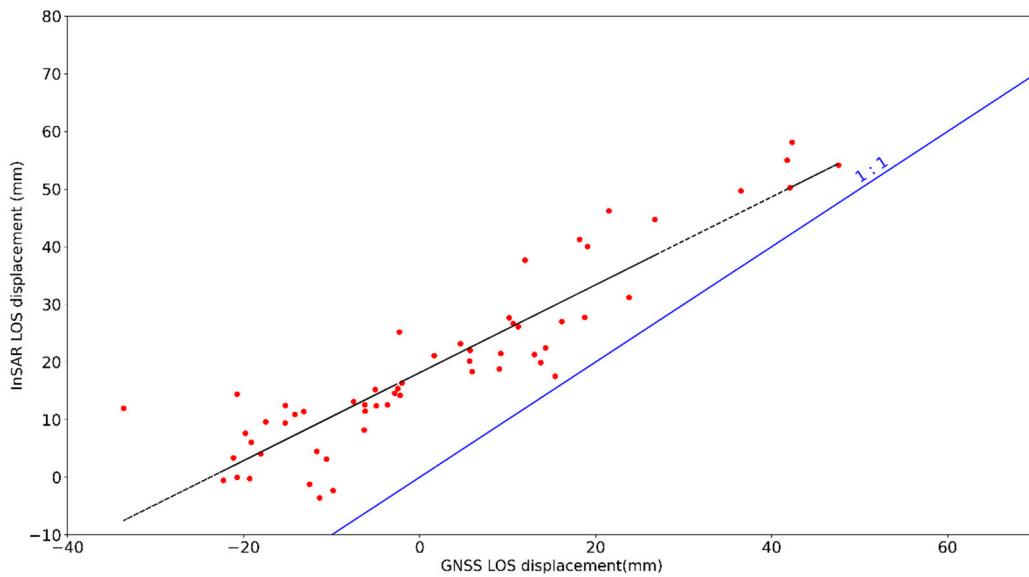


Figure S9. Graph showing the trend differences between InSAR and GNSS LOS displacements (descending orbit) of the same dates during the common period of observation (58 common dates). For comparison, the blue-line indicates a perfect (1:1) correlation.

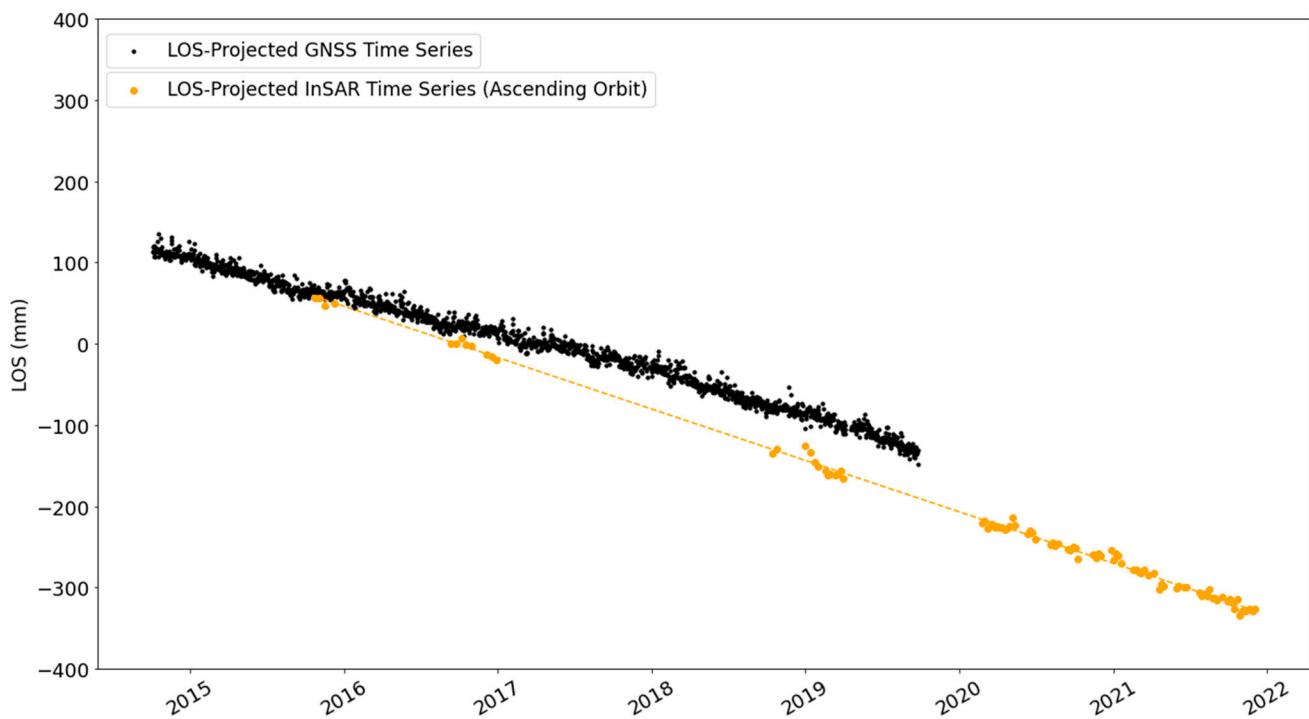


Figure S10. LOS-Projected GNSS Time series (KRIN station; black points) and InSAR position time series (orange points, ascending orbit) of the pixel which contains the GNSS station.

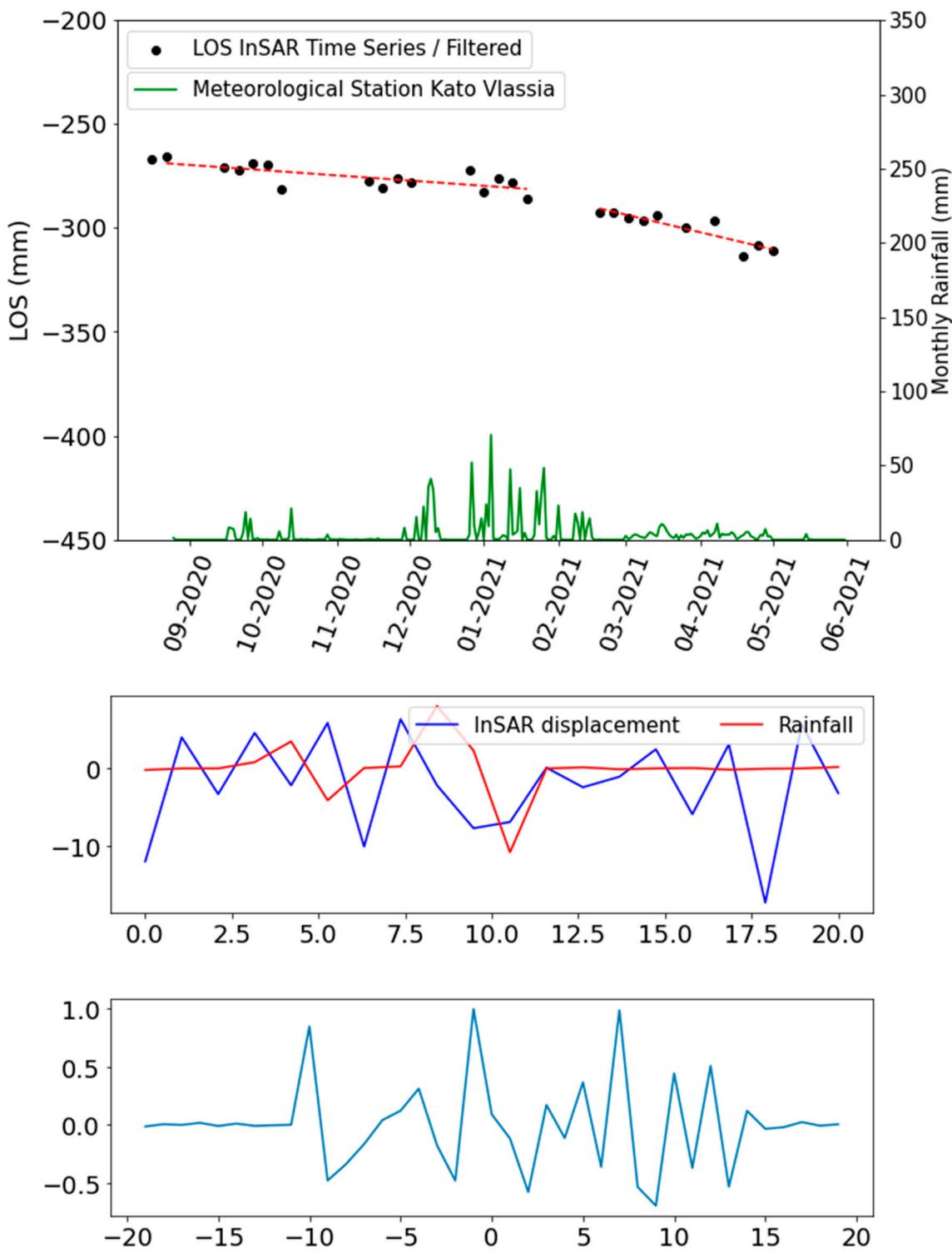


Figure S11. Graphs showing position time series and average monthly rainfall (Kato Vlassia station, top panel) for the period September 2020–May 2021 and corresponding graphs (middle and lower panel) showing cross-correlation results. The corresponding displacement rates are reported in Table 2.

**Table S1.** Dataset of Sentinel-1 SAR acquisitions of ascending and descending orbit used in this study.

Number of SAR Acquisition	Date of SAR Acquisitions (Ascending Orbit)	Date of SAR Acquisitions (Descending Orbit)	Satellite
1	20151024 16:31:33 UTC	20151111 04:39:32 UTC	Sentinel-1
2	20151024	20151111	Sentinel-1
3	20151105	20151123	Sentinel-1
4	20151117	20151205	Sentinel-1
5	20151211	20160906	Sentinel-1
6	20160912	20160918	Sentinel-1
7	20160924	20160930	Sentinel-1
8	20161006	20161006	Sentinel-1
9	20161018	20161012	Sentinel-1
10	20161030	20161018	Sentinel-1
11	20161205	20161024	Sentinel-1
12	20161217	20161205	Sentinel-1
13	20161229	20161211	Sentinel-1
14	20181014	20161223	Sentinel-1
15	20181026	20170104	Sentinel-1
16	20181231	20170110	Sentinel-1
17	20190112	20170116	Sentinel-1
18	20190124	20170122	Sentinel-1
19	20190130	20170128	Sentinel-1
20	20190205	20170203	Sentinel-1
21	20190217	20170209	Sentinel-1
22	20190223	20170215	Sentinel-1
23	20190301	20170221	Sentinel-1
24	20190313	20170227	Sentinel-1
25	20190319	20170305	Sentinel-1
26	20190325	20170311	Sentinel-1
27	20190331	20170317	Sentinel-1
28	20200224	20170323	Sentinel-1
29	20200301	20170329	Sentinel-1
30	20200307	20170404	Sentinel-1
31	20200313	20170410	Sentinel-1
32	20200319	20170416	Sentinel-1
33	20200325	20170422	Sentinel-1
34	20200331	20170504	Sentinel-1
35	20200406	20170510	Sentinel-1
36	20200412	20170516	Sentinel-1
37	20200418	20170528	Sentinel-1
38	20200424	20170603	Sentinel-1
39	20200430	20170609	Sentinel-1
40	20200506	20170709	Sentinel-1
41	20200512	20170715	Sentinel-1
42	20200611	20170721	Sentinel-1
43	20200617	20170820	Sentinel-1
44	20200623	20170919	Sentinel-1
45	20200629	20170925	Sentinel-1



46	20200804	20171001	Sentinel-1
47	20200810	20171013	Sentinel-1
48	20200816	20171031	Sentinel-1
49	20200822	20171124	Sentinel-1
50	20200915	20171130	Sentinel-1
51	20200921	20171206	Sentinel-1
52	20200927	20171218	Sentinel-1
53	20201003	20171224	Sentinel-1
54	20201009	20171230	Sentinel-1
55	20201114	20180105	Sentinel-1
56	20201120	20180111	Sentinel-1
57	20201126	20180117	Sentinel-1
58	20201202	20180123	Sentinel-1
59	20201226	20180204	Sentinel-1
60	20210101	20180306	Sentinel-1
61	20210107	20180312	Sentinel-1
62	20210113	20180318	Sentinel-1
63	20210119	20180330	Sentinel-1
64	20210218	20180405	Sentinel-1
65	20210224	20180417	Sentinel-1
66	20210302	20180423	Sentinel-1
67	20210308	20180511	Sentinel-1
68	20210314	20180529	Sentinel-1
69	20210326	20180604	Sentinel-1
70	20210407	20181213	Sentinel-1
71	20210419	20181219	Sentinel-1
72	20210425	20181225	Sentinel-1
73	20210501	20190130	Sentinel-1
74	20210531	20190205	Sentinel-1
75	20210606	20190211	Sentinel-1
76	20210618	20191003	Sentinel-1
77	20210624	20191009	Sentinel-1
78	20210724	20191015	Sentinel-1
79	20210730	20191021	Sentinel-1
80	20210805	20191027	Sentinel-1
81	20210811	20191102	Sentinel-1
82	20210817	20191108	Sentinel-1
83	20210823	20191114	Sentinel-1
84	20210829	20191120	Sentinel-1
85	20210904	20191126	Sentinel-1
86	20210910	20191202	Sentinel-1
87	20210916	20191208	Sentinel-1
88	20210922	20191214	Sentinel-1
89	20210928	20191220	Sentinel-1
90	20211004	20191226	Sentinel-1
91	20211010	20200101	Sentinel-1
92	20211016	20200107	Sentinel-1
93	20211022	20200113	Sentinel-1
94	20211028	20200119	Sentinel-1

95	20211103	20200125	Sentinel-1
96	20211109	20200131	Sentinel-1
97	20211115	20200206	Sentinel-1
98	20211121	20200212	Sentinel-1
99	20211127	20200218	Sentinel-1
100	20211203	20200224	Sentinel-1
101		20200301	Sentinel-1
102		20200307	Sentinel-1
103		20200313	Sentinel-1
104		20200319	Sentinel-1
105		20200325	Sentinel-1
106		20200331	Sentinel-1
107		20200406	Sentinel-1
108		20200412	Sentinel-1
109		20200418	Sentinel-1
110		20200424	Sentinel-1
111		20200430	Sentinel-1
112		20200506	Sentinel-1
113		20200512	Sentinel-1
114		20200518	Sentinel-1
115		20200524	Sentinel-1
116		20200530	Sentinel-1
117		20200605	Sentinel-1
118		20210218	Sentinel-1
119		20210224	Sentinel-1
120		20210302	Sentinel-1
121		20210308	Sentinel-1