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Article

Land Use/Land Cover Optimized SAR Coherence Analysis for Rapid Coastal Disaster Monitoring: The Impact of the Emma Storm in Southern Spain

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Supplementary Materials

Table S1. Detail of the S1 SAR acquisitions considered for this study. Dates are in YYYY/MM/DD format. ASC = Ascending; DESC = Descending. Bold lines correspond to pre- and post-storm images. These acquisitions can be obtained from the Alaska Satelite Facility Distributed Active Archive Center (ASF DAAC) (https://asf.alaska.edu/, accessed on 10 March 2023) by providing each Image ID.

Image N°	Image ID	Orbit type	Date
1	S1A_IW_SLC__1SDV_20160601T181745_20160601T181812_011521_01193D_F72A	ASC	2016/06/01
2	S1A_IW_SLC__1SDV_20160613T181746_20160613T181813_011696_011EB5_AB1A	ASC	2016/06/13
3	S1A_IW_SLC__1SDV_20160719T181748_20160719T181815_012221_012F94_8C52	ASC	2016/07/19
4	S1A_IW_SLC__1SDV_20160731T181749_20160731T181816_012396_013553_D5FC	ASC	2016/07/31
5	S1A_IW_SLC__1SDV_20160905T181751_20160905T181817_012921_0146D6_3139	ASC	2016/09/05
6	S1A_IW_SLC__1SDV_20160917T181751_20160917T181818_013096_014C7B_9ADC	ASC	2016/09/17
7	S1B_IW_SLC__1SDV_20161029T181707_20161029T181734_002725_0049CD_A96C	ASC	2016/10/29
8	S1B_IW_SLC__1SDV_20161110T181706_20161110T181733_002900_004EB0_E563	ASC	2016/11/10
9	S1B_IW_SLC__1SDV_20161216T181705_20161216T181732_003425_005D9C_A30B	ASC	2016/12/16
10	S1B_IW_SLC__1SDV_20161228T181705_20161228T181732_003600_00629E_0D85	ASC	2016/12/28
11	S1B_IW_SLC__1SDV_20170202T181703_20170202T181730_004125_00722F_D70F	ASC	2017/02/02
12	S1B_IW_SLC__1SDV_20170214T181703_20170214T181730_004300_007765_43BD	ASC	2017/02/14
13	S1A_IW_SLC__1SDV_20170304T181747_20170304T181814_015546_0198C5_495B	ASC	2017/03/04
14	S1B_IW_SLC__1SDV_20170310T181703_20170310T181730_004650_0081B9_CB97	ASC	2017/03/10
15	S1B_IW_SLC__1SDV_20170403T181703_20170403T181730_005000_008BE7_60C7	ASC	2017/04/03
16	S1A_IW_SLC__1SDV_20170409T181748_20170409T181815_016071_01A87C_613C	ASC	2017/04/09
17	S1A_IW_SLC__1SDV_20170503T181750_20170503T181817_016421_01B325_A833	ASC	2017/05/03
18	S1B_IW_SLC__1SDV_20170509T181705_20170509T181732_005525_009AE0_33B9	ASC	2017/05/09
19	S1A_IW_SLC__1SDV_20170608T181752_20170608T181819_016946_01C347_EECA	ASC	2017/06/08
20	S1B_IW_SLC__1SDV_20170614T181724_20170614T181751_006050_00A9F8_9D2E	ASC	2017/06/14
21	S1B_IW_SLC__1SDV_20170708T181725_20170708T181752_006400_00B402_635F	ASC	2017/07/08
22	S1A_IW_SLC__1SDV_20170714T181754_20170714T181821_017471_01D33D_480E	ASC	2017/07/14
23	S1A_IW_SLC__1SDV_20170807T181755_20170807T181822_017821_01DDF0_4128	ASC	2017/08/07
24	S1B_IW_SLC__1SDV_20170813T181727_20170813T181754_006925_00C321_9C8C	ASC	2017/08/13
25	S1B_IW_SLC__1SDV_20170906T181728_20170906T181755_007275_00CD47_A91F	ASC	2017/09/06

26	S1A_IW_SLC__1SDV_20170912T181757_20170912T181823_018346_01EDFD_06A2	ASC	2017/09/12
27	S1A_IW_SLC__1SDV_20171006T181757_20171006T181824_018696_01F8AD_E509	ASC	2017/10/06
28	S1B_IW_SLC__1SDV_20171012T181729_20171012T181756_007800_00DC6C_FB8F	ASC	2017/10/12
29	S1B_IW_SLC__1SDV_20171105T181729_20171105T181756_008150_00E675_7378	ASC	2017/11/05
30	S1A_IW_SLC__1SDV_20171111T181757_20171111T181824_019221_0208BF_3CDE	ASC	2017/11/11
31	S1A_IW_SLC__1SDV_20171205T181756_20171205T181823_019571_0213C4_D561	ASC	2017/12/05
32	S1B_IW_SLC__1SDV_20171211T181728_20171211T181755_008675_00F6B5_E0F3	ASC	2017/12/11
33	S1B_IW_SLC__1SDV_20180104T181727_20180104T181754_009025_0101F6_17FE	ASC	2018/01/04
34	S1A_IW_SLC__1SDV_20180110T181755_20180110T181822_020096_022426_CFE2	ASC	2018/01/10
35	S1A_IW_SLC__1SDV_20180203T181754_20180203T181821_020446_022F4B_3681	ASC	2018/02/03
36	S1B_IW_SLC__1SDV_20180209T181726_20180209T181753_009550_011324_1113	ASC	2018/02/09
37	S1B_IW_SLC__1SDV_20180221T181726_20180221T181753_009725_0118E2_F941	ASC	2018/02/21
38	**S1A_IW_SLC__1SDV_20180227T181754_20180227T181821_020796_023A79_B45C**	**ASC**	**2018/02/27**
39	**S1B_IW_SLC__1SDV_20180305T181726_20180305T181753_009900_011EBA_CF74**	**ASC**	**2018/03/05**
40	S1A_IW_SLC__1SDV_20160701T062712_20160701T062740_011951_0126C6_7E5C	DESC	2016/07/01
41	S1A_IW_SLC__1SDV_20160713T062713_20160713T062741_012126_012C80_2D7F	DESC	2016/07/13
42	S1A_IW_SLC__1SDV_20160725T062705_20160725T062732_012301_013237_231B	DESC	2016/07/25
43	S1A_IW_SLC__1SDV_20160806T062722_20160806T062749_012476_013809_AED1	DESC	2016/08/06
44	S1A_IW_SLC__1SDV_20160911T062716_20160911T062744_013001_014959_DE60	DESC	2016/09/11
45	S1A_IW_SLC__1SDV_20160923T062716_20160923T062744_013176_014F27_4818	DESC	2016/09/23
46	S1A_IW_SLC__1SDV_20161029T062717_20161029T062745_013701_015FA7_B009	DESC	2016/10/29
47	S1A_IW_SLC__1SDV_20161110T062716_20161110T062744_013876_016529_3EC9	DESC	2016/11/10
48	S1A_IW_SLC__1SDV_20161216T062715_20161216T062743_014401_017581_5C97	DESC	2016/12/16
49	S1A_IW_SLC__1SDV_20161228T062715_20161228T062743_014576_017AEF_C40B	DESC	2016/12/28
50	S1A_IW_SLC__1SDV_20170202T062713_20170202T062741_015101_018B01_16C9	DESC	2017/02/02
51	S1A_IW_SLC__1SDV_20170214T062713_20170214T062741_015276_019087_5C7F	DESC	2017/02/14
52	S1B_IW_SLC__1SDV_20170304T062620_20170304T062647_004555_007EFE_5245	DESC	2017/03/04
53	S1A_IW_SLC__1SDV_20170310T062713_20170310T062741_015626_019B2A_C5A6	DESC	2017/03/10
54	S1A_IW_SLC__1SDV_20170403T062713_20170403T062741_015976_01A590_78B7	DESC	2017/04/03
55	S1B_IW_SLC__1SDV_20170409T062621_20170409T062648_005080_008E34_11DA	DESC	2017/04/09
56	S1B_IW_SLC__1SDV_20170503T062623_20170503T062650_005430_00984F_C1AA	DESC	2017/05/03
57	S1A_IW_SLC__1SDV_20170509T062715_20170509T062743_016501_01B593_0011	DESC	2017/05/09
58	S1B_IW_SLC__1SDV_20170608T062628_20170608T062655_005955_00A72C_E5CC	DESC	2017/06/08
59	S1A_IW_SLC__1SDV_20170614T062724_20170614T062751_017026_01C5BA_87F4	DESC	2017/06/14
60	S1A_IW_SLC__1SDV_20170708T062726_20170708T062753_017376_01D051_A245	DESC	2017/07/08
61	S1B_IW_SLC__1SDV_20170714T062630_20170714T062657_006480_00B64D_F498	DESC	2017/07/14
62	S1B_IW_SLC__1SDV_20170807T062632_20170807T062659_006830_00C058_3D6F	DESC	2017/08/07
63	S1A_IW_SLC__1SDV_20170813T062728_20170813T062755_017901_01E050_DAEC	DESC	2017/08/13
64	S1A_IW_SLC__1SDV_20170906T062729_20170906T062756_018251_01EAF2_C3EA	DESC	2017/09/06
65	S1B_IW_SLC__1SDV_20170912T062633_20170912T062700_007355_00CFA5_8AFE	DESC	2017/09/12
66	S1B_IW_SLC__1SDV_20171006T062634_20171006T062701_007705_00D9BA_2B3A	DESC	2017/10/06
67	S1A_IW_SLC__1SDV_20171012T062730_20171012T062757_018776_01FB0E_4673	DESC	2017/10/12
68	S1A_IW_SLC__1SDV_20171105T062730_20171105T062757_019126_0205C6_1461	DESC	2017/11/05
69	S1B_IW_SLC__1SDV_20171111T062634_20171111T062701_008230_00E8DE_8EB7	DESC	2017/11/11
70	S1B_IW_SLC__1SDV_20171205T062633_20171205T062700_008580_00F3B3_9C85	DESC	2017/12/05
71	S1A_IW_SLC__1SDV_20171211T062729_20171211T062756_019651_021639_9A72	DESC	2017/12/11
72	S1A_IW_SLC__1SDV_20180104T062728_20180104T062755_020001_02211F_F150	DESC	2018/01/04
73	S1B_IW_SLC__1SDV_20180110T062632_20180110T062659_009105_010494_84EC	DESC	2018/01/10
74	S1B_IW_SLC__1SDV_20180203T062631_20180203T062658_009455_011005_B33D	DESC	2018/02/03
75	S1A_IW_SLC__1SDV_20180209T062727_20180209T062754_020526_0231D3_7E0F	DESC	2018/02/09
76	S1A_IW_SLC__1SDV_20180221T062727_20180221T062754_020701_023765_66A2	DESC	2018/02/21
77	**S1B_IW_SLC__1SDV_20180227T062631_20180227T062658_009805_011B96_E1D2**	**DESC**	**2018/02/27**
78	**S1A_IW_SLC__1SDV_20180305T062727_20180305T062754_020876_023CEE_1A89**	**DESC**	**2018/03/05**

TableS2. Detail of the 40 S1 SAR interferometric pairs. Dates are in YYYY/MM/DD format. Blue diamond indicates the pre-storm image pairs and orange diamond indicates the storm image pairs. For those dates with both ascending and descending orbit images, the two perpendicular baselines are presented respectively.

Image 1	Image 2	Btemp [d]	Orbit type	B⊥ [m]
2016/06/01	2016/06/13	12	ASC	63.22
2016/07/19	2016/07/31	12	ASC	36.17
2016/09/05	2016/09/17	12	ASC	81.94
2016/07/01	2016/07/13	12	DESC	67.22
2016/07/25	2016/08/06	12	DESC	42.08
2016/09/11	2016/09/23	12	DESC	50.67
2016/10/29	2016/11/10	12	ASC / DESC	100.12 / 120.77
2016/12/16	2016/12/28	12	ASC / DESC	53.04 / 39.64
2017/02/02	2017/02/14	12	ASC / DESC	21.39 / 37.91
2017/03/04	2017/03/10	6	ASC / DESC	20.46 / 35.43
2017/04/03	2017/04/09	6	ASC / DESC	9.07 / 117.73
2017/05/03	2017/05/09	6	ASC / DESC	66.74 / 10.44
2017/06/08	2017/06/14	6	ASC / DESC	29.23 / 98.31
2017/07/08	2017/07/14	6	ASC / DESC	85.81 / 66.68
2017/08/07	2017/08/13	6	ASC / DESC	74.19 / 72.90
2017/09/06	2017/09/12	6	ASC / DESC	182.49 / 21.64
2017/10/06	2017/10/12	6	ASC / DESC	143.92 / 41.81
2017/11/05	2017/11/11	6	ASC / DESC	58.77 / 86.09
2017/12/05	2017/12/11	6	ASC / DESC	134.45 / 103.29
2018/01/04	2018/01/10	6	ASC / DESC	51.32 / 17.95
2018/02/03	2018/02/09	6	ASC / DESC	13.02 / 60.81
2018/02/21 ◊	**2018/02/27** ◊	**6**	**ASC / DESC**	**35.84 / 134.49**
2018/02/27 ◊	**2018/03/05** ◊	**6**	**ASC / DESC**	**37.47 / 32.95**

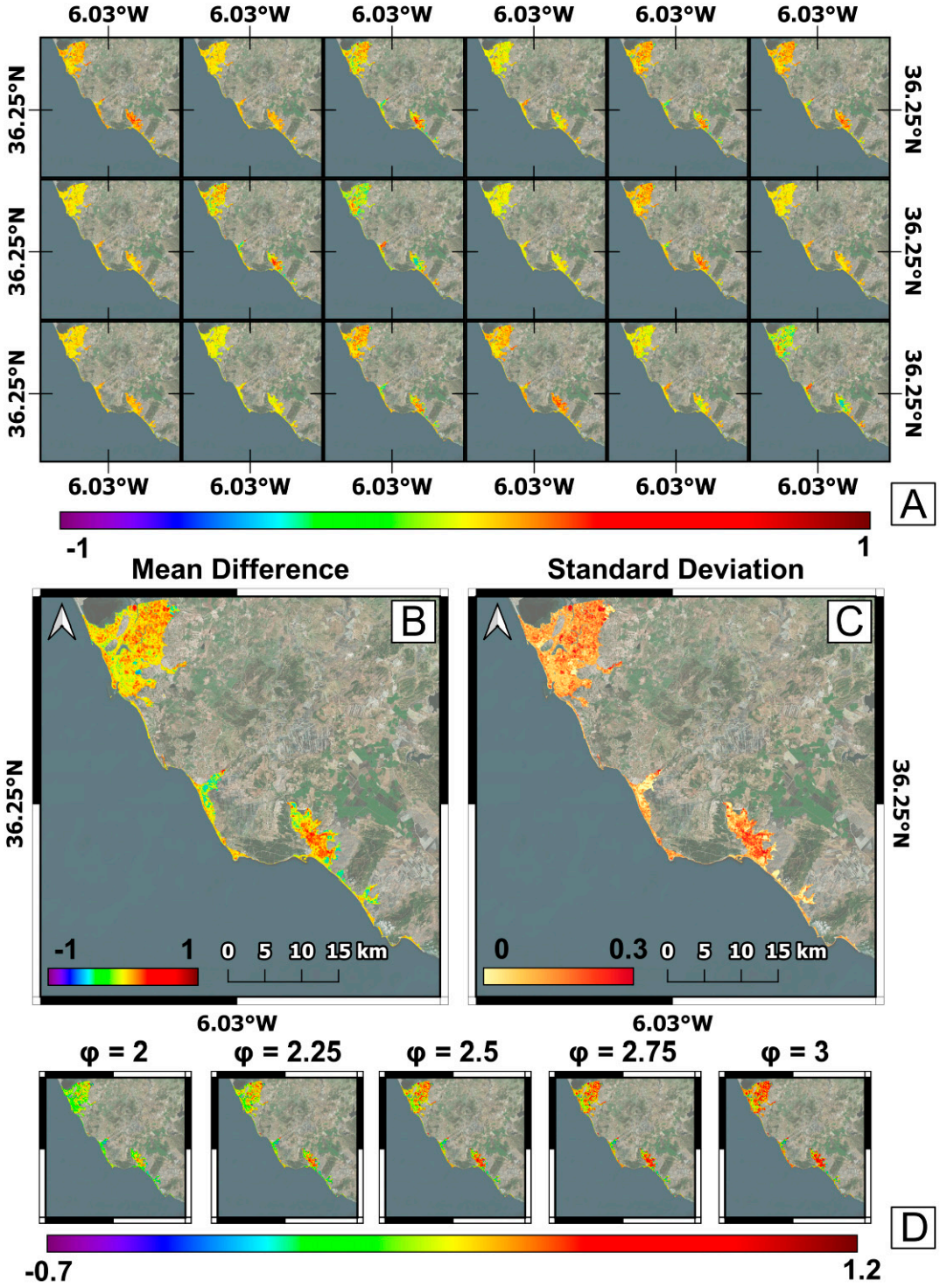

Figure S1. Coherence difference threshold workflow for < 8 m.a.s.l. pixels in ascending orbit images. 18 temporal series difference maps [A]; mean difference [B] and standard deviation [C] for the temporal series difference maps; and generated thresholds according to different φ values [D].

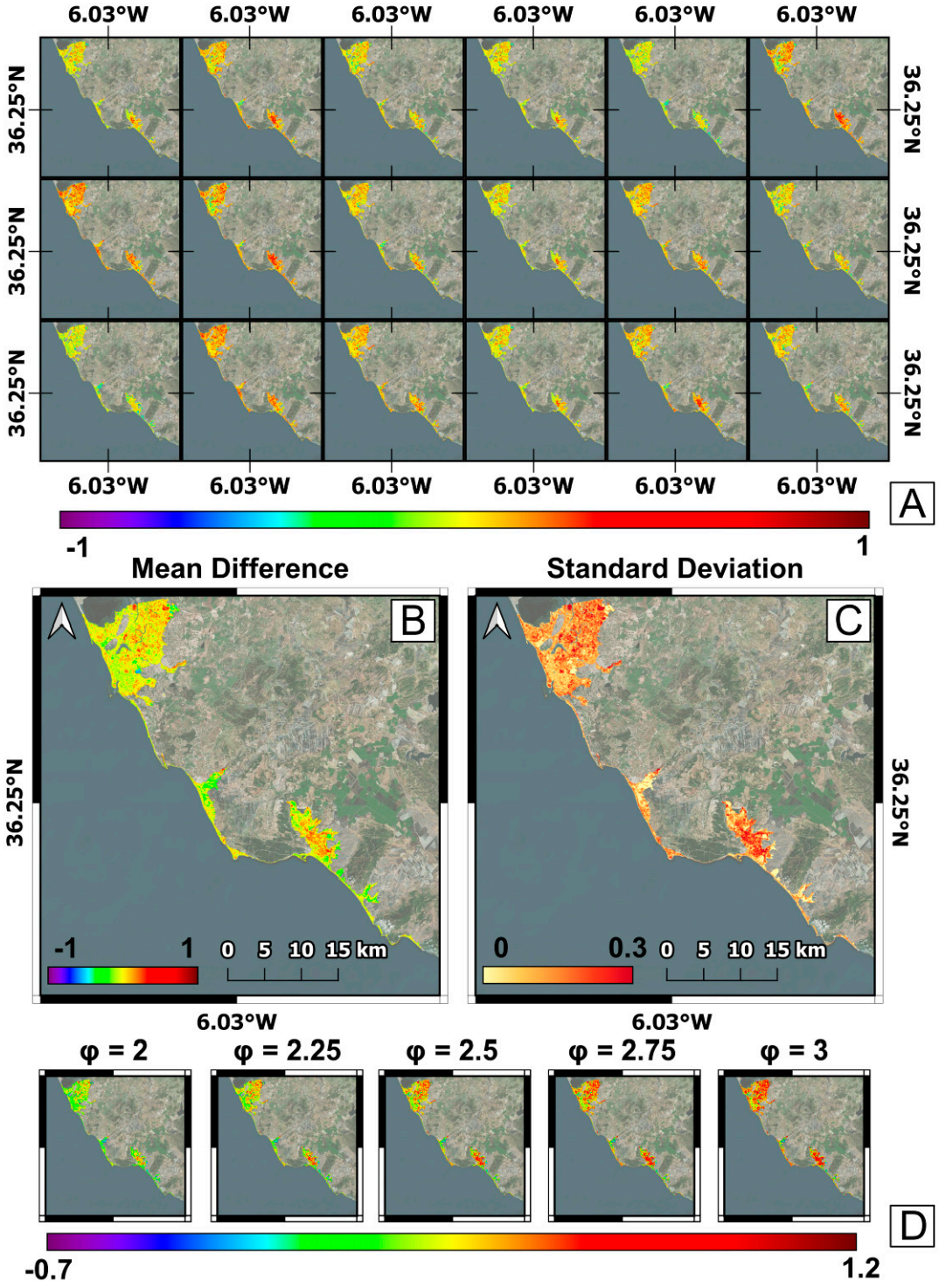

Figure S2. Coherence difference threshold workflow for < 8 m.a.s.l. pixels in descending orbit images. 18 temporal series difference maps [A]; mean difference [B] and standard deviation [C] for the temporal series difference maps; and generated thresholds according to different φ values [D].