

# Supplementary Materials

**Table S1** Landsat 5 TM (LT05), Landsat 7 ETM+ (LE07), Landsat 8 OLI (LC08), ASTER (AST) and Sentinel-2 (S2) scenes used to produce the annual velocity maps. Scene pair dates (DD/MM/YYYY) is also listed. Bias and uncertainty metrics for the magnitude components of the velocity are listed. MED is mean surface velocity difference in stable terrain area, STDV is standard deviation. The spatial autocorrelation distance (D) is 2400 m. The resolution (PS) of the interannual velocity is 120 m.

Annual velocity							
Velocity date pair information				Velocity date pair information			
Sat.	Date	MED $\pm$ STDV (m a <sup>-1</sup> )	$e_{off}$ (m a <sup>-1</sup> )	Sat.	Date	MED $\pm$ STDV (m a <sup>-1</sup> )	$e_{off}$ (m a <sup>-1</sup> )
LT05	25/07/1986– 30/09/1987	2.51 $\pm$ 1.32	2.51	LT05	10/09/2003– 27/08/2004	1.61 $\pm$ 1.14	1.61
LT05	30/09/1987– 28/06/1988	4.40 $\pm$ 4.87	4.42	LT05	27/08/2004– 13/07/2005	5.62 $\pm$ 1.67	5.62
LT05	28/06/1988– 19/09/1989	2.99 $\pm$ 3.28	3.00	LT05	13/07/2005– 01/08/2006	2.32 $\pm$ 0.89	2.32
LT05	19/09/1989– 21/08/1990	2.11 $\pm$ 1.16	2.11	LT05	01/08/2006– 01/06/2007	1.92 $\pm$ 1.13	1.92
LT05	21/08/1990– 07/07/1991	2.30 $\pm$ 1.23	2.30	LT05	01/06/2007– 22/08/2008	1.64 $\pm$ 1.05	1.64
LT05	07/07/1991– 26/08/1992	5.10 $\pm$ 6.47	5.13	LT05	22/08/2008– 09/08/2009	1.72 $\pm$ 1.07	1.72
LT05	26/08/1992– 19/12/1993	6.58 $\pm$ 9.70	6.63	LT05	09/08/2009– 13/09/2010	4.92 $\pm$ 6.23	4.95
LT05	19/12/1993– 17/09/1994	2.77 $\pm$ 1.70	2.77	LT05	13/09/2010– 31/08/2011	4.45 $\pm$ 6.03	4.48
LT05	17/09/1994– 04/09/1995	6.54 $\pm$ 3.16	6.55	AST	28/04/2012– 06/04/2013	3.46 $\pm$ 1.41	3.46
LT05	04/09/1995– 22/09/1996	4.07 $\pm$ 3.87	4.08	LC08	19/07/2013– 08/09/2014	1.53 $\pm$ 0.58	1.53
LT05	22/09/1996– 25/09/1997	3.37 $\pm$ 1.27	3.37	LC08	08/09/2014– 10/08/2015	2.11 $\pm$ 0.68	2.11
LT05	25/09/1997– 28/09/1998	3.46 $\pm$ 1.38	3.46	LC08	10/08/2015– 13/09/2016	1.23 $\pm$ 1.04	1.23
LT05	28/09/1998– 15/09/1999	2.53 $\pm$ 1.61	2.53	LC08	13/09/2016– 15/08/2017	1.63 $\pm$ 1.45	1.63
LE07	23/09/1999– 08/08/2000	5.64 $\pm$ 1.83	5.64	LC08	15/08/2017– 05/10/2018	1.95 $\pm$ 1.19	1.95
LE07	08/08/2000– 24/06/2001	3.33 $\pm$ 2.82	3.34	S2	22/08/2018– 26/09/2019	4.54 $\pm$ 0.58	4.54
LE07	24/06/2001– 14/08/2002	1.02 $\pm$ 1.48	1.03	S2	26/09/2019– 25/09/2020	4.62 $\pm$ 0.43	4.62

LT05	22/08/2002– 10/09/2003	1.91 ± 1.31	1.91
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**Table S2** Landsat 8 OLI (LC08) and Sentinel-2 (S2) scenes used to produce the seasonal velocity maps. Scene pair dates (DD/MM/YYYY) is also listed. Bias and uncertainty metrics for the magnitude components of the velocity are listed. MED is mean surface velocity difference in stable terrain area, STDV is standard deviation. The spatial autocorrelation distance (D) is 600 m. The resolution (PS) of the interannual velocity is 30 m.

Seasonal velocity							
Velocity date pair information				Velocity date pair information			
Sat.	Date	MED ± STDV (m d <sup>-1</sup> )	$e_{off}$ (m d <sup>-1</sup> )	Sa t.	Date	MED ± STDV (m d <sup>-1</sup> )	$e_{off}$ (m d <sup>-1</sup> )
LC08	14/04/2013–01/06/2013	0.09 ± 0.05	0.09	S2	06/09/2018–16/09/2018	0.32 ± 0.31	0.32
LC08	01/06/2013–19/07/2013	0.07 ± 0.05	0.07	S2	16/09/2018–06/10/2018	0.37 ± 0.11	0.37
LC08	19/07/2013–07/10/2013	0.05 ± 0.04	0.05	S2	06/10/2018–11/10/2018	2.56 ± 0.15	2.56
LC08	07/10/2013–23/10/2013	0.51 ± 0.41	0.51	S2	11/10/2018–16/10/2018	2.01 ± 0.52	2.01
LC08	23/10/2013–26/12/2013	0.05 ± 0.04	0.05	S2	16/10/2018–26/10/2018	0.35 ± 0.16	0.35
LC08	26/12/2013–11/01/2014	0.29 ± 0.18	0.29	S2	26/10/2018–10/11/2018	0.69 ± 0.22	0.69
LC08	11/01/2014–16/03/2014	0.13 ± 0.09	0.13	S2	10/11/2018–25/11/2018	0.56 ± 0.10	0.56
LC08	16/03/2014–03/05/2014	0.11 ± 0.07	0.11	S2	25/11/2018–10/12/2018	0.74 ± 0.08	0.74
LC08	03/05/2014–19/05/2014	0.32 ± 0.23	0.32	S2	10/12/2018–15/12/2018	1.41 ± 0.18	1.41
LC08	19/05/2014–04/06/2014	0.48 ± 0.37	0.48	S2	15/12/2018–30/12/2018	0.64 ± 0.06	0.64
LC08	04/06/2014–23/08/2014	0.05 ± 0.03	0.05	S2	30/12/2018–14/01/2019	0.71 ± 0.08	0.71
LC08	23/08/2014–08/09/2014	0.16 ± 0.06	0.16	S2	14/01/2019–24/01/2019	0.18 ± 0.12	0.18
LC08	08/09/2014–27/11/2014	0.17 ± 0.08	0.17	S2	24/01/2019–03/02/2019	0.16 ± 0.09	0.16
LC08	27/11/2014–29/12/2014	0.06 ± 0.03	0.06	S2	03/02/2019–18/02/2019	0.42 ± 0.08	0.42
LC08	29/12/2014–30/01/2015	0.04 ± 0.03	0.04	S2	18/02/2019–05/03/2019	0.33 ± 0.11	0.33
LC08	30/01/2015–15/02/2015	0.11 ± 0.08	0.11	S2	05/03/2019–15/03/2019	0.20 ± 0.04	0.20
LC08	15/02/2015–19/03/2015	0.06 ± 0.03	0.06	S2	15/03/2019–25/03/2019	0.33 ± 0.07	0.33
LC08	19/03/2015–22/05/2015	0.28 ± 0.49	0.28	S2	25/03/2019–09/04/2019	0.56 ± 0.07	0.56
LC08	22/05/2015–07/06/2015	0.43 ± 0.31	0.43	S2	09/04/2019–14/04/2019	1.92 ± 0.18	1.92
LC08	07/06/2015–25/07/2015	0.18 ± 0.15	0.18	S2	14/04/2019–24/05/2019	0.10 ± 0.15	0.10
LC08	25/07/2015–10/08/2015	0.16 ± 0.15	0.16	S2	24/05/2019–03/06/2019	0.23 ± 0.20	0.23
LC08	10/08/2015–13/10/2015	0.09 ± 0.06	0.09	S2	03/06/2019–28/07/2019	0.20 ± 0.24	0.20
LC08	13/10/2015–14/11/2015	0.49 ± 0.46	0.49	S2	28/07/2019–26/09/2019	0.11 ± 0.24	0.11
LC08	14/11/2015–16/12/2015	0.17 ± 0.09	0.17	S2	26/09/2019–01/10/2019	0.97 ± 0.52	0.97
S2	06/12/2015–05/01/2016	0.06 ± 0.03	0.06	S2	01/10/2019–26/10/2019	0.81 ± 0.76	0.81
S2	05/01/2016–04/02/2016	0.12 ± 0.05	0.12	S2	26/10/2019–05/11/2019	0.37 ± 0.09	0.37
S2	04/02/2016–04/04/2016	0.12 ± 0.04	0.12	S2	05/11/2019–20/11/2019	0.14 ± 0.08	0.14
S2	04/04/2016–13/06/2016	0.06 ± 0.03	0.06	S2	20/11/2019–10/12/2019	0.14 ± 0.05	0.14
S2	13/06/2016–21/09/2016	0.28 ± 0.58	0.28	S2	10/12/2019–20/12/2019	0.22 ± 0.08	0.22
S2	21/09/2016–11/10/2016	0.23 ± 0.33	0.23	S2	20/12/2019–30/12/2019	0.13 ± 0.09	0.13
S2	11/10/2016–30/11/2016	0.21 ± 0.34	0.21	S2	30/12/2019–19/01/2020	0.13 ± 0.04	0.13
S2	30/11/2016–10/12/2016	0.93 ± 0.15	0.93	S2	19/01/2020–29/01/2020	0.18 ± 0.05	0.18
S2	10/12/2016–30/12/2016	0.14 ± 0.05	0.14	S2	29/01/2020–03/02/2020	0.77 ± 0.07	0.77
S2	30/12/2016–19/01/2017	0.23 ± 0.07	0.23	S2	03/02/2020–18/02/2020	0.31 ± 0.07	0.31
S2	19/01/2017–18/02/2017	0.07 ± 0.04	0.07	S2	18/02/2020–28/02/2020	0.22 ± 0.05	0.22
S2	18/02/2017–10/03/2017	0.23 ± 0.14	0.23	S2	28/02/2020–04/03/2020	1.37 ± 0.08	1.37
S2	10/03/2017–30/03/2017	0.10 ± 0.07	0.10	S2	04/03/2020–09/03/2020	1.15 ± 0.20	1.15
S2	30/03/2017–09/05/2017	0.21 ± 0.10	0.21	S2	09/03/2020–19/03/2020	0.28 ± 0.11	0.28

S2	09/05/2017–12/08/2017	0.43 ± 0.65	0.43	S2	19/03/2020–08/04/2020	0.11 ± 0.04	0.11
S2	12/08/2017–06/09/2017	0.50 ± 0.41	0.50	S2	08/04/2020–18/04/2020	0.25 ± 0.13	0.25
S2	06/09/2017–21/09/2017	0.44 ± 0.36	0.44	S2	18/04/2020–18/05/2020	0.23 ± 0.31	0.23
S2	21/09/2017–11/10/2017	0.21 ± 0.08	0.21	S2	18/05/2020–17/06/2020	0.43 ± 0.51	0.43
S2	11/10/2017–31/10/2017	0.62 ± 0.38	0.62	S2	17/06/2020–02/07/2020	0.57 ± 0.59	0.57
S2	31/10/2017–05/11/2017	0.41 ± 0.16	0.41	S2	02/07/2020–26/08/2020	0.30 ± 0.50	0.30
S2	05/11/2017–10/11/2017	0.47 ± 0.08	0.47	S2	26/08/2020–31/08/2020	1.61 ± 0.44	1.61
S2	10/11/2017–20/11/2017	0.19 ± 0.11	0.19	S2	31/08/2020–15/09/2020	0.62 ± 0.27	0.62
S2	20/11/2017–25/11/2017	0.81 ± 0.12	0.81	S2	15/09/2020–25/09/2020	0.27 ± 0.04	0.27
S2	25/11/2017–10/12/2017	0.30 ± 0.10	0.30	S2	25/09/2020–10/10/2020	0.47 ± 0.04	0.47
S2	10/12/2017–15/12/2017	1.27 ± 0.16	1.27	S2	10/10/2020–15/10/2020	1.60 ± 0.07	1.60
S2	15/12/2017–20/12/2017	1.47 ± 0.20	1.47	S2	15/10/2020–20/10/2020	1.80 ± 0.07	1.80
S2	20/12/2017–30/12/2017	0.86 ± 0.08	0.86	S2	20/10/2020–30/10/2020	1.13 ± 0.46	1.13
S2	30/12/2017–04/01/2018	0.65 ± 0.15	0.65	S2	30/10/2020–09/11/2020	0.27 ± 0.21	0.27
S2	04/01/2018–09/01/2018	0.40 ± 0.13	0.40	S2	09/11/2020–14/11/2020	0.95 ± 0.17	0.95
S2	09/01/2018–24/01/2018	0.24 ± 0.07	0.24	S2	14/11/2020–19/11/2020	1.36 ± 0.61	1.36
S2	24/01/2018–08/02/2018	0.33 ± 0.04	0.33	S2	19/11/2020–09/12/2020	0.36 ± 0.24	0.36
S2	08/02/2018–13/02/2018	0.76 ± 0.09	0.76	S2	09/12/2020–24/12/2020	0.43 ± 0.06	0.43
S2	13/02/2018–10/03/2018	0.26 ± 0.08	0.26	S2	24/12/2020–03/01/2021	0.21 ± 0.09	0.21
S2	10/03/2018–15/03/2018	1.05 ± 0.22	1.05	S2	03/01/2021–08/01/2021	1.02 ± 0.09	1.02
S2	15/03/2018–30/03/2018	0.57 ± 0.35	0.57	S2	08/01/2021–13/01/2021	1.14 ± 0.08	1.14
S2	30/03/2018–09/04/2018	0.48 ± 0.35	0.48	S2	13/01/2021–18/01/2021	1.01 ± 0.45	1.01
S2	09/04/2018–14/05/2018	0.31 ± 0.04	0.31	S2	18/01/2021–23/01/2021	0.77 ± 0.14	0.77
S2	14/05/2018–29/05/2018	0.53 ± 0.45	0.53	S2	23/01/2021–22/02/2021	0.06 ± 0.04	0.06
S2	29/05/2018–08/06/2018	0.57 ± 0.58	0.57	S2	22/02/2021–24/03/2021	0.13 ± 0.10	0.13
S2	08/06/2018–13/07/2018	0.48 ± 0.51	0.48	S2	24/03/2021–29/03/2021	1.40 ± 0.61	1.40
S2	13/07/2018–22/08/2018	0.11 ± 0.03	0.11	S2	29/03/2021–08/05/2021	0.09 ± 0.06	0.09
S2	22/08/2018–06/09/2018	0.66 ± 0.11	0.66				

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