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Supplemental Data for 'Evolution and Controls of Large Glacial Lakes in the Nepal Himalaya'

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Article

Evolution and controls of large glacial lakes in the Nepal Himalaya

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SUPPLEMENTARY FILE

Figure S1. A color composite of a time series of Landsat satellite images showing growth of Imja Lake from 1975-2016.

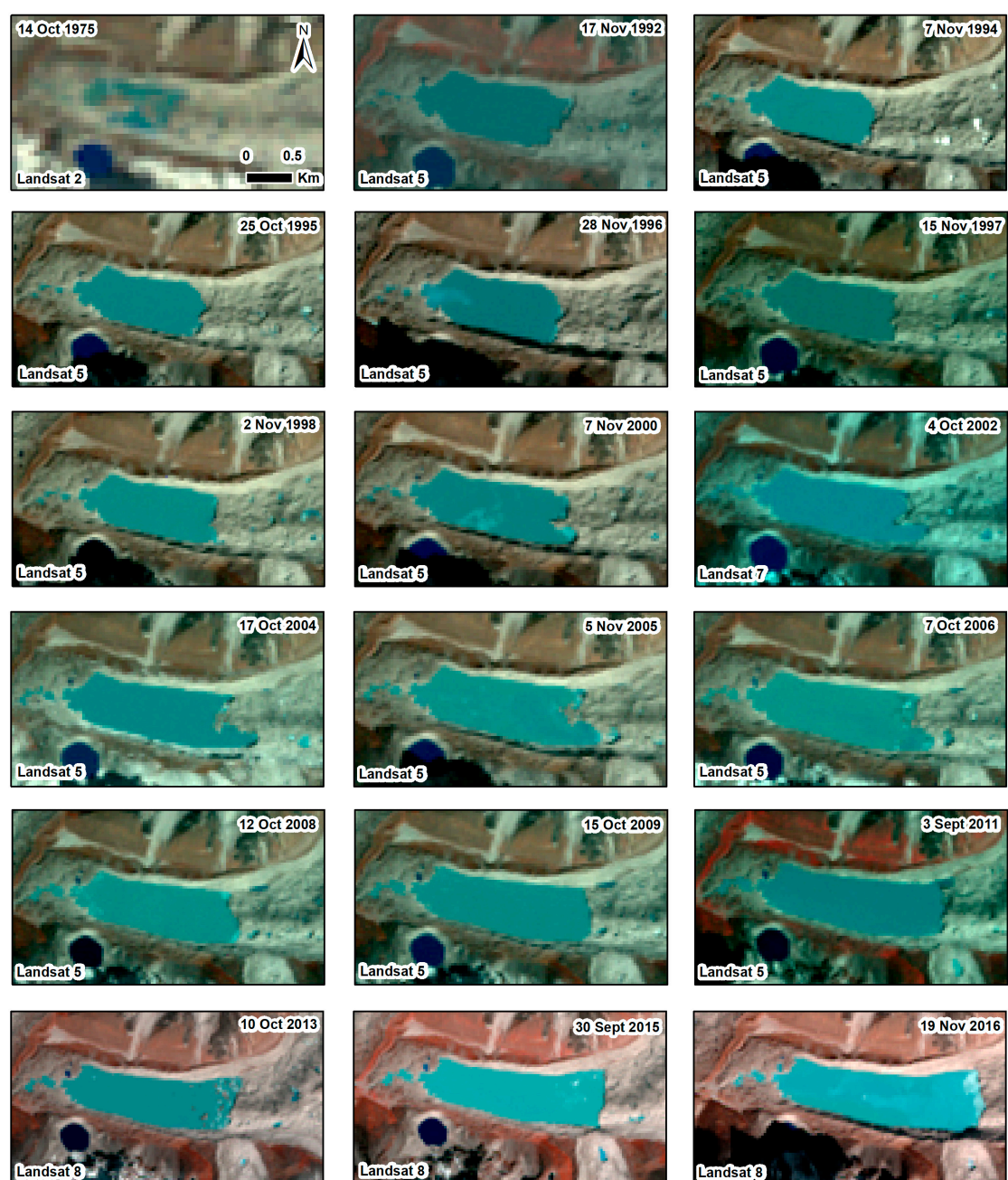


Figure S2. A color composite of a time series of Landsat satellite images showing growth of Lower Barun Lake from 1975-2016.

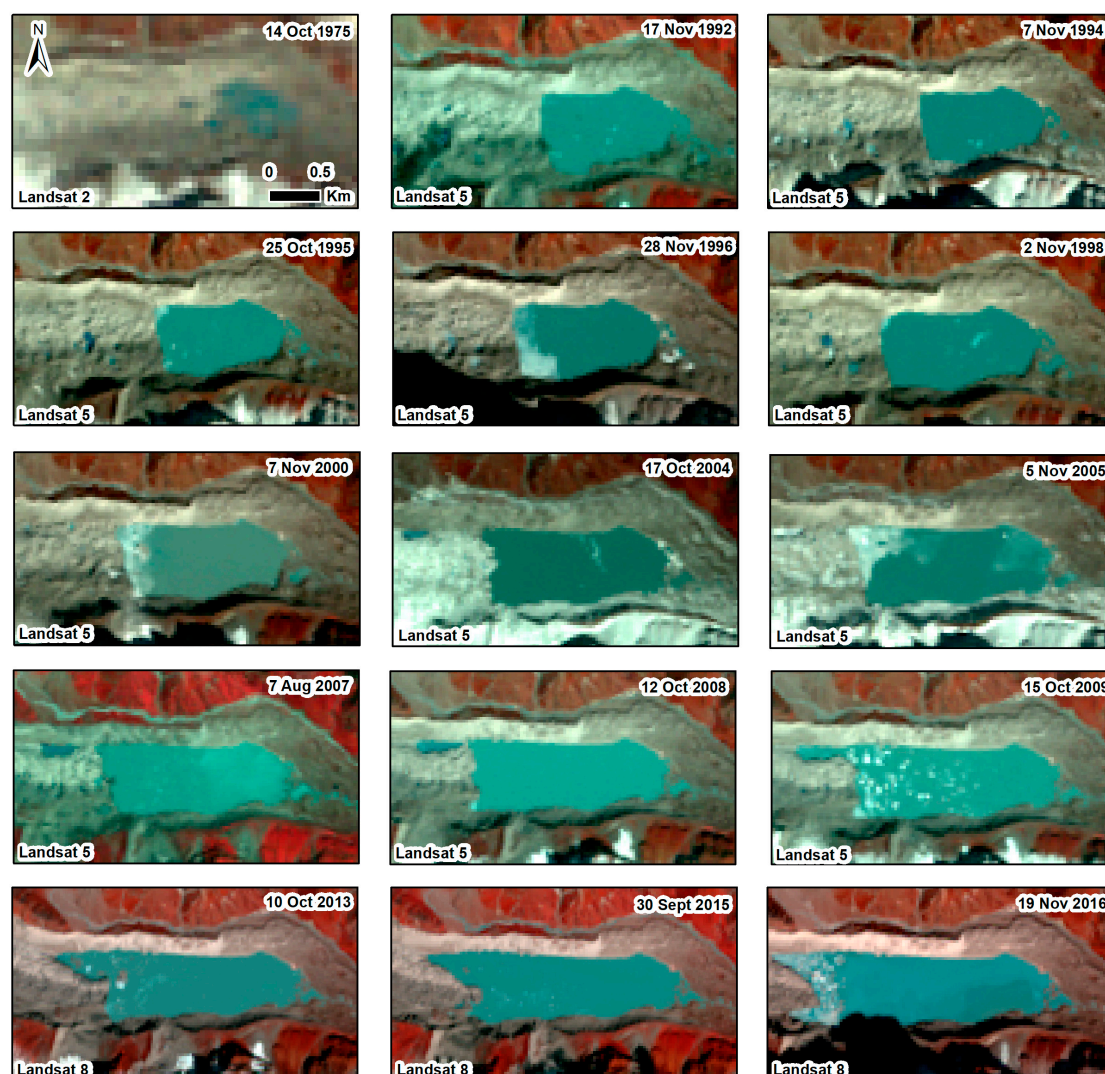


Figure S3. A color composite of a time series of Landsat satellite images showing growth of Thulagi Lake from 1973–2016.

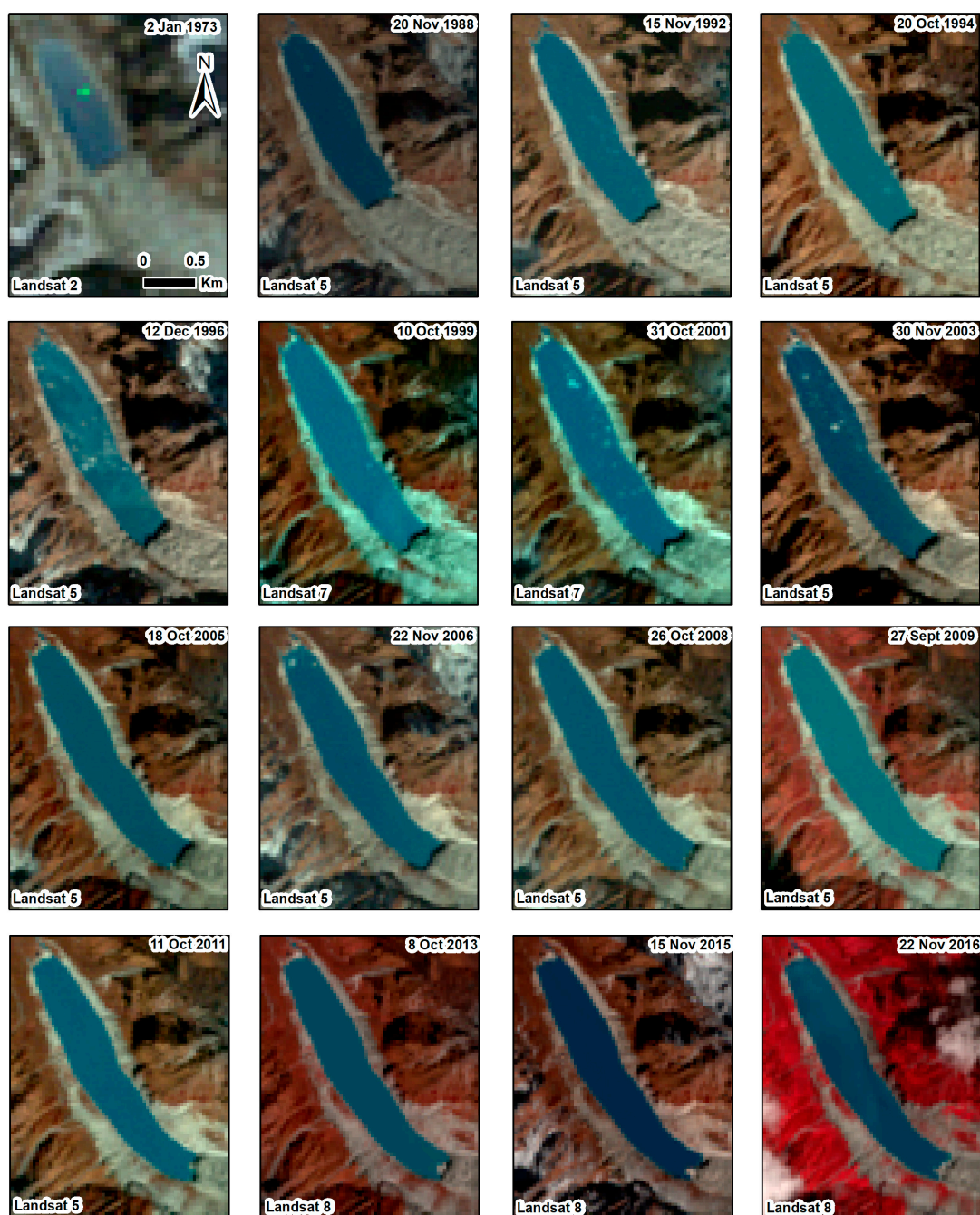


Figure S4. Centerline lake transect.

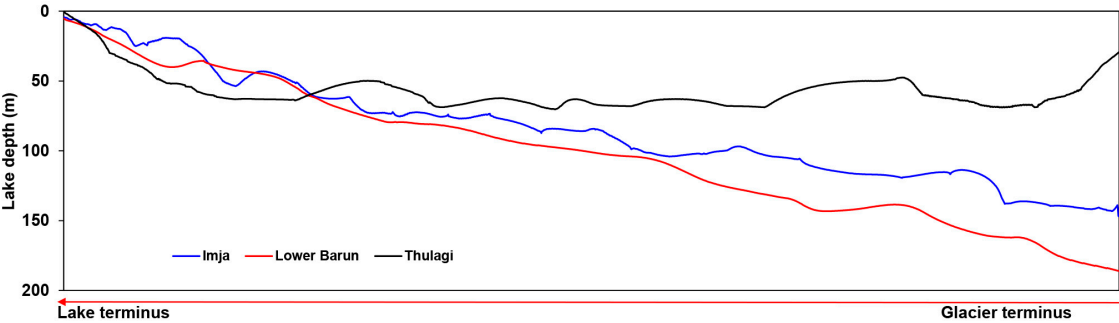


Figure S5. Icebergs in the Thulagi Lake. Photographs by J. Kargel, 30 October 2017.



Figure S6. (a,b) Field photographs showing vegetation on ice-cored end moraine. (c,d) Bird's eye view of Thulagi Lake where dark colored end moraine is reflecting some of the vegetation growth. Photographs by J. Kargel, 3 May 2013.



Figure S7. Upper Barun Lake and possible flood route in case of an outburst.

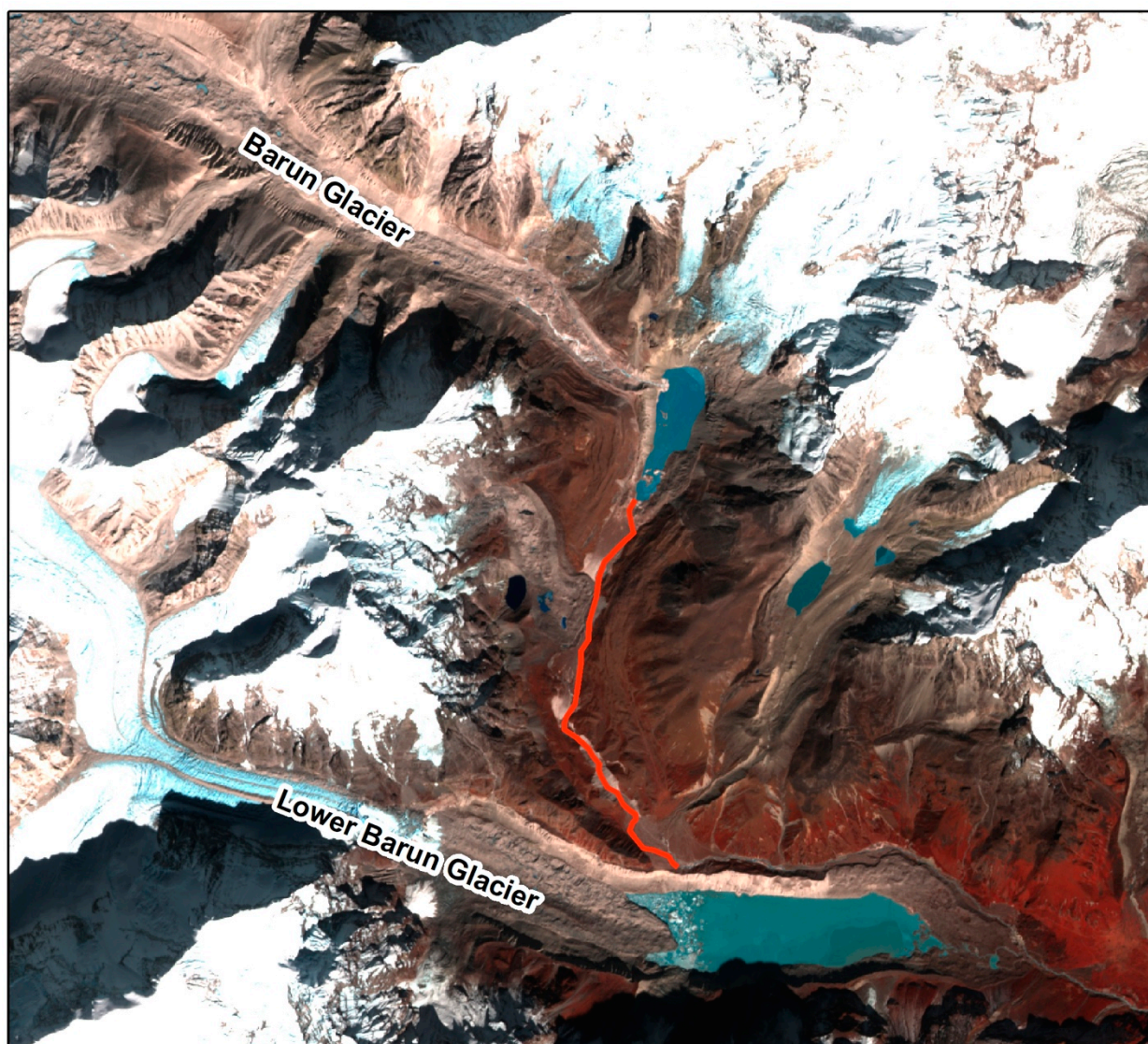


Figure S8. Imja Lake lowering project (a–d) and part of a warning siren network (e).



Table S1. List of Landsat satellite imageries used in this study.

Date of acquisition	Satellite	Scene	Applications
2 Jan 1973	Landsat 1	LM11520401973002AAA04	Lake
2 Nov 1975	Landsat 2	LM21510411975306AAA05	Lake
1 Dec 1976	Landsat 2	LM21500411976336AAA03	Lake
3 Dec 1976	Landsat 2	LM21520401976338AAA05	Lake
6 Jan 1977	Landsat 2	LM21500411977006AAA03	Lake
15 Jan 1979	Landsat 2	LM21510411979015AAA02	Lake
6 Dec 1987	Landsat 5	LT51400411987340BKT00	Lake
23 Jan 1988	Landsat 5	LT51400411988023BKT00	Lake
3 Oct 1988	Landsat 5	LT51420401988277BKT01	Lake
7 Nov 1989	Landsat 5	LT51420401989311BKT00	Lake
9 Nov 1989	Landsat 5	LT51400411989313BKT00	Lake
12 Jan 1990	Landsat 5	LT51400411990012BKT00	Lake
7 May 1991	Landsat 5	LT51400411991127ISP00	Lake
12 Oct 1991	Landsat 5	LT51420401991285ISP01	Lake
15 Nov 1991	Landsat 5	LT51400411991319ISP00	Lake
15 Nov 1992	Landsat 5	LT51420401992320ISP00	Lake
17 Nov 1992	Landsat 5	LT51400411992322ISP00	Lake
17 Oct 1993	Landsat 5	LT51420401993290ISP01	Lake
4 Nov 1993	Landsat 5	LT51400411993308ISP00	Lake
20 Oct 1994	Landsat 5	LT51420401994293ISP00	Lake
7 Nov 1994	Landsat 5	LT51400411994311ISP00	Lake
25 Oct 1995	Landsat 5	LT51400411995298ISP00	Lake
8 Nov 1995	Landsat 5	LT5142020401995312ISP00	Lake
12 Nov 1996	Landsat 5	LT51400411996317ISP00	Lake
12 Dec 1996	Landsat 5	LT51420401996347ISP00	Lake
31 Jan 1997	Landsat 5	LT51400411997031ISP00	Lake
2 Nov 1998	Landsat 5	LT51400411998306BKT00	Lake
10 Oct 1999	Landsat 7	LE71420401999283SGS00	Lake
26 Sept 2000	Landsat 7	LE71420402000270SGS00	Lake
29 Sept 2001	Landsat 7	LE71420402001272AGS00	Lake
17 Oct 2001	Landsat 7	LE71400412001290SGS00	Lake
20 Dec 2001	Landsat 7	LE71400412001354SGS00	Lake
5 Nov 2002	Landsat 7	LE71400412002309SGS00	Lake
5 Dec 2002	Landsat 7	LE71420402002339SGS00	Lake
21 Oct 2003	Landsat 7	LE71420402003294SGS01	Lake
8 Nov 2003	Landsat 7	LE71400412003312ASN01	Lake
17 Oct 2004	Landsat 5	LT51400412004291BKT00	Velocity
10 Nov 2004	Landsat 7	LE71400412004315PFS00	Lake

16 Nov 2004	Landsat 5	LT51420402004321BKT00	Lake
12 Oct 2005	Landsat 7	LE71400412005285PFS00	Lake
18 Oct 2005	Landsat 5	LT51420402005291BKT00	Lake, Velocity
5 Nov 2005	Landsat 5	LT51400412005309BKT01	Velocity
16 Nov 2006	Landsat 7	LE71400412006320PFS00	Lake
22 Nov 2006	Landsat 5	LT51420402006326BKT01	Lake, Velocity
17 Nov 2007	Landsat 7	LE71420402007321PFS00	Lake
19 Nov 2007	Landsat 7	LE71400412007323PFS00	Lake
10 Oct 2008	Landsat 5	LT51420402008284BKT00	Lake
20 Oct 2008	Landsat 7	LE71400412008294PFS03	Lake
13 Nov 2008	Landsat 7	LT51400412008318BKT00	Lake
15 Oct 2009	Landsat 5	LT51400412009288KHC00	Lake
29 Oct 2009	Landsat 5	LT51420402009302BKT00	Lake
3 Dec 2010	Landsat 5	LT51420402010337KHC00	Lake
13 Dec 2010	Landsat 7	LE71400412010347PFS00	Lake
19 Oct 2011	Landsat 5	LT51420402011292KHC00	Lake
30 Nov 2011	Landsat 7	LE71400412011334EDC00	Lake
29 Oct 2012	Landsat 7	LE71420402012303PFS00	Lake
31 Oct 2012	Landsat 7	LE71400412012305PFS00	Lake
8 Oct 2013	Landsat 8	LC81420402013281LGN00	Velocity
24 Oct 2013	Landsat 8	LC81420402013297LGN01	Lake
13 Dec 2013	Landsat 8	LC81400412013347LGN00	Lake
12 Nov 2014	Landsat 8	LC81420402014316LGN00	Velocity
14 Nov 2014	Landsat 8	LC81400412014318LGN00	Lake
30 Sept 2015	Landsat 8	LC81400412015273LGN00	Velocity
1 Nov 2015	Landsat 8	LC81400412015305LGN00	Lake
9 Apr 2016	Landsat 8	LC08_L1TP_140041_20160409_20170326	Lake
12 June 2016	Landsat 8	LC81400412016164LGN00	Lake
19 Nov 2016	Landsat 8	LC81400412016324LGN01	Velocity
12 April 2017	Landsat 8	LC08_L1TP_140041_20170412_20170501	Lake



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