remote sensing

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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.

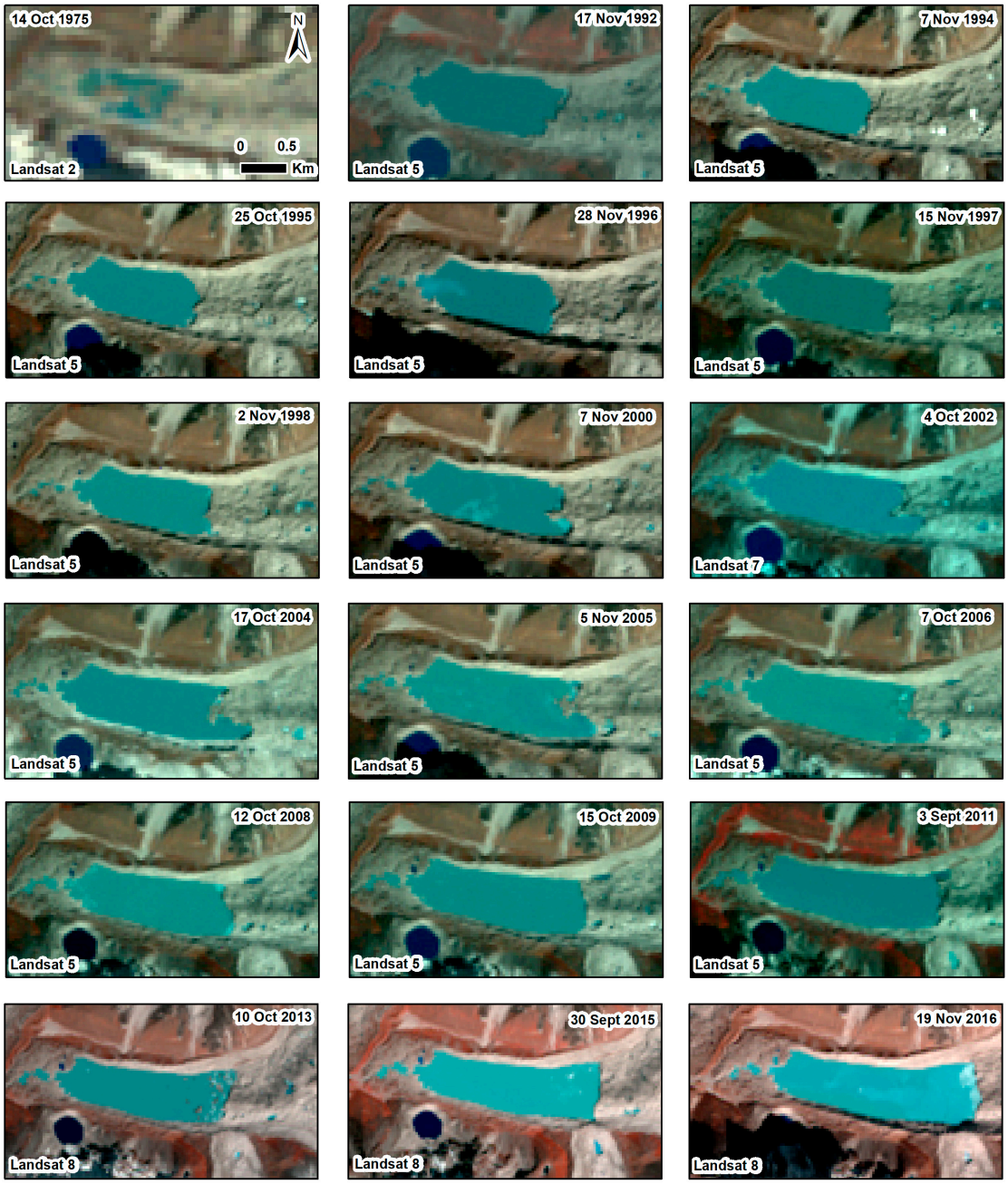

Figure S2. A color composite of a time series of Landsat satellite images showing growth of Lower Barun Lake from 1975-2016.

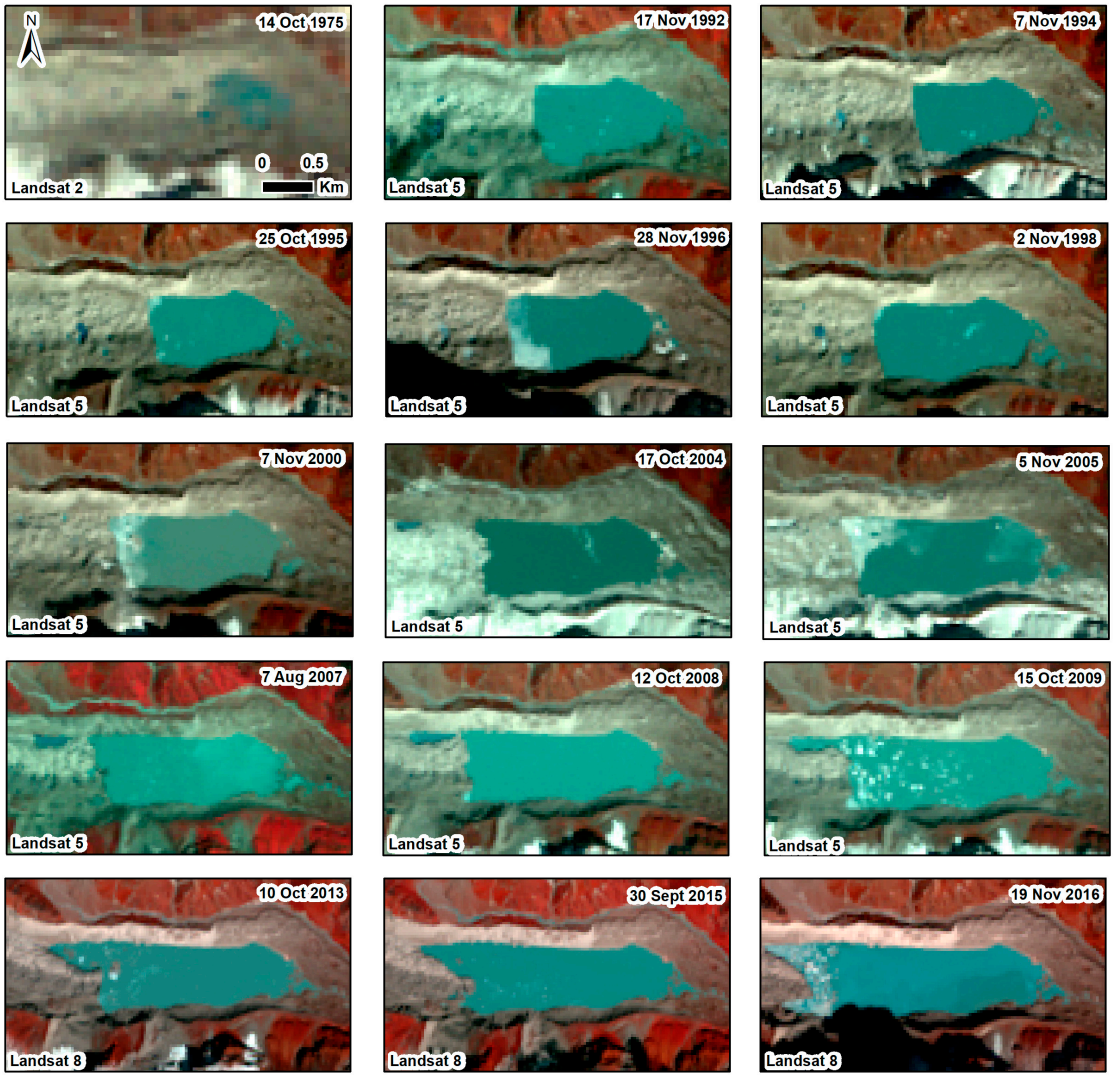

Figure S3. A color composite of a time series of Landsat satellite images showing growth of Thulagi Lake from 1973-2016.

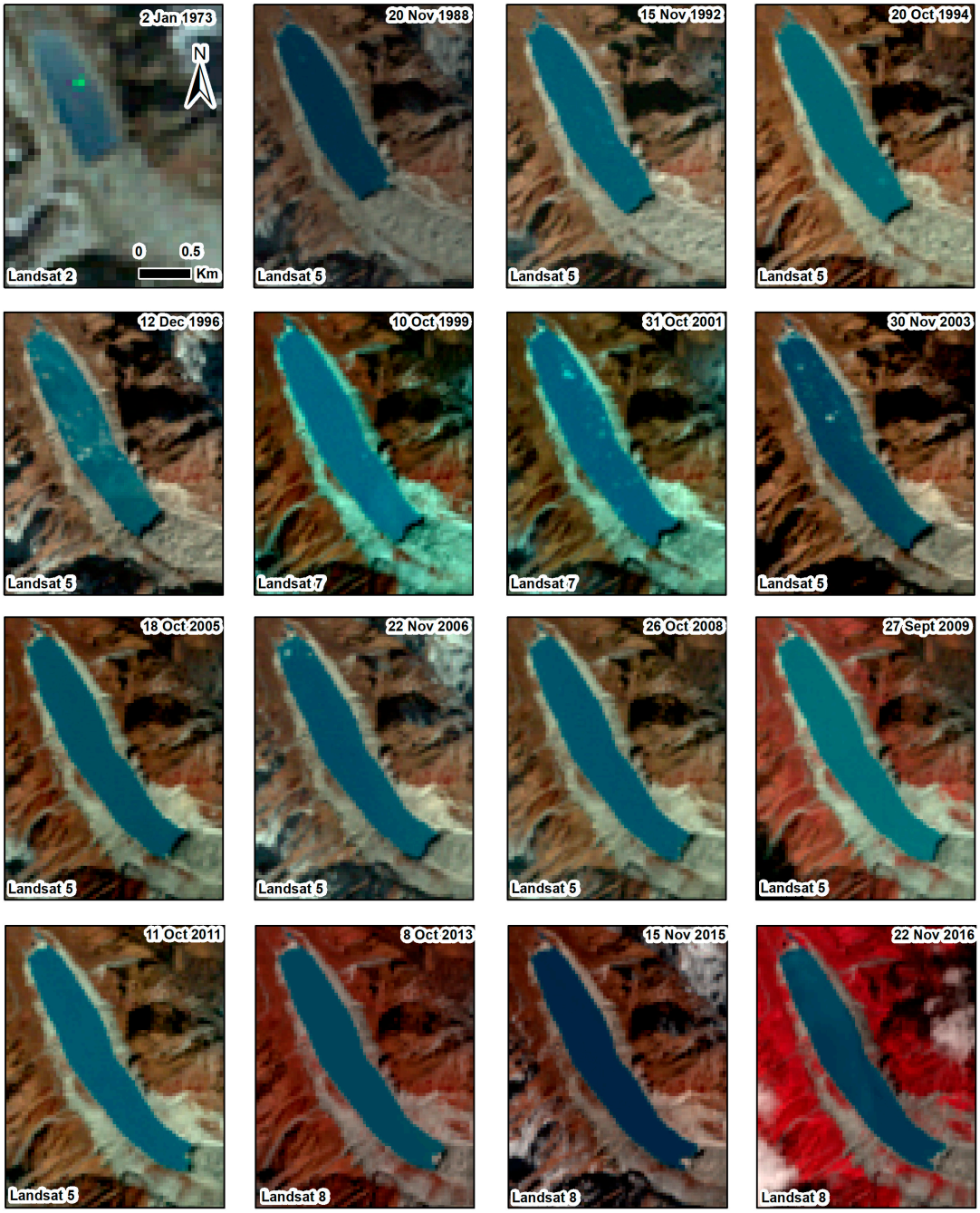

Figure S4. Centerline lake transect.

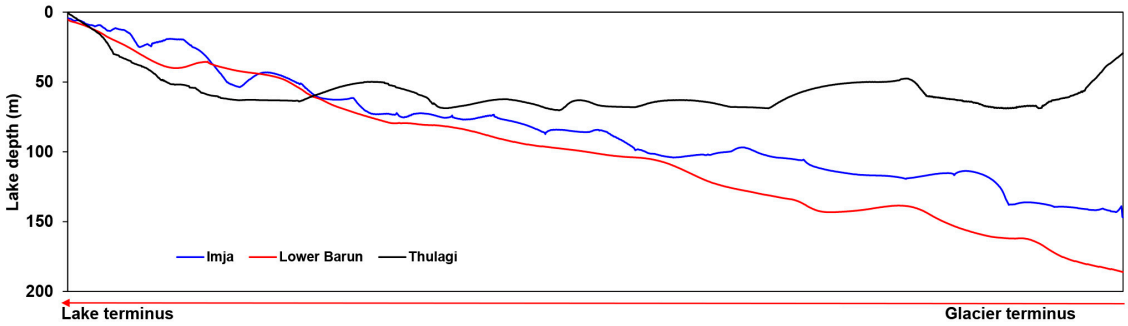

Figure S5. Icebergs in the Thulagi Lake. Photographs by J. Kargel, 30 October 2017.

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.

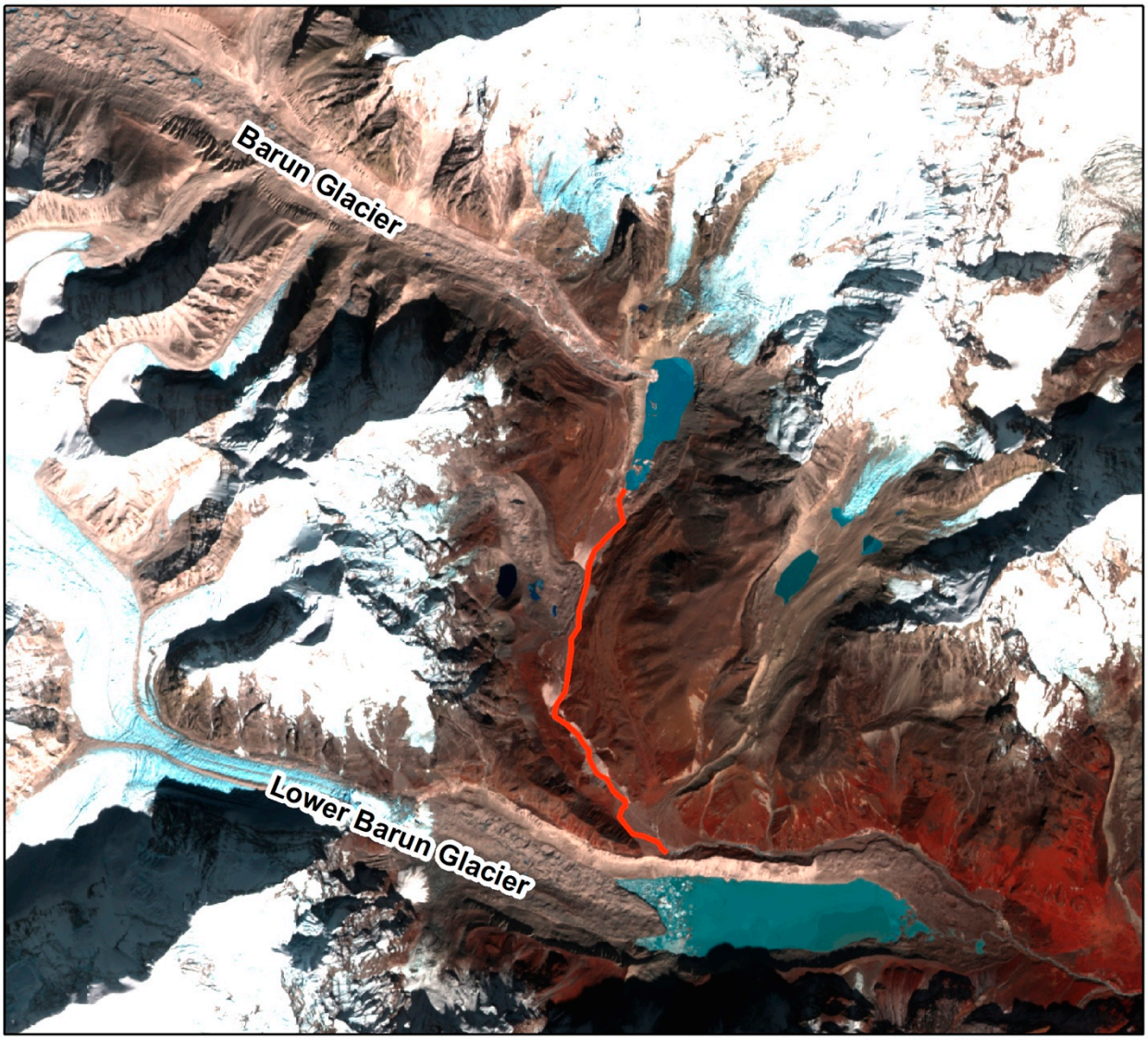

Figure S8. Imja Lake lowering project (**a–d**) and part of a warning siren network (**e**).

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