

*Supplementary Material*

**Of “Rapid Glacier Shrinkage and Glacial Lake Expansion of a  
China-Nepal Transboundary Catchment in the Central Himalaya,  
between 1964 and 2020”**

**Contents of this file**

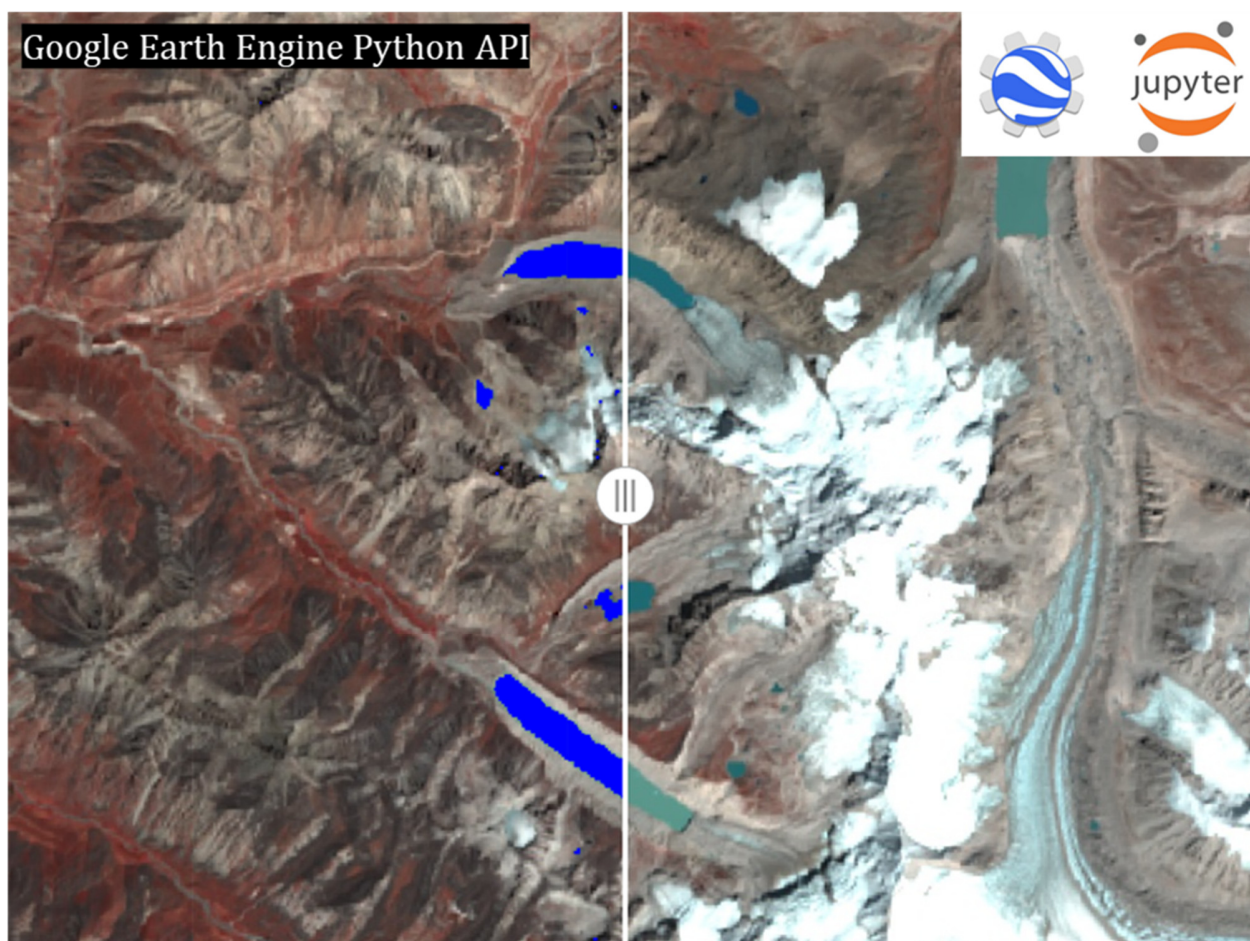
Table S1

Figures S1 to S3

**Table S1.** Data used for this study.

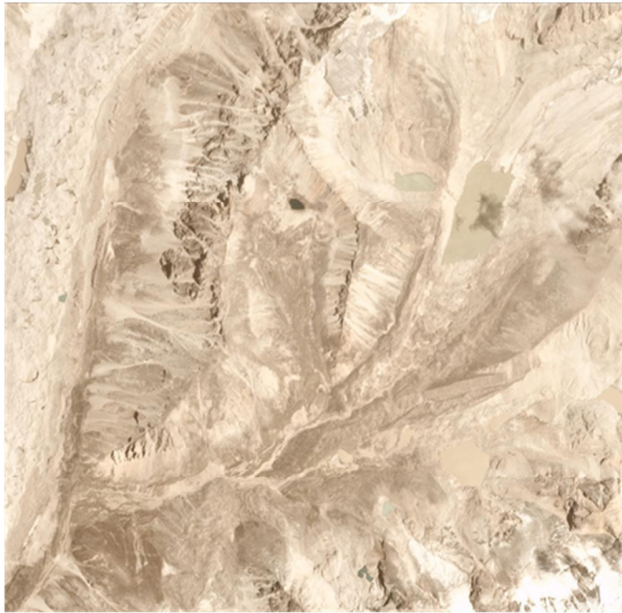
Year	Data source	ID	Date yyyy-mm-dd	Resolution (m)	Purpose
1964	KH-4A	DS1014-2118DA190	1964-11-26	~2.7	Lake area, Glacier area
1964	KH-4A	DS1014-2118DA191	1964-11-26	~2.7	Lake area, Glacier area
1964	KH-4A	DS1014-2118DA192	1964-11-26	~2.7	Lake area, Glacier area
1964	KH-4A	DS1014-2118DA193	1964-11-26	~2.7	Lake area, Glacier area
1972	KH-4A	DS1116-1023DA068	1972-04-21	~2.7	Lake area, Glacier area
1980	KH-9	DZB1216-500449L002001	1980-10-01	6-9	Lake area, Glacier area
1987	Landsat TM	LT051404119871206	1987-12-06	30	Lake area
1988	Landsat TM	LT0514004019880903	1988-09-03	30	Lake area
1989	Landsat TM	LT0514004119891109	1989-11-09	30	Lake area
1991	Landsat TM	LT0514004119911115	1991-11-15	30	Lake area
1992	Landsat TM	LT0514004119921101	1992-11-01	30	Lake area
1993	Landsat TM	LT0514004119931003	1993-10-03	30	Lake area
1994	Landsat TM	LT0514004119941022	1994-10-22	30	Lake area
1995	Landsat TM	LT0514004119951025	1995-10-25	30	Lake area
1996	Landsat TM	LT0514004119961011	1996-10-11	30	Lake area
1997	Landsat TM	LT0514004119971014	1997-10-14	30	Lake area
1998	Landsat TM	LT0514004119980915	1998-09-15	30	Lake area
1999	Landsat TM	LT0514004119991121	1999-11-21	30	Lake area
2000	Landsat TM	LT0514004120001006	2000-10-06	30	Lake area, Glacier area
2001	Landsat TM	LT0514004120011009	2001-10-09	30	Lake area
2002	Landsat ETM+	LE0714004120021004	2002-10-04	30	Lake area
2003	Landsat TM	LT0514004120031218	2003-12-18	30	Lake area
2004	Landsat TM	LT0514004120041017	2004-10-17	30	Lake area
2005	Landsat TM	LT0514004120051105	2005-11-05	30	Lake area
2006	Landsat TM	LT0514004120060905	2006-09-05	30	Lake area
2007	Landsat TM	LT0514004120070807	2007-08-07	30	Lake area
2008	Landsat TM	LT0514004120081012	2008-10-12	30	Lake area
2009	Landsat TM	LT0514004120090913	2009-09-13	30	Lake area
2010	Landsat ETM+	LE0714004120101026	2010-10-26	30	Lake area, Glacier area
2010	Landsat ETM+	LE0714004120101111	2010-11-11	30	Lake area
2011	Landsat ETM+	LE0714004120111114	2011-11-14	30	Lake area
2011	Landsat ETM+	LE0714004120111130	2011-11-30	30	Lake area
2012	Landsat ETM+	LE0714004120121031	2012-10-31	30	Lake area
2012	Landsat ETM+	LE0714004120121116	2012-11-16	30	Lake area
2013	Landsat OLI	LC0814004120131111	2013-11-11	30	Lake area
2014	Landsat OLI	LC0814004120140927	2014-09-27	30	Lake area
2015	Landsat OLI	LC0814004120150930	2015-09-30	30	Lake area
2016	Landsat OLI	LC0814004120161018	2016-10-18	30	Lake area
2017	Landsat OLI	LC0814004120171106	2017-11-06	30	Lake area

2018	Landsat OLI	LC0814004120181024	2018-10-24	30	Lake area, Glacier area
2019	Landsat OLI	LC0814004120191011	2019-10-11	30	Lake area
2020	Landsat OLI	LC0814004120201013	2020-10-13	30	Lake area, Glacier area
2020	Planet Scope	-	2020-09-29	3.125	Warp KH images
2020	Planet Scope	-	2020-10-05	3.125	Warp KH images
2020	Planet Scope	-	2020-10-09	3.125	Warp KH images
2020	Planet Scope	-	2020-10-11	3.125	Warp KH images
1990	(Wang et al., 2020)	-	-	-	Lake area
2018	(Wang et al., 2020)	-	-	-	Lake area
1999-2003	(Dehecq et al., 2019)	PKH_WRS2_B8_1999_2003_snr5_n1_r170_res12	-	120	Glacier surface velocity
2013-2015	(Dehecq et al., 2019)	PKH_WRS2_B8_2013_2015_snr5_n1_r170_res12	-	120	Glacier surface velocity
1975-2000	(Maurer et al., 2019)	-	-	30	Glacier surface elevation
2000-2016	(Maurer et al., 2019)	-	-	30	Glacier surface elevation
2000	SRTM DEM	N27E086	-	30	Glacier surface elevation
2000	SRTM DEM	N28E086	-	30	Glacier surface elevation
2007	ALOS PALSAR	AP_07609_FBD_F0540_RT1	-	12.5	Glacier surface elevation
2007	ALOS PALSAR	AP_07609_FBD_F0550_RT1	-	12.5	Glacier surface elevation
2007	ALOS PALSAR	AP_07857_FBD_F0540_RT1	-	12.5	Glacier surface elevation
1979-2019	ERA5	-	-	0.25 arc degrees	Meteorological
2000	LandScan 2000	-	-	1 km	Population distribution
2018	LandScan 2018	-	-	1 km	Population distribution

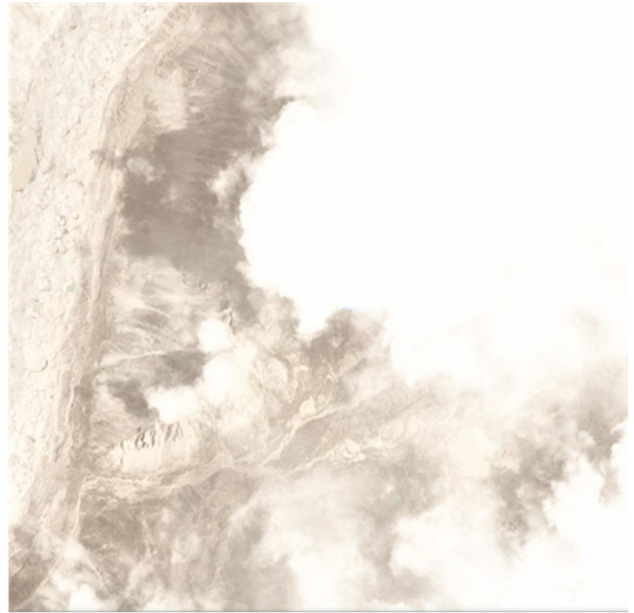


**Figure S1.** An example of extracting the rapid expansion glacial lakes on Landsat images using Google Earth Engine Python API.

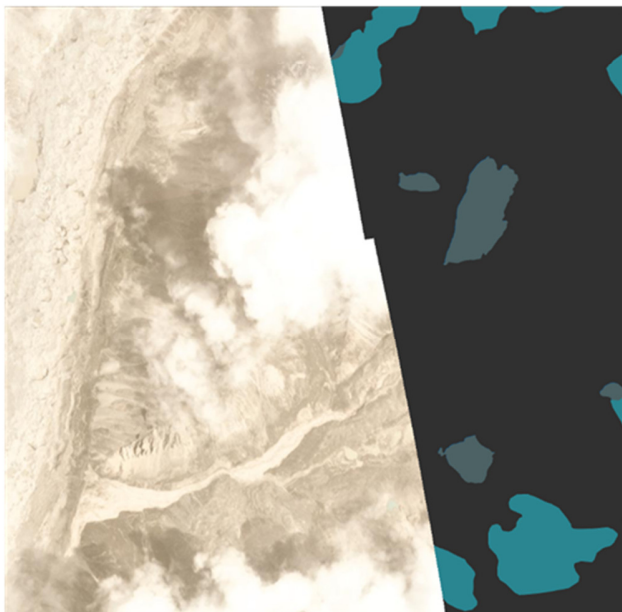
**20180706**



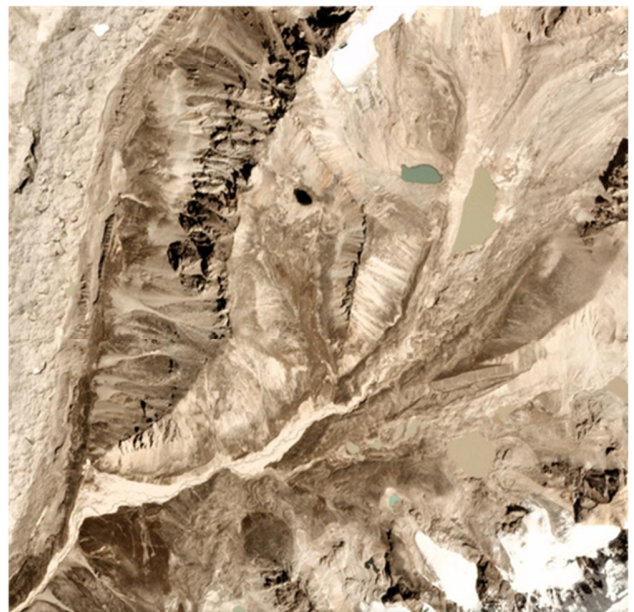
**20180728**



**20180810**



**20180918**



**Figure S2.** Identified Lake A GLOF event by PlanetScope imagery.



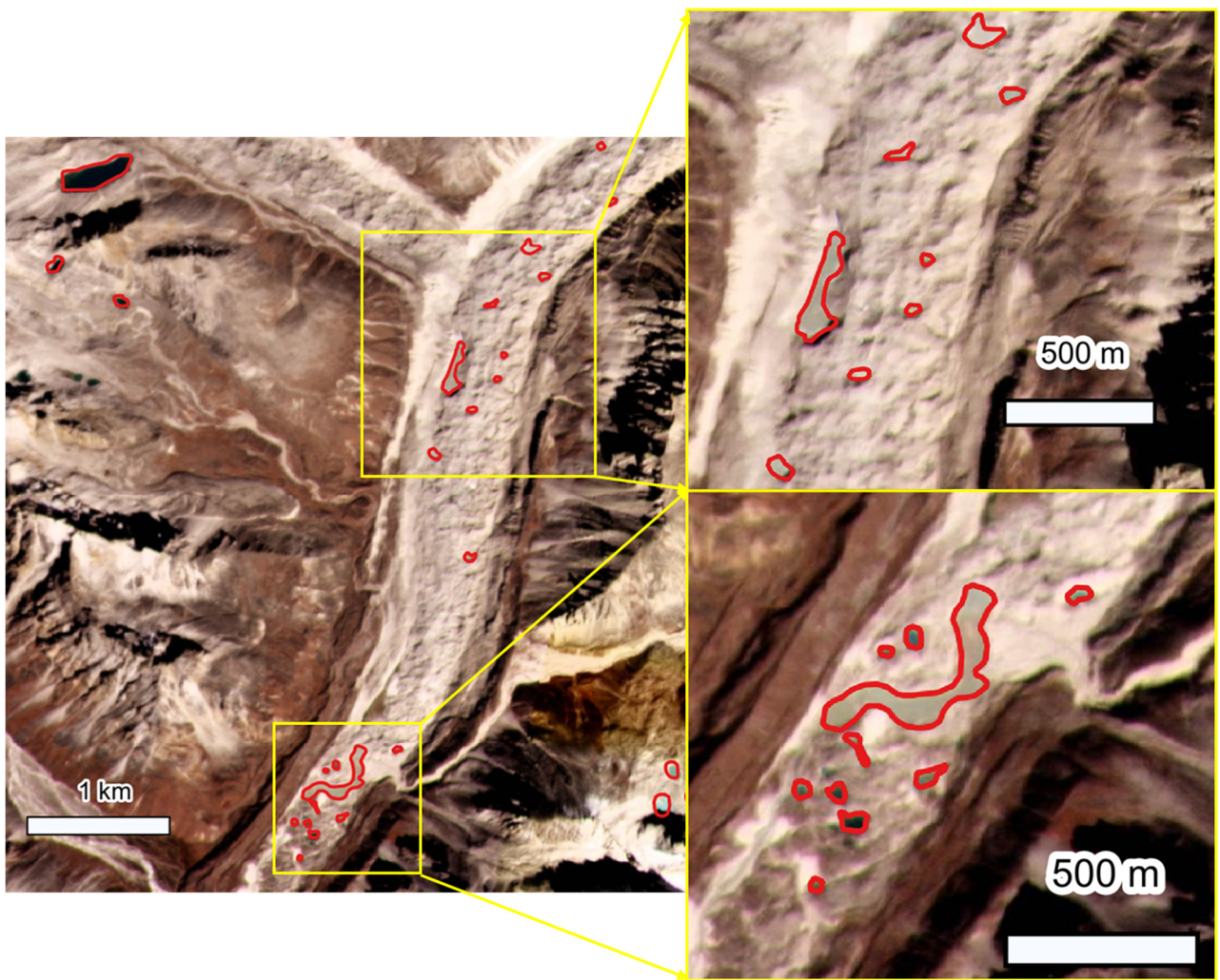


Figure S3. Supraglacial lakes and ice cliffs on Glacier M base on PlanetScope image.